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NASKAH PEMELIHARAAN
PERPUSTAKAAN NEGARA MALAYSIA

MALAYSIAN HIGHER EDUCATION — *A Concise Guide*

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We thank the educational institutions, government agencies, professional societies, trade associations and business firms who had shared invaluable information with us. Our deepest appreciation also goes to our advertisers for their vote of confidence in this new publication.

Thank you all for your support in making the **Malaysian Higher Education — A Concise Guide** a reality.

Lindy

School of Fashion & Textile

LINDY SCHOOL OF FASHION & TEXTILE was founded in 1988 by Miss Lindy Oon Siew Keow, who is highly qualified in Art & Design. Miss Lindy graduated from St-Martin School of Art & Design from London College of Fashion, and then went on to specialise in Embroidery Design at Birmingham Polytechnic (England) where she received her B.A. Honour. Miss Lindy, along with a team of professional and trained lecturers, give the students the skills and practical experience required for a challenging and rewarding career in fashion.

LINDY SCHOOL OF FASHION & TEXTILE offers professional courses for Diploma and Certificate level.

Five programmes are offered at the school:

DIPLOMA

• **FASHION — WOMEN WEAR OR CHILDREN WEAR**
Constant change is the challenge of the world of fashion, but the rewards are great for those who can recognise the opportunities. If you have business experience or proven commercial skills and want to enter the potential "minefield"

of fashion, then this course is for you. This diploma is usually completed in 18 months.

• CREATIVE / FASHION EMBROIDERY

This course places a strong emphasis on embroidery as Fine Art, and on the growing importance of this aspect on the subject for teaching and the development of Artist Craftsmen. Study cover all aspects of hand and machine embroidery as it's related to Fashion and Interior design. The diploma is usually completed in one year.

CERTIFICATE

• PATTERN DRAFTING AND GARMENT MAKING

Two programmes are offered for the certificate. You may choose between the Children Wear wear certificate or the Women Wear Certificate. Both programmes provide students with professional skills and practical knowledge required for a successful career in the fashion field. The certificate is usually completed in one year.

• FRENCH BEADING

The art of couture beading is highly desirable skill for the designer as surface decoration. The course is being held as a response to demand as the technique continues to make an

important impact on evening wear, bridal wear and couture design. The certificate is usually completed in 6 months.



LINDY SCHOOL OF FASHION & TEXTILE has four intakes a year. This allows students to commence their studies throughout the year at a term convenient to them and ensure that the graduates enter the work force at a separate time and maximise employment prospects.

Syllabus are well studied & reviewed to respond to the real world and needs of today's industry. The programmes also involve industry projects to ensure that the student gain real-life experience and have the chance to make important business contact.

If you need more information, please call us at:

Lindy School of Fashion & Textile

No. 11A-1, SS 2/67

47300 Petaling Jaya

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Preface

Malaysia today is on the threshold of many exciting developments in the field of education to meet the needs of the twenty-first century. Multimedia facilities in schools, smart schools, common campuses for national and national type schools ... the list goes on. The government's call to make the nation a regional centre of excellence for higher learning has also added impetus to the attempts to meet the challenges of higher education. More than ever before, students have an impressive choice of studies, of careers to aim for, of places to go to.

Malaysian Higher Education — A Concise Guide is a book that has arrived at the right time, at the right place and for the right purpose. It is for all of you out there struggling to find your way through the maze of bewildering options available. This guide will help to start you off on the right footing. It will help you chart your career pathway and fulfil your goals.

Who should read this Guide?

School leavers who are seeking to further their education will find this guide useful in providing not only course information but also essential information on educational institutions.

Working adults who are interested in enhancing their work skills or obtaining more qualifications will be able to get information on postgraduate courses and the demands of the job market in relation to the courses that they will be pursuing.

Parents will find this guide a tremendous help in planning their children's education locally or abroad.

Counsellors who need to advise students on opportunities in education and career will find this guide an invaluable tool.

Educationists will be able to use the up-to-date information here to plan for future developments.

Information on courses

If you don't know what courses are available that match your interests and aptitude, this book will help you find the answers to all your questions. The Guide offers an in-depth and comprehensive write-up of over 200 professions, which includes job functions, education and training requirements and career prospects. Its encyclopaedic approach and the practical categorisation, comparative tables, charts and an uncluttered layout make for easy reading.

Information on institutions

This book provides a listing of more than 150 reputable schools, colleges and other institutions of higher learning in Malaysia. It also outlines the courses that they provide to prepare students for careers in the public and private sectors.

Other information

Also available is a comprehensive list of sources students could turn to for financial aid and a checklist of the qualifications Malaysia recognises.

The information in this book is based on data obtained from business firms, trade associations, professional societies, educational institutions and government agencies. Although the contents were carefully compiled, we advise readers to confirm the accuracy of any details of interest with the institutions concerned or with the authorities in the Ministry of Education.

We wish you all a rewarding career.

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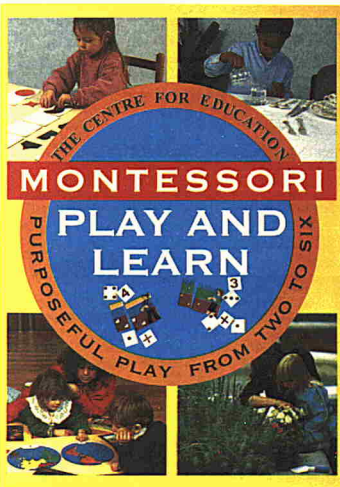
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An extensive listing of qualifications awarded by local and foreign institutions of higher learning recognised by the public sector in Malaysia

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Public Sector
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SPECIALISTS IN EARLY CHILDHOOD CARE AND EDUCATION

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كوليج الاسلامي سلطان زين العابدين Kolej agama sultan zainal abidin

THE SULTAN ZAINAL ABIDIN ISLAMIC COLLEGE



The Sultan Zainal Abidin Islamic College (KUSZA) was established in January 1980, and is the first centre for Islamic higher learning in Terengganu. More than 2,000 students have graduated from KUSZA since its inception.

The Sultan Zainal Abidin Islamic College Enactment No. 3 Year 1981 has enabled KUSZA to implement programmes in Islamic studies and other fields related to it.

DIPLOMA PROGRAMMES OFFERED

- | | |
|----------------------------------|--|
| ✓ International trade | ✓ Law |
| ✓ Marketing | ✓ Nursing |
| ✓ Finance | ✓ Information Technology |
| ✓ Accountancy | ✓ Islamic Studies (Syariah) |
| ✓ Personnel Management | ✓ Islamic Studies (Usuluddin) |
| ✓ Banking Studies | ✓ Islamic Studies (Language & Arabic Literature) |
| ✓ Insurance Studies | ✓ Islamic Studies (Dakwah) |
| ✓ Industrial Technology | ✓ Islamic Studies (Al-Quran & Al Sunnah) |
| ✓ Arabic Language with Education | |

CERTIFICATE PROGRAMMES OFFERED

- | | |
|-------------------------------------|---|
| ✓ Computer Analysis | ✓ English Language |
| ✓ Islamic Studies | ✓ English for Specific Purposes |
| ✓ Falak Syarie (Astronomy) | ✓ Test of English as a Foreign Language (TOEFL) |
| ✓ Intensive English and Mathematics | ✓ Intensive Arabic and Intensive Language |
| ✓ Arabic Language | |

ADMISSION REQUIREMENTS FOR DIPLOMA AND CERTIFICATE PROGRAMMES
Must at least be 17 years old, with *Sijil Pelajaran Malaysia (SPM)* or
General Certificate of Education (GCE 'O' Level) qualification.

LANGUAGES OF INSTRUCTION

The languages of instruction at KUSZA are Bahasa Malaysia, Arabic and English.

KUSZA's Philosophy:

"To create a righteous Muslim generation through knowledge, faith and virtuosity."

"To create a righteous Muslim generation through knowledge, faith and virtuosity."

FACILITIES AT KUSZA INCLUDES:

✓ Hostels

Presently, there are 16 hostels that can accommodate about 2,000 students. All students are required to stay in throughout their period of studies at KUSZA. Besides accommodation, the hostels also provide breakfast, lunch and dinner.

✓ Medical Care

All students are given medical care and treatment as provided for by the Ministry of Health. Transport to medical centres (hospitals and clinics) are provided. Students requiring intensive care treatment are placed in Class 2 Wards paid by KUSZA.



✓ Counselling

The aims of this service are to help students with their personal, emotional, social and educational problems, their choice of careers, financial aids and etc. The service is handled by 3 trained and experienced counsellors.

✓ Sports and Recreation

KUSZA provides various sports and recreational facilities for students such as football fields, tennis courts, sepak takraw courts, and a gymnasium with indoor sports facilities (including badminton, volleyball, squash and table tennis).

✓ Cafeteria

A cafeteria for students and staff which can accommodate 100 seats at a time is located at the Administrative building. The cafeteria also offers catering services for students. 3 more cafeterias are planned to be built in the near future for students' convenience.

✓ Computer Laboratory

A computer laboratory is provided for students to study and acquire knowledge in information technology.

✓ Language Laboratory

Students are able to use the language laboratories for effective learning of the Arabic and English languages.



✓ Nursing Laboratory

This laboratory is especially designed for the Diploma in Nursing Science students to conduct their practical training.

✓ Industrial Technology Workshop

This complex is used by the Diploma in Industrial Technology students for their practical training. The complex consists of the Electronic, Welding, Machine, and Casting workshops. It also consists of the Computer Aided Design (CAD) and the Computer Aided Manufacturing (CAM) laboratories.

✓ Theatre/Audio Visual Room

To cohere with the latest teaching-learning techniques, these rooms provide facilities such as videos, televisions and overhead projectors (OHP) for students and lecturers to utilise.



Further Information:

Sultan Zainal Abidin Islamic College (KUSZA),

Gong Badak,

21300 Kuala Terengganu,

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(Ref: Admission Unit)

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- Production Management
- Warehouse Management
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- Supervision
- Storekeeping
- Personnel Management
- Travel Management
- Retail Management
- Business Skills

COMPUTER PROGRAMMING

- BASIC Programming
- Personal Computer Specialist
- Programming in C

TECHNICAL

- Air-Train Staff
- Home Management Design
- Baking
- Baking Contractor

- F & G Basic Mechanical Engineering
- Refrigeration and Air Conditioning
- Surveying and Estimating
- Civil Engineering
- General Mechanical Engineering
- Hydraulics and Pneumatics
- Electrical Installation
- Stereo Engineering Technology
- Unathi Courses

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- Bookbinding Publishing
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- F & G Basic Engineering
- TV Valve and H.F. Servicing
- Electrical Engineering

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- Handwriting Analysis
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- Resinworking - Pattern Casting
- Stone Work - Engraving
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CHAPTER 1

CAREER GUIDANCE

Choosing a career is one of the most important decisions you will ever make in your life – and usually not the easiest! Your choice determines your future – how much you will earn to support yourself, where you may work, and your lifestyle. You need to give yourself the best possible chance of a secure and fulfilling future and that can be achieved if you select a career that is in line with your interest and aptitude and that challenges your mind.

PLAN AHEAD

You can begin planning from as early as Form Four so that you have enough time to consider all the options carefully; once you have left school, you will find the time-frame for practical things like submitting forms and meeting deadlines very short indeed.

If you have passed your SPM, you have a choice between attending Form Six classes and attending a Diploma or Matriculation course at a local institution.

Should you choose to continue your studies at a private institution, check several of the best value for money, regardless of distance.

If you are planning to study abroad, you will

Options after SPM

For successful candidates:

- study for the STPM,
- do a diploma course,
- join a local university for a matriculation course (only for Bumiputeras),
- enrol for a certificate or diploma course at a government institute or private college,
- do a pre-university course e.g. A-levels, Canadian Grade 13, etc.,
- study abroad,
- seek employment.

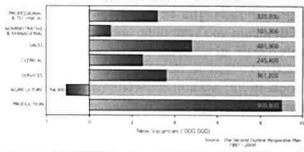
For unsuccessful candidates:

- re-sit the SPM,
- enrol at a government institute or private institution for a vocational course such as hair dressing, printing and welding,
- seek employment.

need to apply at least a year in advance. Allocate sufficient time for applications, letters of acceptance, enquiries, accommodation and travel arrangements. The more time you give yourself, the greater the opportunity for weighing options.

If you have not passed your SPM/SPVM and are not keen to re-sit, all is not lost. There are courses that will equip you with skills for an enormous range of jobs, such as art and design, beauty care and hairdressing, computer programming, hotel and catering and insurance. No matter which job you choose, some sort of skills training will serve you in good stead both now and in the future.

JOB PROSPECTS ESTIMATES FOR
THE PERIOD OF 1991-2000



CHOOSE YOUR CAREER

In setting your career goals and planning the right steps to achieve it, you need to think long-term and the decisions you make need to be informed ones. You have to consider the job market, the demands of the job you choose, the qualifications you will need, and where you should study.

Know the job

In these days of specialisation, most of us have only vague notions of other people's jobs. Some of us even have romanticised notions about certain jobs and these can lead to disappointment. Nursing, for example, is viewed as an exciting job, with nurses required to be soft-hearted and caring. Few realise that nurses must be able to keep a cool head in a crisis and need to have a great deal of stamina.

What you have to do is to read everything you can get your hands on regarding the job you are considering. Talk to those in the industry. Consult family and friends. Even arrange to spend some time with people in their workplace.

When choosing the type of training you require for a particular career, consider also the following factors:

- your eligibility for admission into a course,
- your ability to pay for the course and the kind of financial aid you can obtain, if necessary,
- whether the course is recognised by the Government or the relevant local professional body,
- the academic standard and reputation of the institution offering the course.

Study the career pathway

This is especially important if your aim is to enter a profession like accountancy or engineering. One avenue is to pass STPM and go on to a local university to get a degree. Being a degree-holder gives you a wider variety of first job opportunities. You can apply for membership of a professional institution later. The alternative is to skip STPM, which means you save time, and go straight for a professional qualification at a private college. Which of these is best for you, only you can decide. If you are still uncertain about what you want to be, choose the STPM/university route for this gives you the opportunity to defer your decision until later.

Know yourself

You can't, as the saying goes, fit a square peg into a round hole. Neither would you aim to be a visualiser if you were colour blind! Choosing a career, you must recognise, is less about having a dream and more about having an objective. To achieve that objective, you have to be realistic about yourself, your skills, your capabilities, your capacity for

self-discipline and motivation, your preferences and at the same time you must not sacrifice your values.

It is important to be as objective and as honest as possible when assessing the type of person you are. Perhaps the obvious place to begin this self-assessment is with the subjects you have been studying at school, both the ones you do well in and the non-examination ones which you simply enjoy.

Once you have done that, consider the activities you would prefer to be involved in at a workplace. Do you like dealing with details? Do you enjoy keeping records of things? Do you have a special affinity with small children or old people? You may be someone who is very independent and self-disciplined and who prefers to work by yourself or you may be the type of person who does not want to sit at a desk all day. Do you need to be working with people around you or are you happiest with machines? How do you feel about shift work, about doing the same thing every day, or about supervising other people?

Ask yourself what you need for peace of mind and self-fulfilment. For example, how important is security or prestige to you? How important is it for you to lead rather than being led? Do you prefer creativity to analysis?

These are all important questions that will guide you towards making the right choice.

THE PROFESSIONAL JOB MARKET

In the industrial sector, in areas such as administration and management, building and construction, economics and finance, engineering, and marketing and sales, job opportunities are available especially for those with both technical and professional training. Those most likely to be employed are engineers, managers, scientists and technicians.

It is, of course, important not to read too much into economic forecasts, employment trends and statistics, or jump to pessimistic conclusions. If you feel, for example, that forestry management is what you truly want to do, don't be put off by information that the primary sector industries (agriculture, forestry, mining) are less active than they used to be. People move on and people retire. Organisations change. There are still jobs to be had and one of them could be just right for you.

CHAPTER 2

THE MALAYSIAN HIGHER EDUCATION SYSTEM

Education in Malaysia is under the umbrella of the Ministry of Education. The government has endeavoured to provide education for every Malaysian child from the age of 6. Hence, public education is either free or heavily subsidised.

PUBLIC EDUCATION

The structure of the Malaysian education system

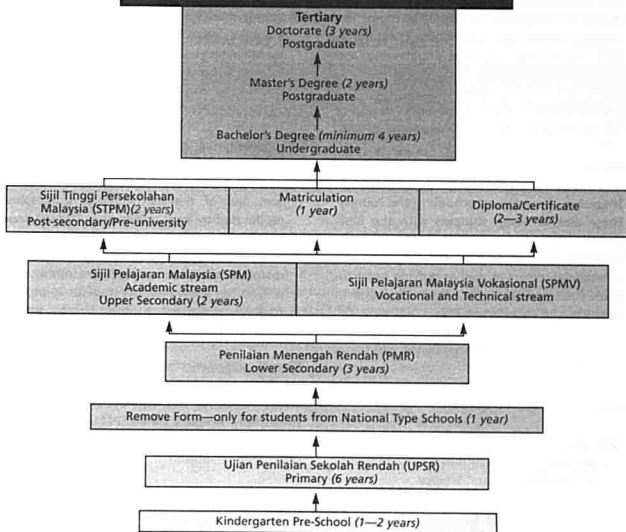
can be summed up in the following diagram:

Since this book caters mainly for students who have completed at least their lower secondary education, we shall focus on education from the upper secondary level onwards.

Upper Secondary Education

Based on their PMR results, students are placed in one of the following streams:

OVERVIEW OF THE NATIONAL EDUCATION SYSTEM



(1) Academic

The academic stream offers education in science and the arts. Students are placed in normal secondary schools, residential schools, science schools and MARA Junior Science colleges. At the end of the two years of upper secondary education, students sit for the Sijil Pelajaran Malaysia (SPM) which is equivalent to the GCE 'O' levels. Those who are successful can then proceed to post-secondary education, while the others could join private educational institutions or look for jobs.

Entry Requirements for Academic Stream (Science and Arts)

Those eligible are Malaysians who have successfully completed their PMR.

(2) Technical

Malaysia currently has 9 technical schools and these provide interested students with fundamental education in science and technology as well as opportunities for them to pursue their studies at institutions of higher learning. The courses offered are Agriculture, Commerce, Civil Engineering, Electrical Engineering and Mechanical Engineering.

Students in the Technical and Vocational stream sit for the Sijil Pelajaran Malaysia Vokasional (SPMV).

(3) Vocational

There are 70 vocational schools in the country. These aim to equip students with the basic technical skills and knowledge they require to meet the labour needs of the industrial and commercial sectors as well as provide opportunities for them to further their education in technical and vocational fields.

Two types of courses are offered by the vocational schools:

(a) Vocational Education Course

Here, students study both vocational subjects and academic subjects such as Bahasa Malaysia, English, Mathematics and Science.

(b) Skills Training Course

This skills training course is of 2 years' duration. It culminates in the Peperiksaan Majlis Latihan Vokasional Kebangsaan (MLVK) Asas which students sit for at the end of the first year of studies and then the MLVK Pertengahan which they sit for at the end of the second year.

Entry Requirements for Technical and Vocational Schools

Those eligible are Malaysians from fully-assisted government schools who have successfully completed their PMR.

Post-secondary Education

Students who successfully sat for the SPM or SPMV and who wish to seek post-secondary education can select one of the three options below:

- (1) Prepare for the Sijil Tinggi Pelajaran Malaysia (STPM) which is equivalent to the GCE 'A' levels. There are three streams in the STPM, namely, Science, Arts and Technical. Administered by the Malaysian Examination Council which is accredited to the University of Cambridge Local Examination Syndicate (UCLES) in the United Kingdom, the STPM is the entry qualification for Malaysian universities and is also recognised by most overseas universities.

Entry Requirements

As a general rule, only those with a Grade One in the SPM or SPMV are eligible.

- (2) Join one of the matriculation programmes moderated by local universities. The syllabuses for these programmes are designed by the universities themselves and they set and maintain the standards. Furthermore, some universities allow diploma students to progress towards a degree or enter directly into an undergraduate degree programme.

Entry Requirements

Those eligible are Malaysians who have successfully completed their SPM with credits in at least Bahasa Malaysia, English, Mathematics and other Science subjects.

- (3) Enrol for certificate/diploma courses at Institut Teknologi MARA, polytechnics or other public training institutions. All offer a wide selection

of courses. Those at Institut Teknologi MARA are of 2-3 years' duration.

Entry Requirements

Those eligible are Malaysians who have successfully completed their SPM with credits in at least Bahasa Malaysia, English, Mathematics and other Science subjects.

Tertiary and Higher Education

There are three types of institutions of higher learning—universities, colleges and polytechnics.

(1) Universities

There are 9 universities in Malaysia and one of them, the International Islamic University (IIU) is an international university. A variety of undergraduate and postgraduate courses are available at these universities. Except for Universiti Teknologi Malaysia and the IIU, which process their own applications for student admission, all University admissions

come under the control of a co-ordinating body—Unit Pusat Universiti (UPU), an arm of the Ministry of Education.

Entry Requirements

An SPM Credit in Bahasa Malaysia + [2 STPM Grade E or (1 STPM Grade E and 2 STPM Grade R)] + a pass in General Paper.

Besides academic merit, selection criteria is also based on the choice of majors and availability of places.

SPM/SPMV holders who have at least a Grade 2 and 5 credits including those in Bahasa Malaysia and Mathematics can apply to Universiti Teknologi Malaysia for admission into selected degree programmes such as courses in:

- certain types of engineering,
- industrial science,
- land survey,
- property management,
- science and computer in education,
- technology management,

STUDENT ENROLMENT IN LOCAL PUBLIC INSTITUTIONS, 1990-2000

Level of Education	Enrolment						Increase (%)	
	1990	%	1995	%	2000	%	6MP	7MP
Teacher Education (Non-graduates)	21,750	0.5	35,410	0.7	32,000	0.6	62.8	-9.6
Certificate	10,130	0.2	17,080	0.3	21,290	0.4	68.6	24.6
Diploma	32,020	0.8	46,930	1.0	61,900	1.1	46.6	31.9
Degree	58,440	1.4	89,600	1.8	167,900	3.0	53.3	87.4

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Teacher Education

- The teacher education programme was aimed at producing trained teachers for the primary and secondary levels.
- From 1994, computer courses were made compulsory to all trainees in teacher training colleges.
- A total of 48,090 non-graduate teachers and 22,770 graduate teachers were trained during the Plan period.
- The additional graduate teachers will increase the proportion of graduate teachers teaching at the secondary level from 58 per cent in 1995 to about 73.5 per cent in the year 2000.
- A teacher training college in Bintulu, Sarawak, was established in 1994 to produce science and mathematics teachers for primary schools.

Tertiary Education

- Enrolment at the degree, diploma and certificate levels increased by 52.7 per cent from 1990 to 1995.
- Output from public institutions of higher learning saw more arts graduates than science and technical graduates.
- The intake into the first degree level courses also increased from about 11,000 in 1990 to 17,000 in 1995.

**OUTPUT FOR CERTIFICATE AND DIPLOMA COURSES
FROM LOCAL PUBLIC EDUCATIONAL INSTITUTIONS, 1990-2000**

Course	Output			
	6MP	%	7MP	%
DIPLOMA				
Arts	18,690	47	31,590	50
Arts & Humanities	3,770		5,900	
Business & Economics	14,920		25,690	
Science	7,060	18	7,040	11
Agriculture & Related Sciences	2,130		1,180	
Others	4,930		5,860	
Technical	14,120	35	25,000	39
Engineering	11,620		19,780	
Architecture & Town Planning	1,440		3,150	
Survey	750		1,480	
Others	310		590	
Total	39,870	100	63,630	100
CERTIFICATE				
Arts	7,760	26	8,470	21
Arts & Humanities	1,300		1,890	
Business & Economics	6,460		6,580	
Science	4,500	15	8,460	20
Pure Sciences	2,010		350	
Others	2,490		8,110	
Technical	17,520	59	23,990	59
Engineering	15,350		20,220	
Architecture & Town Planning	1,570		2830	
Survey	600		940	
Total	29,780	100	40,920	100

7th Malaysia Plan Report

**INTAKE AND OUTPUT OF SKILLED AND SEMI-SKILLED MANPOWER BY
COURSE FROM LOCAL PUBLIC TRAINING INSTITUTIONS, 1990-2000**

Course	Output	
	6MP	7MP
Agriculture	1,870	760
Building Trades	16,060	19,770
Commerce	15,440	13,500
Engineering Trades	92,250	114,970
Civil	1,150	1,180
Electrical	38,590	34,480
Mechanical	52,510	59,310
Printing Trades	320	11,960
Skill-upgrading	3,500	4,800
Others	16,230	34,250
Total	145,670	200,010

7th Malaysia Plan Report

(g) town and rural planning.
The duration of study for these students is 5 years.

SPM/SPMV holders can also apply to the universities for admission into diploma courses, for example:

- Universiti Sains Malaysia – *laboratory technology*
- Universiti Pertanian Malaysia – *agribusiness, agricultural engineering, computer science, fishery, forestry, human resource development and veterinary science*
- Universiti Teknologi Malaysia – *several types of engineering courses, land survey, town and rural planning, and valuation.*

The duration of these diploma courses is 3 years. In 1995, 18,918 students out of a total number of 89,670 students pursuing tertiary education were enrolled in the 9 local universities. Currently, there are about 60,000 Malaysians studying abroad.

To meet the ever-increasing demand for higher education, the government intends to establish more universities in the near future. It has also encouraged local universities to offer distance learning courses and reputable foreign universities to open branch campuses here.

(2) Colleges

There are 2 colleges sponsored by the government—Institut Teknologi MARA (ITM) which was set up in 1956 and Kolej Tunku Abdul Rahman (KTAR) which was established in 1966. ITM's main campus is in Shah Alam, Selangor and KTAR is in Kuala Lumpur. The 2 colleges offer a variety of professional and semi-professional courses in commerce, science and technology, and management and administration courses at certificate and diploma levels.

Entry Requirements

- TAR College – SPM with at least 4 credit passes including English and Mathematics.
– Diploma courses – STPM with at least 3 principal passes.
- ITM – SPM with at least 5 credit passes including English and Mathematics.

(3) Polytechnics

Malaysia currently has 7 polytechnics which

provide certificate and diploma courses in engineering and commerce at the technician and junior executive levels.

Entry Requirements

- Certificate – SPM Grade 3 with at least a credit in Mathematics and a pass in Bahasa Malaysia.
- Diploma – STPM Grade 1 and 2 with a credit in Mathematics and another core subject.

Government Agencies

Training programmes for specific skills and vocational trades are also provided by government agencies such as:

- (1) the Ministry of Agriculture,
- (2) the Ministry of Human Resources,
- (3) the Ministry of Land and Regional Development,
- (4) the Ministry of Rural and National Development,
- (5) the Ministry of Youth and Sports.

Teacher Education

Teacher education is organised at diploma level for graduate teachers and certificate level for non-graduate teachers.

(1) Teacher Training Colleges

There are 31 teacher training colleges in Malaysia. Intakes are twice yearly for primary school trainee teachers. The training period for primary and secondary school teachers is two and a half years divided into 5 semesters. The course for technical trade teachers is three years divided into 6 semesters. Trainees are required to do course work and practical training through attachment to schools. They are continually assessed and have also to sit for a final written examination.

To meet the demands for graduate teachers, teacher training colleges have arranged for twinning programmes with local and foreign universities, especially in the Teaching of English as a Second Language (TESL), the Sciences and Mathematics. Specialist teacher education is offered at specialist teacher training colleges. These conduct courses in education for the blind and deaf, art and craft, guidance and counselling, and music.

Entry Requirements

Varies yearly. Minimum SPM for a 3 year diploma. Diploma will also be awarded to university graduates after the completion of a one year student course.

(2) University Teacher Education

In line with the Ministry's policy to have graduate teachers teach in secondary schools, local universities are also offering degree programmes in education. Those who wish to teach in the upper and post-secondary school levels must hold a Bachelor's degree and a Postgraduate Diploma in Education or Certificate in Education. The curriculum for teacher training in universities is generally similar in scope and structure to that in teacher training colleges.

PRIVATE EDUCATION

Private education in Malaysia covers all levels – pre-school, primary, secondary and tertiary. It provides an important alternative to public education, particularly at tertiary level where places in the local universities are limited and the cost of studying abroad is often beyond the means of many families.

The benefits of private sector involvement in education are many. Among others, the increase in the number of private education institutions here has helped to reduce the outflow of foreign exchange with respect to pursuit of education abroad. The private sector also has the resources and expertise to help the government realise its vision of making Malaysia a regional educational centre of excellence. The above factors coupled with the conducive environment and relatively low cost of living here, would attract more foreign students to study in Malaysia, therefore making education another foreign exchange earner.

OVERVIEW OF PRIVATE HIGHER EDUCATION

POST SECONDARY EDUCATION

Postgraduate

Doctorate
Master's Degree

Undergraduate

Bachelor's Degree through:
• Twinning
• Credit Transfer
• Advanced Standing Programme
• External Studies

Professional Examination Bodies

Local

- CLP
- IBBM
- IEM
- MACPA
- Others

External

- AIA
- ACCA
- CIMA
- ABE
- CIM
- IAM
- ICSA
- BCS
- IDPMM
- EC
- AAT
- NCC
- LCCI
- PEI
- CGLI
- Others

Pre-University

BTEC
Foundation studies
GCE 'A' levels
HSC
SAM
STPM
TAFE
WATEE
Others

Local Diploma & Certificate

Fashion
Hotel & Catering
Public Relations
Others

Private Higher Education Institutions (PHEI)

PHEIs offer courses for students who have completed the SPM, SPMV, SMIII (three-year Senior Middle education offered by Chinese independent schools) or STPM. Students have a broad spectrum of courses to choose from.

(1) *Academic*

Academic courses include matriculation or pre-university programmes, university foundation programmes and bachelor degree courses. Degree courses normally feature PHEIs having links with tertiary institutions overseas.

(2) *Technical and Vocational*

Such courses provide training in fields such as engineering and information technology and qualify students for exemptions in some degree programmes.

(3) *Professional*

Professional courses will almost certainly feature ties with professional associations, statutory bodies or examination councils. These courses can, in some cases, lead indirectly to Bachelor's degrees or postgraduate programmes. The popular professional courses are Accountancy, Business Management, Computing and Engineering.

(4) *Others*

Other courses at certificate and diploma levels include Advertising, Art and Design, Hotel and Catering, and Secretarial Studies.

Undergraduate and Postgraduate Degree Levels

Under arrangement with institutions of higher learning and professional bodies in Malaysia and abroad, PHEIs conduct many courses leading to both Bachelor's and Postgraduate degrees. Students can pursue many disciplines such as Business and Finance, Computer Science, Engineering and Law.

The various routes leading to a Bachelor's degree which are available here in Malaysia are twinning programmes, credit transfer programmes, advanced standing programmes and external programmes, all involving arrangements between institutions. Joint programmes are also available for students who wish to pursue postgraduate degrees.

(1) *Twinning Programme*

First introduced in 1980, twinning programmes have become very popular among students. Most overseas-bound students are attending such programmes. Under this arrangement, a local PHEI works with one or a consortium of local/foreign universities. Part of the course offered is conducted locally and the remainder, overseas. Most twinning programmes are "2 + 1" or "2 + 2"-year arrangements. Students register with both the local PHEI and the foreign university it is linked to. Upon successful completion of their course, they are conferred degrees by the main foreign university.

(2) *Credit Transfer Programme*

In a credit transfer programme, students are allowed admission into American universities and certain British and Australian universities based on the credit hours earned at the local PHEI. The curriculum set by the local PHEI incorporates the requirements of that of the foreign university. The duration of study conducted at the local PHEI is limited to a maximum of 2 years. Students must obtain a 'C' Grade Average Point (GPA) of between 2 to 3 to qualify for transfer.

The programme is designed to offer students the widest choice of universities but unlike twinning programmes, where there is an exclusive arrangement between the local PHEI and the overseas university or consortium of universities, it does not guarantee admission to any overseas university. Admission rests solely with the foreign university.

Students who sat for the STPM can earn as much as 20—30 credits in the American degree programme. The list below indicates the transfer equivalents for the various subjects:

Subject	Transfer Equivalents
Accounting	ACCT 210
Bahasa Malaysia	Humanities and Fine Arts— 6 hours elective
Biology	Biology 203Q
Chemistry	Chemistry 201Q and Chemistry 112
Economics	Economics 201Q and Economics 202Q
General Paper	Humanities—3 CR hours, Social Sciences—3 CR hours
Geography	General Elective—6 CR hours
History	History 100G
Mathematics	Mathematics 242Q

(3) *Advanced Standing Programme*

This programme enables local PHEI students to pursue courses recognised by foreign universities as qualification for admission into their faculties. Students need either to complete the full course or just a part of it before going abroad. Their duration of study at the local PHEI, however, is limited to a maximum of 3 years. The local PHEI draws up the curriculum based on the requirements of the foreign degree programme or of professional bodies.

(4) *Validation and Accreditation*

Under this arrangement, the local PHEI conducts courses on behalf of an overseas institution. Examples of such courses are the BTEC National Diploma and Higher National Diploma. Strict quality control ensures that standards conform to those of the overseas institution and students are awarded the same recognition as their counterparts overseas.

(5) *External Programme*

External programmes are intended for those who register as external students with foreign universities. The local PHEI which provides the necessary tuition for these students observes a curriculum that has been drawn up to fulfil the examination requirements of the foreign universities. The examination is supervised solely by authorised bodies.

Distance learning is also considered an external programme in the sense that students do not have to be on campus. They study on their own with the aid of specially prepared texts, assignment materials and through mail and electronic services. Guidance from universities which offer distance learning is available.

Some local universities and colleges have already introduced distance learning courses, for instance, Universiti Sains Malaysia offers degrees in the Arts, Social Sciences and Science also through this mode of study. Students, however, are required to be on campus for the last part of their course.

(6) *Joint Programme*

For joint programmes, the courses offered are only at postgraduate level. Students register with the university (local or foreign) and the

local PHEI, both of which are jointly responsible for the entire academic programme. One requirement of the programme is that students have to study at the university. Upon their successful completion of the course, they are conferred a degree is conferred by the university concerned.

Professional and Semi-Professional Levels

Students who study for professional and semi-professional examinations are required to register as members of the professional body offering the examination. Besides full-time courses, some local PHEIs have part-time and distance learning options. For certain courses, students can even choose to study on their own.

Local Professional Examination Bodies

ACCOUNTANCY

(1) *Malaysian Association of Certified Public Accountants (MACPA)*

MACPA is the only professional accountancy body in Malaysia that conducts training and examinations. Students can choose from 3 training schemes:

- (a) Work under a training contract and at the same time do a correspondence course in preparation for the MACPA examinations.
- (b) Sign a training contract with an accounting or audit firm acceptable to MACPA and work under supervision.
- (c) Enrol at an institution acceptable to MACPA for a full-time course of study in order to prepare for the association's examinations.

Examinations are divided into 3 parts – Foundation Examination, Professional Examination I and Professional Examination II. Students must pass these examinations within a stipulated time frame and complete a period of practical training before they are eligible to be members of MACPA.

Graduates who hold Bachelor of Accounting degrees from Universiti Malaya/Universiti Kebangsaan Malaysia or the Advanced Diploma in Accounting from Institut Teknologi MARA may register with MACPA without having to sign a training contract. These students are exempted from having to sit for Professional Examination I. However, they must sit for Professional Examination II within 9 months of their graduation.

tion date in order to be practising public accountants. If they are unsuccessful, they will have to enrol in one of the 3 training schemes above.

(2) Malaysian Institute of Accountants (MIA)

In Malaysia, all practising accountants must be registered members of MIA. The Institute recognises qualifications from the following bodies:

- (a) The Australian Society of Certified Practising Accountants,
- (b) The Canada Institute of Chartered Accountants,
- (c) The Chartered Association of Certified Accountants (United Kingdom),
- (d) The Chartered Institute of Management Accountants (CIMA),
- (e) The Indian Institute of Chartered Accountants,
- (f) The Institute of Chartered Accountants in Australia,
- (g) The Institute of Chartered Accountants in England and Wales (ICAEW),
- (h) The Institute of Chartered Accountants in Ireland,
- (i) The Institute of Chartered Accountants of Scotland (ICAS),
- (j) The Malaysian Association of Certified Public Accountants (MACPA),
- (k) The New Zealand Society of Accountants.

It also recognises the following accountancy qualifications from the following local institutions:

- (a) Bachelor of Accounting, Universiti Malaya,
- (b) Bachelor of Accounting, Universiti Pertanian Malaysia,
- (c) Bachelor of Accounting, Universiti Utara Malaysia,
- (d) Advanced Diploma in Accounting, Institut Teknologi MARA,
- (e) Diploma in Accounting, Universiti Malaya.

BANKING

Institut Bank-Bank Malaysia (IBBM)

IBBM conducts courses to fulfil the manpower needs of the banking and financial industry. Students must be employees of financial institutions. On successful completion of a two-stage examination, they are

awarded a Diploma in Banking and Finance.

LAW

Bar Council

The Bar Council of Malaysia regulates the Certificate of Legal Practice (CLP) which was introduced to ensure the substantive and procedural laws of the country are understood. LLB degree holders with the exception of those from universities in Malaysia, Singapore, New Zealand and Australia must pass the CLP before they are allowed to practise law in Malaysia. Those who complete the CLP and those exempted from taking it must then work for 9 months under a Malaysian Bar member who has been practising law for a minimum of 7 years. After the 9 months, they are then called to the Bar.

ENGINEERING

Institute of Engineers Malaysia (IEM)

IEM conducts training and examinations for those who are unable to pursue a degree course in engineering. Students, however, must be employed in an engineering organisation which is registered with IEM to be eligible to sit for the IEM/BEM Part I and II Graduate Examinations. Successful candidates have to register with the Board of Engineers, Malaysia (BEM) before they can become practising engineers. After gaining relevant work experience, they can become Corporate Members of IEM and this qualifies them as Professional Engineers under BEM.

ARCHITECTURE

Pertubuhan Akitek-Akitek Malaysia (PAM)

Through its education arm, the Sekolah Juruteknik Akitek (SJA-PAM), PAM offers a Diploma in Drafting which is a part-time course of 4 years' duration.

External Professional Examination Bodies

ACCOUNTANCY

(1) Association of International Accountants (AIA)

AIA is a recognised international accounting body but its members cannot join MIA. The

course it provides consists of 3 levels – Foundation, Professional I and Professional II.

(2) Chartered Association of Certified Accountants (ACCA)

ACCA is the largest accountancy body recognised by statute in the UK. ACCA members who register with MIA are empowered to audit the accounts of public and limited companies in Malaysia.

(3) Chartered Institute of Management Accountants (CIMA)

CIMA is the only professional body in the UK which specialises in management accountancy. It focuses on the needs of industry and commerce in relation to accountancy.

BUSINESS MANAGEMENT

(1) Association of Business Executives (ABE)

ABE is a professional body which seeks to promote efficient administration and improve management practices in commerce, industry and the public sector. The ABE course consists of 4 parts – Certificate, Diploma Levels I and II, and Advanced Diploma. Students who complete the course may then enrol in MBA programmes.

(2) Chartered Institute of Marketing (CIM)

CIM is the recognised professional body for management in marketing. The course is divided into 3 parts – Parts I and II, constituting the Certificate in Marketing, and Part III, the Diploma in Marketing.

(3) Diploma in Management Studies (DMS)

DMS is a postgraduate diploma course awarded by the CNAA. It offers students the opportunity to study specialised management for areas such as shipping or human resource. DMS holders may be exempted from sitting for management exams set by other professional bodies.

(4) Institute of Administrative Management (IAM)

IAM is a UK organisation which promotes administrative management in the industrial and commercial sectors. The internationally

recognised IAM course is offered at Certificate and Diploma levels.

(5) Institute of Chartered Secretaries and Administrators (ICSA)

ICSA is the leading professional body for chartered secretaries and administrators. According to the Companies Act, a company secretary of a limited liability company must be a Chartered Secretary. The ICSA course consists of three stages – Foundation, Pre-Professional and Professional. Members earn their title of Associate (ACIS) and Fellow (FCIS) only after they have completed a period of relevant work experience.

COMPUTER

(1) British Computer Society (BCS)

BCS is an internationally recognised organisation. It conducts an examination which consists of 2 parts. Part I is equivalent to BTEC HNC and Part II, to an honours degree from a British university.

(2) Institute of Data Processing Management (IDPM)

IDPM is a single professional body in the UK which operates in the interest of data processing practitioners. IDPM members are usually computer programmers and systems analysts. The Institute offers an internationally recognised course with levels ranging from Foundation, Diploma, Higher Diploma to Graduate Diploma. IDPM diplomas are the most sought-after computer qualifications in the world.

ENGINEERING

Engineering Council of the United Kingdom (EC) EC conducts an internationally recognised professional examination leading to the award of a Chartered Engineer title after the candidate has acquired relevant and approved work experience. The examination is divided into Part I and II and successful candidates may use their results to gain admission into postgraduate courses of study.

Semi-Professional Courses

ACCOUNTANCY

Association of Accounting Technicians (AAT)

ENTRY REQUIREMENTS FOR COURSES OFFERED BY PROFESSIONAL EXAMINATION BODIES

COURSE/ EXAMINATION	STPM/A' LEVEL PASSES		SPM/O' LEVEL PASSES	EQUIVALENT QUALIFICATIONS
Accountancy				
AAT			4 (including Mathematics & Statistics)	
ACCA	2	+	3 (including English & Mathematics)	3 LCCI Higher
AIA	2	+	3 (including English & Mathematics)	Mature students with working experience
CIMA	2	+	3 (including English & Mathematics) 3 (including English & Mathematics)	2 LCCI Higher + Diploma in Accounting from approved institutions
MACPA *	2		Credits in English & Mathematics	
Architecture				
Diploma in Drafting			Credit in English	
Banking				
IBBM*			4 (including English or Bahasa Malaysia) or 4 + pass in English or Bahasa Malaysia	Minimum 6 years working experience
Business Management				
ABE	2		Eligible for Certificate only	LCCI Higher Diploma
CIM	1	+	4 (including English & Mathematics)	21 years and above + 3 years marketing experience
	5	+		1 year marketing experience
DMS (Post graduate)				Basic degree
IAM	1	+	4 (including English)	Mature students with 3 years working experience
ICSA	2	+	3 (including English) or 3 (including English)	+ 3 LCCI Higher At least 23 years old, recommended by employer or college principal
Commercial Skills				
LCCI				At least 16 years old, except for Level III
PEI			3 (including English) for Certificate	
RSA			3 (including English) for lower levels	
Computer				
BCS			4 (including English & Mathematics)	NCC Polytechnic Diploma + 1 year working experience
IDPM			4 (including English, Maths & Accounting) for foundation level	
NCC			4 (including English & Mathematics)	Aptitude test or recognised computer qualifications
Engineering				
EC	2	+	5	CGLI Full Technology Certificate
IEM*	2P+3R or 3P+1R			
Law				
CLP			Bahasa Malaysia	LLB from a recognised university
Technical and Vocational Skills				
CGLI				Reasonable degree of competency in English

* Local Professional Examination Bodies

AAT is sponsored by major British Chartered Accountancy bodies such as ACCA and CIMA which give exemptions to AAT members who wish to obtain professional qualifications. The Association awards a recognised technical qualification (equivalent to BTEC's HND standard) for support staff who work with qualified accountants. It also provides a certificate course in accounting for accounts clerks and bookkeepers, for which no entry qualifications are needed.

COMPUTER

National Computing Centre (NCC)

NCC promotes knowledge, skills and operating standards in computing. There are 2 levels in the NCC course, i.e. the Basic Diploma and the Higher Diploma.

COMMERCIAL SKILLS

(1) *London Chamber of Commerce and Industry (LCCI)*

LCCI is one of the most reputable and prestigious bodies worldwide which provide a system of qualifications in the commercial sector. Its certificates and diplomas are valued by both the public and private sectors. Its range of courses include business, language and secretarial studies. The courses are available at 3 levels, namely, Level I, Level II and Level III. LCCI also confers group diplomas such as the Diploma in Accounting, Diploma in Cost Accounting, Diploma in Economics and

Diploma in Management Accounting. In Malaysia, students who wish to sit for the LCCI examinations must register through the Malaysian Examination Syndicate of the Education Ministry.

(2) *Pitman Examination Institute (PEI)*

PEI is an international examining body that assesses office, secretarial and business training in many countries all over the world. The areas tested include clerical skills, information technology, foreign languages and English for Speakers of Other Languages (ESOL). These courses are suitable for school leavers, those wishing to further their education and even adults who are interested in developing or improving their skills.

(3) *Royal Society of Arts (RSA)*

RSA is a body that validates secretarial and business courses. Examinations for office management courses are at elementary, intermediate and advanced levels. It also assesses students sitting for advanced diploma courses.

TECHNICAL AND VOCATIONAL SKILLS

City and Guild of London Institute (CGLI)

CGLI is an independent, non-profit organisation which provides a range of examinations for vocational subjects such as dressmaking and hairdressing. The courses consist of Parts I and II, which are considered as craft-skill levels, and Part III, which is an advanced craft and technician level. The Institute confers certificates of achievement which are internationally recognised. In Malaysia, those who wish to take the CGLI examinations are required to register with an approved centre.

Pre-University Level

Students who pursue pre-university courses complete the entire duration of their study at the local PHEIs and they sit for examinations set by the various examination boards of both local and overseas institutions.

Some of the more popular pre-university courses are:

(1) *the GCE 'A' levels (UK)*

A wide range of academic subjects such as Accounting, Economics, and Law are offered. In Malaysia, the 'A' levels are administered by the University of Cambridge, University of Oxford, University of London and the Associated Examining Board (AEB), a professional examination body.

With two principal passes, a student can gain admission into universities in the United Kingdom. The 'A' levels are also widely accepted as the qualification for direct entry into universities in many other countries.

(2) *the Higher School Certificate New South Wales, Australia (HSC)*

The HSC is an Australian matriculation award recognised by universities in Australia and New Zealand, as well as major universities in the

PRE-UNIVERSITY

Course/Examination	Entry Requirements	Course Duration	Recognition
GCE 'A' levels (UK)	3 SPM credits	To source	UK and worldwide
HSC (Australia)	SPM/'O' levels or equivalent	1 year	Australia, NZ and worldwide
SAM (Australia)	5 SPM passes including Maths & Science + C5 in English / 5 'O' levels passes including credit in English/ 6 SMill passes including credit in English	1 year	Australia and worldwide
WATEE (Australia)	5 passes at SPM/'O' levels or equivalent	1 year	Australia and worldwide
Foundation studies	Maximum SPM aggregate score of 20 in five main subjects including English & Maths + minimum IELTS band 5 or TOEFL 500 for Science students/IELTS band 5.5 or TOEFL 525 for Arts students	1 – 1 1/2 years	Host university
ND, BTEC (UK)	4 SPM credits	2 years	UK
TAFE (Australia)	5 SPM credits	3 years	Australia

United Kingdom, Europe, the United States, Canada and Asia. Students are required to sit for both Arts and Science subjects.

(3) *the South Australian Matriculation Examination (SAM)*

Assessment of a student's performance is divided into two parts: project work, assignments and tests constitute 50% of the marks and the final examination takes up the remaining 50%. On successful completion of this programme, students qualify for entry not only into Australian universities but also into other universities worldwide.

(4) *the Western Australian Matriculation Tertiary Entrance Examination (WATEE)*

Students are required to sit for 6 subjects chosen from different lists of subjects. The assessment system assigns 50% for course work and the remaining 50% for the external examination. Successful candidates are eligible to enrol in any Australian university or in most universities in New Zealand, the United Kingdom, the United States and Canada.

(5) *Foundation Studies*

Full-time foundation studies are offered by approved PHEIs. Their courses are closely supervised by the foreign universities they are linked

to and thus students can qualify for direct admission into the first year of the degree programmes offered by the universities.

One such example is the Higher Introductory Technology and Engineering Conversion Course (HITECC). It is a diploma course tailored for 'A' level students in the science stream and mature students who do not have 'A' levels or equivalent qualifications. On completion of the foundation course, students join year 1 of the degree course.

(6) *the National Diplomas (ND) and Higher National Diplomas (HND) awarded by the Business and Technician Education Council (BTEC)*

BTEC awards diplomas which can serve as pre-requisites for entry into UK degree courses. Students can choose from a wide range of courses in agricultural science, banking, commerce, engineering and information technology, among others.

(7) *the Technical and Further Education (TAFE) programmes*

TAFE programmes form part of the Australian education system. They offer practical, job-orientated training. Among the fields of study offered are accounting and commerce, art and design, engineering and technology, management and marketing, and music. These range

from trade to professional levels and the awards issued are Certificates, Advanced Certificates, Associate Diplomas and Diplomas. TAFE qualifications enable graduates to apply for exemptions in some degree courses.

Local PHEI or Internal Diploma and Certificate Level

Many local PHEIs offer courses and skills training which are usually of a high standard. The PHEIs determine the curriculum, set their own examinations and award their own diplomas and certificates which could be validated by established higher educational institutions abroad. There is an extensive range of courses available, such as hotel and catering, and fashion.

Some local PHEIs also offer courses in English and other major languages. Many of the English courses prepare students for internationally recognised English examinations.

English Language Examination Bodies

(1) Test of English as a Foreign Language (TOEFL)

Students who wish to pursue further studies in foreign universities and colleges especially in North America, the United Kingdom and Australia must sit for TOEFL and obtain a minimum acceptable score which is usually 550. TOEFL is a multiple-choice test consisting of 3 sections: Listening Comprehension, Structure and Written Expression, and Reading and Comprehension.

(2) Test of Written English (TWE)

TWE must be taken together with TOEFL. It requires students to write an essay to demonstrate their writing skills. The score obtained is on a scale of 1 – 6.

(3) International English Language Testing System (IELTS)

IELTS is widely recognised by universities in the United Kingdom, Australia, New Zealand and other English-speaking countries. It consists of two general sub-tests – Listening and Speaking – and two specialised sub-tests – Reading and Writing. The latter two evaluate skills in areas linked to the subjects chosen by the students.

(4) Test of Spoken English (TSE)

TSE evaluates the oral proficiency of non-native speakers of English. Students are given a variety of questions on paper and on tape. They are required to state their answers orally and these are recorded on tape for evaluation.

The TSE programme offers two different categories. The first, TSE-A, is for those applying for undergraduate and graduate school studies, for teaching training courses and research assistant applicants. For them the test is part of the entrance requirements. The second, TSE-P, is for others, such as those who need certification in their profession.

Other Examination Bodies

(1) Scholastic Assessment Tests (SAT)

SAT scores are used by colleges and universities to assess whether students have the necessary skills to cope with their studies at tertiary level. Some institutions require applicants to sit for one or several of these tests as a prerequisite to admission or placement. SAT also serves as an instrument to compare academic achievements of students from different schools.

(2) Graduate Management Admission Test (GMAT)

GMAT is used by graduate schools of business to assess whether applicants are suitable candidates for advanced studies in business and management. Approximately 1,300 graduate management programmes worldwide and 850 business schools require applicants to sit for GMAT.

(4) Graduate Record Examination (GRE)

GRE consists of a General Test and Subject Test which cover 16 subject areas. The General Test assesses students' analytical, verbal and quantitative abilities. GRE tests are administered worldwide at various locations each year. They enable institutions to compare the qualifications of applicants from a variety of colleges and universities and to ascertain their differing standards. GRE scores form one of the several aspects considered by tertiary institutions in their selection of candidates for post graduate studies.

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 Cost Estimators or Quantity Surveyors
 Data Processing Managers
 Education Administrators
 Financial Managers
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 Marketing, Advertising and Public Relations Managers
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 Remisers
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 Retail Managers
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 Editors
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 Proof Readers
 Public Relations Specialists
 Publishers
 Radio and Television Announcers and Newscasters
 Reporters and Correspondents
 Translators
 Writers

COMPUTER, MATHEMATICAL AND OPERATIONS RESEARCH OCCUPATIONS

Actuaries
 Computer Programmers
 Computer Scientists and Systems Analysts
 Mathematicians
 Operations Research Analysts
 Statisticians

ENGINEERS

Aerospace Engineers
Agricultural Engineers
Aircraft Maintenance Engineers
Chemical Engineers
Civil Engineers
Electrical Engineers
Electronics Engineers
Environmental Engineers
Industrial Engineers
Mechanical Engineers
Metallurgical, Ceramic and Materials Engineers
Mining Engineers
Nuclear Engineers
Petroleum Engineers
Stationary Engineers

HEALTH ASSESSMENT AND TREATING OCCUPATIONS

Acupuncturists
Dietitians and Nutritionists
Occupational Therapists
Pharmacists
Physical Therapists
Physician Assistants
Physiotherapists
Recreational Therapists
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Respiratory Therapists
Speech-Language Pathologists and Audiologists

HEALTH DIAGNOSING PRACTITIONERS

Chiropractors
Dentists
Optometrists
Osteopaths
Physicians
Podiatrists
Psychiatrists
Veterinarians

JUDGES AND LAWYERS

Judges
Lawyers

LIFE SCIENTISTS

Agricultural Scientists
Biochemists
Biological Scientists
Botanists
Food Technologists
Foresters and Conservation Scientists
Horticulturists
Marine Biologists
Medical Scientists
Microbiologists
Zoologists

PERFORMING ARTS OCCUPATIONS

Actors
Dancers
Film and Television Producers
Film, Stage and Television Directors
Music Therapists

Musicians
Stage Managers
Stunt Performers

PHYSICAL SCIENTISTS

Astronomers
Chemists
Geologists and Geophysicists
Hydrologists or Hydrogeologists
Meteorologists
Physicists

SOCIAL AND RECREATION WORKERS

Fitness Instructors
Human Services Workers
Probation Officers
Recreation Workers
Social Workers
Sports Coaches
Welfare Workers

SOCIAL SCIENTISTS AND URBAN PLANNERS

Anthropologists
Archaeologists
Criminologists
Economists
Environmental Scientists
Geographers
Historians
Marketing Research Analysts
Political Scientists
Psychologists
Social Scientists
Sociologists
Urban and Regional Planners

TEACHERS, LIBRARIANS AND COUNSELLORS

Adult Education Teachers
Archivists
College and University Lecturers
Conservators
Counsellors
Curators
Guidance Officers
Librarians
Museum Officers
Rehabilitation Counsellors
School Teachers - Kindergarten
School Teachers - Primary
School Teachers - Secondary
Teachers - Art
Teachers - English as a Second Language
Teachers - Music
Teachers - Physical Education
Teachers - Special Education

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Animators
Designers
Fashion Designers
Films and Television Camera Operators
Graphic Designers
Interior Designers
Painters and Decorators
Photographers

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Billing Clerks
Bookkeeping, Accounting and Auditing Clerks
Clerical Supervisors
Computer and Peripheral Equipment Operators
Court Registrars
Credit Clerks
Dispatchers
General Office Clerks
Hotel and Motel Desk Clerks
Information Clerks
Library Assistants and Bookmobile Drivers
Mail Clerks and Messengers
Order Clerks
Payroll and Timekeeping Clerks
Personnel Clerks
Receptionists
Record Clerks
Secretaries
Stenographers and Court Reporters
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147 MARKETING AND SALES OCCUPATIONS

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Insurance Agents
Manufacturers' and Wholesale Sales
Representatives
Marketing Officers
Real Estate Agents, Brokers and Appraisers
Sales Workers
Securities Sales Representatives
Services Sales Representatives
Travel Agents

**156 TECHNICIANS AND RELATED SUPPORT
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Clinical Laboratory Technologists and Technicians
Dental Hygienists
Dental Laboratory Technicians
Dispensing Opticians
Electroencephalograph (EEG) Technologists
Emergency Medical Technicians
Licensed Practical Nurses
Medical Record Technicians or Administrators
Nuclear Medicine Technologists
Ophthalmic Laboratory Technicians
Radiographers
Surgical Technologists

TECHNOLOGISTS, EXCEPT HEALTH

Aircraft Pilots
Air Traffic Controllers
Broadcast Technicians
Drafters
Engineering Technicians
(Civil, Electrical, Electronics,
Industrial, Mechanical and Chemical)
Library Technicians
Science Technicians

173 PRODUCTION OCCUPATIONS

Assemblers and Precision Assemblers
Blue-Collar Worker Supervisors

FOOD PROCESSING OCCUPATION

Butchers

INSPECTORS AND RELATED OCCUPATIONS

Construction and Building Inspectors
Health Inspectors and Compliance Officers
Inspectors, Testers and Graders

**METALWORKING AND PLASTICS-WORKING
OCCUPATIONS**

Boilermakers
Heat Treaters
Jewellers
Machinists and Tool Programmers
Metalworking and Plastics-Working Machine
Operators
Tool and Die Makers
Tool and Die Setters
Welders, Cutters and Welding Machine Operators

PLANT AND SYSTEM OPERATORS

Electric Power Generating Plant Operators and
Power Distributors and Dispatchers
Water and Wastewater Treatment Plant
Operators

PRINTING OCCUPATIONS

Binders and Finishers
Prepress Workers
Printing Press Operators
Screen Printer or Stencil Preparers

**TEXTILE, APPAREL AND FURNISHINGS
OCCUPATIONS**

Apparel Workers
Dress Makers
Shoe and Leather Workers and Repairers
Textile Machinery Operators
Upholsterers

WOODWORKING OCCUPATIONS

Wood Carvers
Woodworkers or Wood Machinists

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Computer Service Technicians
Electronics Technicians
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Sewing Machine Mechanics
Telecommunications Technicians
Textile Technicians
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Nursing Assistants

PERSONAL SERVICE AND BUILDING AND GROUNDS SERVICE OCCUPATIONS

Beauty Therapists
Child Care Workers
Cleaners
Croupiers
Driving Instructors
Flight Attendants
Florists
Gardeners
Governesses
Hairdressers
Home Care Workers
Landscape Gardeners
Make-up Artists

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Fire-fighting Occupations
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Life Guards
Police Officers, Detectives and Special Agents
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Forest Workers
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215 CONSTRUCTION TRADES AND EXTRACTIVE OCCUPATIONS

Bricklayers
Cabinet Makers
Carpenters or Joiners
Carpet Installers
Concrete Masons and Terrazzo Workers
Electricians
Glaziers
Insulation Workers
Painters and Decorators
Plasterers
Plumbers and Pipe Fitters
Roofers
Roustabouts
Sheetmetal Workers
Stonemasons
Structural and Reinforcing Ironworkers
Tile Setters — Wall and Floor, Roof

226 TRANSPORTATION AND MATERIAL MOVING OCCUPATIONS

Bus Drivers
Material Moving Equipment Operators
Rail Transportation Workers
Taxi Drivers and Chauffeurs
Truck Drivers

EXECUTIVE AND MANAGERIAL OCCUPATIONS

Accountants and Auditors

Job Description: A career in this line involves the preparation, analysis and verification of financial reports and taxes, and monitoring of any information system pertaining to finance.

The work involved includes the following:

- *auditing* – verifying an organisation's financial records to check for mismanagement, fraud and any discrepancies;
- *financial accounting* – preparing the annual accounts and handling day-to-day functions such as maintaining book-keeping records, paying salaries and receiving and paying out money;
- *management accounting* – recording and analysing financial information in an organisation; this area of work generally embodies budgeting, cost accounting and investment appraisal.

The accounting profession in Malaysia is regulated by the Malaysian Institute of Accountants (MIA) as legislated in the Accountants Act of 1967. All practising accountants in Malaysia, either Public Accountants or Registered Accountants, must now be registered with MIA.

Public Accountants

Public accountants are those who have worked for a minimum of 5 years (with 75% of that time being in audit work) in a public accounting firm. Alternatively, they have to be practising accountants overseas and members of a recognised body.

Public accountants either work in public accounting firms or they have their own accounting firms. They provide financial advice and accounting, auditing and tax services to clients. They also offer valuable advice on proposed mergers and acquisitions, and act as liquidators and receivers for companies that are winding up.

Registered Accountants

Registered accountants are those who have worked for a minimum of 5 years and who have

satisfactory practical accounting experience. They include those working in government and industry. In many larger businesses, top management positions such as financial controllers and corporation presidents are often filled by people who have a background in accounting, internal auditing or finance. Most management accountants hold these positions. Some accountants, however, prefer to work in colleges and universities as lecturers.

Education: There are many ways to become an accountant. For instance, aspirants can pursue a university degree in accounting or choose to take a professional route which allows them to work full-time and study part-time for MACPA (Malaysian Association of Certified Public Accountants), CIMA (Chartered Institute of Management Accountants) or ACCA (Chartered Association of Certified Accountants) certification.

For those inclined towards being financial accounting and auditing, MACPA and ACCA provide the more appropriate routes. Those bent on becoming management accountants can enrol with CIMA which is notable for its management accounting and finance management courses. The CIMA qualification is increasingly recognised as the financial qualification for business. MACPA is recognised locally while ACCA and CIMA are internationally recognised.

Personal Attributes: Possesses accuracy; able to analyse, compare, and interpret facts and figures quickly, and make sound judgements based on this knowledge; discrete when dealing with confidential information; has an aptitude for mathematics; good at working with business systems and computers; enjoys desk work.

Job Outlook: The prospects are excellent as there is a shortage of accountants in Malaysia. Moreover, accountants are rarely affected by changes in economic conditions. Capable accountants and auditors advance rapidly in their careers.

Related Occupations: Bank officers, budget officers, financial analysts and stock brokers.

Sources of Additional Information:

The Australian Society of CPAs (ASCPA)
Lot 1205, 12th floor
Wisma HLA
Jalan Raja Chulan

50200 Kuala Lumpur
Tel: 03-201 8412/3/4 Fax: 03-201 4788

The Chartered Association of Certified Accountants (ACCA)

19th floor
Wisma Lee Rubber
Jalan Melaka

50100 Kuala Lumpur
Tel: 03-293 6322 Fax: 03-293 7251

The Chartered Institute of Management Accountants (CIMA)

Malaysian Division
Wisma CIMA
123 Jalan SS6/12
Kelana Jaya Urban Centre

47301 Petaling Jaya
Tel: 03-705 1591 Fax: 03-705 1594

The Malaysian Association of Certified Public Accountants (MACPA)

15 Jalan Medan Tuanku
50300 Kuala Lumpur
Tel: 03-298 9622 Fax: 03-298 9403

The Malaysian Institute of Accountants (MIA)
Dewan Akauntan

No. 2, Jalan Tun Sambanthan 3
Brickfields
50470 Kuala Lumpur
Tel: 03-274 5055 Fax: 03-274 1783

Administration Managers or Office Administrators

Job Description: Administration managers, or office administrators as they are sometimes called, work in private and government organisations. Their scope of work is wide. They essentially plan and direct the activities of an organisation's work force. They are, in short, responsible for the day-to-day running of a business.

The services they provide include some or all of the following:

- co-ordinating administrative services within departments;
- conference planning and management;
- information processing;
- management of facilities;
- management of records;

- materials distribution;
- payroll preparation;
- personal property procurement;
- secretarial and correspondence;
- travel arrangements.

Mid-level managers in this line are responsible for developing overall plans, setting goals and deadlines, delegating authority and defining the responsibilities of those performing supervisory roles. They report to the general manager. Administration managers may also work as office managers and oversee the supervisors of clerical staff.

Education: A degree or a professional qualification in business administration, commerce, finance or management is required, or certificates in office or operations management.

Personal Attributes: Has good leadership qualities and excellent communication and interpersonal skills; logical, analytical, detail-oriented, flexible and decisive; able to cope with deadlines.

Job Outlook: Employment growth for administrative service will be slower than for other occupations. This is due to the low turnover in this line. Administrative service is a very specialised field and very seldom do people change their profession, even if there is a change in workplace. However, there is a rising demand for those able to provide management services and management consulting.

Related Occupations: Company secretaries and management consultants.

Sources of Additional Information:

Institute of Administrative Management
40 Chatsworth Parade
Petts Wood
Orpington
Ken BR5 1RW
United Kingdom

Bank Officers

Job Description: Bank officers handle debit and credit transactions for customers, give financial advice and help customers with loans, foreign currency and investment.

The positions in the bank are as follows:

- the *branch manager*, who supervises staff, liaises with all departments, ensures good customer service, sees customers on loan or investment matters, and develops and implements sales strategy to meet targets for the branch;
- *clerks*, who are responsible for all clerical duties such as sorting mail, filing documents, and recording and processing daily transactions;
- *credit officers*, who analyse and assess all applications for loans;
- *customer service officers*, who handle customers' enquiries on banking services and products, and open new accounts;
- *ledger examiners*, who handle accounting procedures, ensure all cheques or vouchers are valid, and answer customer queries on their accounts;
- *loan officers*, who examine and evaluate business or consumer loan proposals, and publicise banking services and products;
- *merchant bankers*, who handle a range of financial services and usually serve as the "middle man" in commercial or professional sectors in the finance industry;
- *tellers*, who are responsible for customers' debit or credit transactions, issue receipts, bank cheques; balance notes and coins, promote banking services and products, and enter details into bank and customers' records.

Bank officers must be prepared to be transferred to other departments or branches.

Education: For entry level positions such as tellers, SPM qualification is sufficient. However, higher positions will require a degree or diploma in business, specialising in accounting, banking or finance, or require relevant experience.

Personal Attributes: Possesses commendable communication skills, able to calculate accurately.

Job Outlook: Opportunities in the banking industry look promising with the increase in new

local and foreign financial institutions due to high economic activity.

Related Occupations: Economists, financial advisers and securities dealers, and insurance officers.

Budget Analysts

Job Description: The budget analyst's main role is in the development, analysis and execution of budgets. His/Her job is important as the analysis of spending behaviour and the allocation of resources for future expenditure and requirements are important parts of decision-making in most private and government organisations.

Generally, budget analysts seek new ways to improve the efficiency of resources allocation, i.e. to achieve more with less. They also provide advice and assistance during the preparation of annual budgets. This would include analysis of financial reports and proposals to ascertain accuracy, completeness, to identify discrepancies and ensure conformity with objectives and regulations. The budget analyst's work schedule can be extremely tight and stressful.

Education: A bachelor's degree in accounting, finance, business, economics, planning, statistics, or social science usually qualifies one for entry into the occupation.

Personal Attributes: Possesses strong analytical skills; is familiar with financial software packages; able to work under strict time constraints; has good communication skills.

Job Outlook: There will always be a demand for budget analysts because many companies rely heavily on them and there is also the need to replace experienced budget analysts who leave the field.

Related Occupations: Accountants, auditors, economists, financial analysts and financial managers.

Catering Managers

Job Description: Catering managers coordinate all catering arrangements with clients and workers.

The work involves some or all of the following:

- discussing catering arrangements with clients;
- discussing with the chef with regard to the menu;
- supervising the purchase of the food and keeping track of the expenditure as well as hiring staff if necessary;
- scheduling all activities of workers in the dining room, kitchen, bar and other areas;
- ensuring that all work areas are kept clean and correspond to sanitary regulations;
- attending to any food and service complaints.

Education: Relevant courses or qualifications on catering, or work experiences in a similar field are essential. Most large organisations require both qualifications and hands-on experience.

Personal Attributes: Possesses good organisational and coordination skills; has the ability to stay calm when under pressure; able to work long hours including weekends and public holidays.

Job Outlook: Employment opportunities will increase due to the growing tourism and hospitality industry.

Related Occupations: Food and beverage managers, and function coordinators.

Company Secretaries

Job Description: Company secretaries are accountable for the proficient administration of companies, especially adhering to statutory and regulatory requirements, and that the decisions of the Board of Directors are put into effect.

The work involves some or all of the following:

- implementing the decisions of the Board of Directors;
- acting as a sound adviser to the directors of the organisation;
- managing company share transactions and following all legal requirements;
- liaising with auditors, bankers, lawyers, tax advisers and shareholders;
- taking minutes of the meetings;
- doing reports, financial statements, budget allocations and future projections;
- conferring terms of new business contracts;
- ensuring that all policies of the Corporate Act and Income Tax Act, as well as policies on consumer protection and the environment are met.

Education: It is essential for an applicant to be a member of the Institute of Chartered Secretaries and Administration (ICSA) or a holder of a degree in business administration with specialisation in relevant fields such as accounting, business law, economics, finance, computing and management information systems.

Personal Attributes: Possesses management, organisational and good communication skills; is discreet when dealing with confidential matters; able to relate to people at all levels; is analytical.

Job Outlook: The demand for company secretaries depends on economic conditions and the stability of certain industries. Company secretaries are employed by organisations registered in the Registry of Companies. The prospects are good for those from the legal, administrative or accounting background. Those with postgraduate qualifications and computer skills can progress rapidly. Experienced company secretaries are good prospects for higher managerial positions and directorships.

Related Occupations: Accountants, economists, management consultants and merchant bankers.

Construction Contractors and Managers

Job Description: Construction contractors and managers hold various levels of responsibility. They could be contractors, construction superintendents, general construction managers, production managers, project managers and sub-contractors.

The scope of work of construction contractors and managers covers some or all of the following areas:

- planning, budgeting and directing construction projects;
- determining the appropriate construction methods, scheduling the activities, and deciding on and co-ordinating the required labour resources and materials;
- taking on supervisory roles and monitoring the construction activities as the project progresses, to ensure its timely completion;
- looking into the necessary building regulations, permits and licences for the construction activities, and ensuring safety regulations are followed;

- interacting with architects, engineers and other technical workers to ensure design intentions are met;
- liaising with lawyers and financial institutions with regards to drawing up building project contracts and funding.

Education: One way to become a building contractor is to complete an apprenticeship in a particular building trade such as bricklaying or carpentry and then gain enough experience to apply for registration.

For a strong academic background, a bachelor's degree in architecture, cost estimating, engineering or construction science, in particular, is ideal.

Personal Attributes: Possesses leadership qualities and well-developed management skills; has an aptitude for interpreting plans and drawings; has drive and is resourceful.

Job Outlook: As the nation's infrastructure increases, so will the demand for construction contractors and managers. They are needed for the construction of airports, bridges, power stations, towers and other projects. An increased demand for commercial buildings and residential housing will also positively affect the demand for construction contractors and managers.

Construction contractors and managers may be employees under contract with a developer or a management firm overseeing the construction projects. Those who are experienced may become consultants or, if they have the required capital, they may set up their own general contract construction companies.

Related Occupations: Architects, building surveyors, civil engineers, construction supervisors and cost estimators.

Convention Coordinators

Job Description: Convention coordinators coordinate and organise meetings, conventions and conferences for clients.

The work involves some or all of the following:

as coordinators in hotels and convention centres —

- preparing a submission to the client to book the venue;

- conferring with the client the type and cost of services provided with regard to budget availability;
- organising the venue and all decorations as approved by the client;
- arranging for the production and printing of the promotional materials;
- liaising with third-party suppliers or service providers such as caterers;
- arranging the travel and accommodation bookings of the delegates or guests.

as self-employed organisers —

- preparing proposals to win the conference account;
- choosing and booking venue and accommodation;
- maintaining budget and keeping financial records;
- enrolling delegates and guests.

Education: Training in tourism or hospitality studies is required.

Personal Attributes: Possesses competent management skills and computer knowledge; able to negotiate, coordinate and work under pressure; is flexible in working with groups and individuals.

Job Outlook: The prospects are good as the "Meetings, Incentives, Conventions, Exhibitions" (MICE) market is growing in the tourism and hospitality industries. Job opportunities will depend on the number of special events, the number, size and frequency of meetings and conventions held, and the budget made available for the events.

Related Occupations: Food and beverage managers, and function coordinators.

Cost Estimators or Quantity Surveyors

Job Description: The main responsibility of a cost estimator is to predict the cost that will be incurred for a future project. This is important for the survival of any business as the information is required for accurate decision-making is based on his/her reports. The information provided is used when tendering for contracts or deciding whether or not a project is worth undertaking, among others.

Whatever the industry, cost estimators must be able to determine the cost accurately, based on

relevant factors such as materials, labour, location and other items. Besides this, they will have to determine the quantity of the materials and labour required. This particular area of specialisation is also known as quantity survey.

Education: In construction, a degree in architecture, building construction or civil engineering offers better prospects. In manufacturing, a degree in accounting, business, finance, engineering, mathematics, science, statistics, operations research or a related subject is preferred. Professional recognition through certification is valuable because it reflects the cost estimator's competence and experience. To become certified, estimators generally must have adequate experience and must pass an examination.

Personal Attributes: Possesses an aptitude for mathematics; able to analyse, compare and interpret information to make sound and accurate judgements.

Job Outlook: Employment depends upon the level of construction and manufacturing activity but the demand for cost estimators will expand as there is a need for more firms to use their services particularly for cost identification and control.

Experienced cost estimators can advance to management positions such as project managers in construction firms or managers of industrial engineering departments in manufacturing companies. They may also become consultants.

Related Occupations: Appraisers, cost accountants, cost engineers, economists, evaluators, financial analysts and operations research analysts.

Data Processing Managers

Job Description: Data processing managers co-ordinate, plan, and conduct research and development in computer-related activities. They supervise a large group of workers including technicians, data processing workers, computer specialists and support personnel.

Data processing managers are given broad outlines to follow and objectives to achieve. These are usually technical, such as to develop a new programme, to redesign computers or research a new method of manufacturing. Managers have to make detailed plans with relevant factors in mind, such

as overall concepts, costs, resources and other project requirements. They assign each of their team members a specific part of the plan to carry out.

Education: Most data processing managers have been systems analysts, programmers or operators. A degree in computer or information science, computer information systems or data processing is preferred.

Personal Attributes: Possesses technical, leadership and communication skills; able to make rational decisions, to manage time well, and to organise and co-ordinate work effectively.

Job Outlook: It is foreseen that the demand for data processing managers will be greater than that for most occupations. One of the major reasons is the advancing technologies that force companies to update and improve their products. This is where the expertise of data processing managers will be of great help.

Related Occupations: Computer personnel, engineers and mathematicians.

Education Administrators

Job Description: Education administrators have great responsibilities as they are required to provide direction, leadership, daily management and administration of all educational activities in schools, colleges, universities, businesses, correctional institutes and community service organisations.

The job of an educational administrator involves some or all of the following:

- arranging training for teachers and staff;
- providing guidance and other student services;
- managing financial records;
- acting as a representative of the school when dealing with the general public.

Roles and designations vary depending on the type of educational institutions the education administrators are in. They could be one of the following:

- assistant principals;
- principals;
- academic deans;
- student services directors (e.g. registrars).

Education: Education administrators are those who have usually taught or held another related job before moving into administration. A doctorate or at least a master's degree is usually required.

Personal Attributes: Able to make sound decisions and to organise and co-ordinate work efficiently; has strong interpersonal and communication skills.

Job Outlook: The number of openings for this career is expected to be quite small and therefore, only the most qualified and experienced people will be chosen. Most senior positions such as those of principal and assistant principal fall vacant when staff retire. An increase in the openings for educational administrators hinges on the increase in school enrolment and on the budgeted expenditure for education in the country and the respective states.

Related Occupations: Library directors, professional and membership organisation executives and social service agency administrators.

Financial Managers

Job Description: Almost every organisation in every industry, be it private or government-run, has at least one, if not more, financial managers. The designations used vary from controller, treasurer, credit manager to cash manager. This field includes the management of commercial banks, finance companies, hire-purchase companies, insurance companies, accounting firms, etc.

A financial manager's scope of work may involve some or all of the following tasks:

- like those of accountants – preparing financial reports for operations and ensuring conformity with regulations and taxation;
- controlling the cash flow, credit extensions, investments, expenditure, risk of transactions and financial instruments;
- providing information to assess the current and future financial standing of an organisation;
- communicating with stockholders and other investors.

In large firms, there may be many financial managers, each with a specific task. Thus organisations may have some or all of the following:

- *cash and credit managers*, who oversee the cash flow and investment needs of the firm;
- *credit operations managers*, who establish credit-rating criteria, determine the credit ceiling and monitor the credit period;
- *controllers*, who direct the preparation of all financial reports like income statements and balance sheets;
- *risk managers*, who look into the risk of each and every transaction involving the firm.

Education: Employees of banks and financial institutions can pursue the Diploma in Banking and Finance from Institut Bank-Bank Malaysia. A business-related degree for example in finance or accounting is ideal. To enhance one's opportunities for job advancement, a Master of Business Administration (MBA) degree is valuable.

Personal Attributes: Able to analyse detailed account information; possesses tact and excellent judgement; able to oversee supervisory and professional staff members; has good communication and computer skills

Job Outlook: As with most managerial jobs, it is expected that there will be more supply than demand as the number of applicants exceed job openings; there will be, however, also an expected increase in the demand for financial managers.

A third of all financial managers are presumed to be employed by financial institutions such as banks, finance companies and insurance companies. Generally, however, they are found in every organisation. Well-trained and experienced financial managers are prime candidates for top management positions or they may set up their own consulting firms.

Related Occupations: Accountants, auditors, budget officers, credit analysts, loan officers and securities analysts.

Sources of Additional Information:

Institut Bank-Bank Malaysia
5 Jalan Semantan
Damansara Heights
50490 Kuala Lumpur

Health Services Managers

Job Description: Health care is similar to any other normal business in that it requires good management to keep it running smoothly. Health services managers are given the duties of planning, organising, supervising and co-ordinating the implementation of health care in hospitals, community health services, etc.

Health services managers consist of administrators who handle the entire facility and health specialists who are responsible for specific clinical departments or services in the health industry.

The tasks of health services managers include some or all of the following:

- setting the overall direction of the facility;
- being actively involved in planning and policy-making, and in ensuring compliance with the regulations of government agencies;
- co-ordinating activities with government and private organisations;
- giving talks to civic groups;
- promoting public participation in health programmes.

In large facilities, there are many assistant administrators assisting the top administrators in some or all of the following areas:

- making important day-to-day decisions;
- liaising in clinical areas such as food service, medical records, nursing, surgery and therapy;
- non-health care activities like finance, human resource, and information management.

Education: Health services managers in hospitals and larger health facilities must have a degree in health services administration or business administration.

Personal Attributes: Possesses management, leadership organisational as well as analytical and problem-solving skills; has tact, diplomacy, and good communication and interpersonal skills.

Job Outlook: There will be a high demand for health services managers as health services continue to expand and diversify. Hospitals are expected to be the main avenue for openings. Besides that, health services managers are also required in clinics, health agencies, long-term care facilities and nursing homes.

Related Occupation: Directors of voluntary health agencies and social welfare administrators.

Hotel Managers

Job Description: The hotel industry is often referred to as the hospitality industry. The main role of hotel managers is to ensure that guests have a pleasant stay.

Hotel management is a stressful and demanding career, with long and irregular working hours. The efficiency of every aspect of the hotel operations is also the responsibility of the hotel manager.

He/She is responsible for some or all of the following tasks:

- co-ordinating resources and initiating business plans and marketing strategies;
- planning, directing and co-ordinating the various services like food and beverage, staff maintenance, housekeeping, accounting, etc.;
- organising advertising and public relations activities;
- ensuring all health and safety rules and regulations are complied with.

In large hotels, there are managers for different departments.

- The *general manager* has the overall responsibility for the running of the hotel. He/She sets the room rates, approves requests, allocates resources, establishes the standard and quality of service, rooms and food, but all within the guidelines of the owners or shareholders.
- The *resident manager* lives at the hotel and is on stand-by all the time although he/she works only the normal 8 hours a day.
- The *front office manager* takes care of reservations, allocation of rooms and hotel security, and arranges training for the hotel's front desk staff who deal directly with the public.
- The *finance manager* is in charge of all aspects of accounting work.
- The *personnel or human resource manager* conducts staff training and recruitment of new staff.

- The *public relations manager* plans and directs all promotional activities.
- The *food and beverage manager* is responsible for the food services provided at different outlets in the hotel such as its restaurants and lounges. He/She is also in charge of the hotel's banquet facilities.
- The *executive housekeeper* supervises cleaning staff and the purchase of expendable goods.
- The *convention service manager* coordinates special events like conventions, meetings and seminars. He/She may also undertake the supervision of entertainment activities.

Education: Most managers used to be promoted from the ranks of clerks, housekeepers, waiters and chefs. However, a bachelor's degree in hotel and catering is required now, especially by international hotel chains. Those possessing relevant certificates and diplomas are at an advantage.

Personal Attributes: Keen to serve people; has initiative, self-discipline, tact and an outgoing personality; possesses good organisational and communication skills; able to solve problems and concentrate on details.

Job Outlook: The demand for personnel in hotel management is expected to soar due to the increase in tourism activities and business travel. The latter will also create a demand for additional motels and hotels.

However, openings for managers are not going to increase as fast as the rate of growth of the hotel industry. This is because a major share of it will be economy properties and these generally have fewer managers compared to full-service hotels.

Related Occupations: Caterers, function coordinators, recreation managers and restaurant managers.

Sources of Additional Information:

Malaysian Association of Hotels
76B Jalan Imbi
55100 Kuala Lumpur

Switzerland (for a list of hotel schools)

The Embassy of Switzerland
PO Box 12008
50764 Kuala Lumpur

UK

Hotel, Catering and Institutional Management Association
191 Trinity Road
London
SW17 1HN

USA

The American Hotel and Motel Association
888 7th Avenue
New York 10019

Industrial Production Managers

Job Description: Industrial production managers are responsible for all aspects of production of goods and front-line supervision. They are usually technically qualified personnel who have mastered the basics of engineering, design and manufacturing. The duties of industrial production managers vary according to the type of product they are dealing with and the industry they are in.

Generally, the scope of work of industrial production managers includes some or all of the following:

- determining what and how much to produce, as well as the best method of production;
- maintaining an inventory to ensure that financial resources will not be tied up and there will be sufficient materials for production;
- managing technically qualified staff and use of equipment;
- monitoring the standard and quality of a product, probing the probable causes of its failure to meet quality standards and finding solutions to problems;
- stock control and co-ordination of interdepartmental activities.

Education: Many industrial production managers are industrial engineering or business degree holders. Some are former production line supervisors who have been promoted.

Personal Attributes: Possesses a logical and

analytical mind; has excellent communication skills, leadership qualities and an eye for detail.

Job Outlook: There will not be much change in the demand for industrial production managers and any openings that occur will be due to the need to replace those who leave. Those with a proven track record may advance to the position of plant manager or to even more senior positions.

Related Occupations: Industrial engineers and sales engineers.

Loan or Credit Officers

Job Description: Loan or credit officers attend to clients that come to a financial institution to apply for a loan. In a way, loan officers represent the lending institutions which provide funds for a variety of reasons from business to personal.

They usually perform some or all of the following tasks:

- interviewing potential applicants and determining if they meet the criteria for loan applications;
- giving advice on the correct type of loan needed, depending on the applicant's ability to service the loan;
- preparing the necessary paperwork for the processing of loans.

Education: Loan officers usually possess a bachelor's degree in finance, economics or a related field.

Personal Attributes: Possesses good mathematical and communication skills; has integrity and tact; is sensitive to clients' needs.

Job Outlook: There will be a rising demand for people in this career. As the population and economy grows, so will the demand for loans by businesses and consumers. This is also compounded by the fact that loan officers are very important to the success of financial institutions as loans are a major source of income for banks.

Related Occupation: Securities sales personnel.

Management Analysts and Consultants

Job Description: These are normally senior level

positions. The scope of work for management analysts and consultants differs from company to company and from project to project. They are usually hired on a contractual basis and their services are sought after by both public and private organisations which do not have the internal resources or expertise to handle certain projects and problems.

In general, they perform some or all of the following tasks:

- acquiring, reviewing and analysing pertinent information so that they can make recommendations;
- assisting in the implementation of their proposals.

The types of firms that provide consulting services range from sole practitioners to large international organisations employing teams of consultants. There are some that specialise in particular types of industries.

Education: Most areas of business and management, computer and information sciences, engineering and many other fields of study are suited to this occupation. Master's degree holders are at a definite advantage.

Personal Attributes: Possesses organisational, problem-solving, analytical skills; has good judgement and strong communication skills; has a keen interest in people, processes and resource management; is independent and self-motivated.

Job Outlook: The expertise of management analysts and consultants is invaluable and therefore, their services will be in high demand in the near future as most industries and government agencies depend on them to improve the operations of their organisations. Growth is also foreseen in large international firms as well as specialist-consulting services for specific industries. In a highly competitive business world, companies cannot afford to make errors in decision-making; they require the expertise of consultants to give them recommendations and advice. Those with entrepreneurial ambitions may open their own firm.

Related Occupations: Economists, financial analysts, managers and operations research analysts.

Marketing, Advertising and Public Relations Managers

Job Description: The main priority of any firm is to market its products or services profitably and in the process, satisfy the customer's needs. To achieve this, it is necessary to manage and coordinate marketing, advertising, public relations and other related activities.

The marketing manager directs the overall marketing policy which includes market research, marketing strategies, advertising, sales, promotions, pricing, product development and public relations.

The responsibilities include some or all of the following:

- developing detailed marketing strategies with the aid of other managers and also determining the demand for the product as well as any threat from competitors;
- identifying and analysing organisational strengths and weaknesses;
- monitoring trends to identify the potential for a new product or a new market.

In larger organisations, there are various people reporting to the marketing manager such as the following:

- the *sales manager*, who manages the sales force, establishes sales territories and sets sales quotas;
- the *product or brand manager*, who is responsible for marketing particular brands of products;
- the *marketing research manager*, who plans and directs research projects.

Advertising is a highly specialised field within the marketing process. It involves the promotion of goods and services to optimise sales or levels of awareness. The advertising manager takes the overall responsibility for account services, creative services and media services.

There are other important occupations found in advertising.

- *Account executives:* They are responsible for a particular client or group of clients or accounts, and they help maintain good relations

between the agency and the client. Account executives interpret the client's wishes and coordinate between the various creative groups to ensure smooth implementation of a project. They brief the creative groups and monitor their progress.

- *Art directors:* They are responsible for converting the clients' original ideas and requirements into a visual form.
- *Copywriters:* They write the scripts for commercials and headings and detailed text for catalogues and brochures. Good copywriters use clear, succinct language to produce convincing and at times witty copy. From experience they know best how to use language and various styles to appeal to different audiences. In short, they set the theme and mood of the advertisement. This calls for creativity, imagination and a sense of salesmanship.
- *Creative directors:* They are responsible for the concept of an advertisement. They oversee the creative teams who develop the subject matter and presentation of an advertisement.
- *Layout artists:* They prepare initial layouts of advertisements, posters, displays and final artwork for printing. They must be technically sound and capable of producing superior quality artwork. Experience as artists or illustrators is a must.
- *Market researchers:* Their primary function is to provide information on potential customers such as their requirements, likes, dislikes, income, etc. They also indicate how a particular product should be presented. The information is gathered through interviews, surveys and questionnaires, and involves extensive research and skilful interpretation of statistics.
- *Media buyers:* They purchase advertising time or space and negotiate for the best rates.
- *Media planners:* They provide expert advice on which medium best suits the particular campaign, for example, television, radio, cinema, posters, newspapers or magazines.
- *Photographers:* They take photographs that are used in advertisements for the print media.

- **Traffic personnel:** They oversee each project and provide support for both accounts and creative teams. This involves ensuring the smooth flow of a project and a strict adherence to schedules.

The public relations manager oversees all publicity activities. He/She promotes the company's image and its activities externally. The scope of work includes some or all of the following:

- creating and maintaining public awareness about the organisation;
- developing and maintaining relations with the mass media;
- preparing speeches, press releases and brochures, advertisements, etc.;
- co-ordinating special events, promotions, exhibitions, etc.;
- handling complaints;
- bridging the communication gap between employees and management.

Education: For management positions, the following qualifications are usually required:

- *marketing, sales and promotion* – a bachelor's or master's degree in business administration with an emphasis on marketing;
- *advertising* – a bachelor's degree in advertising or journalism;
- *public relations* – a bachelor's or master's degree in public relations or journalism.

For other types of jobs in these industries, the following qualifications are preferred:

- a bachelor's degree in literature, philosophy, psychology and sociology;
- professional qualifications involving art, communication, journalism, marketing and media studies.

However, in advertising, formal educational qualifications and seniority usually do not count as much as talent. Opportunities for advancement abound for those who have the ideas and flair for creating effective advertisements.

Personal Attributes: *Marketing personnel* — has keen interest in market trends; is outgoing and persuasive; possesses excellent communication skills; able to work long hours under pressure.

Advertising personnel — has creativity and originality; possesses excellent communication skills; able to work long hours under pressure.

Public relations personnel — possesses excellent communication and interpersonal skills; is creative and confident.

Job Outlook: There will be a great demand for managers with these skills in the future as it is predicted that there will be fierce competition in both the domestic and global markets. With greater understanding in most organisations of the importance of customer satisfaction, achieved only via marketing, demand for these managers will grow. However, the rate of growth is expected to vary, depending on the industry.

Given the prevailing economic buoyancy in Malaysia there are many openings in advertising. Graduate or professional entry is usually via account management or media planning. People with artistic backgrounds can start as layout workers and those with writing skills, as copywriters. The uninitiated often start doing media or market research.

Freelancing is another option for experienced personnel especially copywriters, artists and photographers. Managers with vast experience may set up their own businesses.

Related Occupations: Commercial and graphic artists, editors and promotions managers.

Sources of Additional Information:

Institute Advertising Communication Training
75 Jalan SS21/1A
Damansara Utama
47400 Petaling Jaya
Tel: (03) 7197451
Fax: (03) 7175622

Institute of Public Relations Malaysia
81B 2nd Floor
Jalan Bangsar
59200 Kuala Lumpur
Tel: (03) 2828905

Personnel Consultants

Job Description: Personnel consultants usually work in private employment agencies. Their main role is to help the unemployed get jobs and

employers recruit qualified staff. They interview applicants and then allocate available jobs to suitable candidates by consolidating relevant information for employers and applicants.

A personnel consultant's job may involve some or all of the following:

- receiving and recording job vacancy information from prospective employers;
- visiting prospective employers to assess pay scales and the work environment;
- writing and placing advertisements in the employment section of newspapers;
- interviewing applicants and preparing short-lists for prospective employers;
- cross-checking references of the applicants before passing on their particulars;
- acting as counsellors to job seekers, for example, providing tips on personal grooming, interview techniques, on how to have a positive image and even giving background information on the company when an interview is scheduled;
- arranging appropriate training in job skills;
- providing placement services to organisations that are cutting back their staff.

Personnel consultants may specialise in the placement of only one group of job seekers.

Education: A bachelor's degree in any one of the disciplines of business, with a major in personnel management is required.

Personal Attributes: Possesses excellent written and oral communication skills; has patience, tact and determination; is sensitive to cultural differences and likes working with people.

Job Outlook: The increase in demand for personnel consultants seems inevitable as the economy expands and new businesses grow. This is because most organisations do not have the ability or resources to screen job applicants to fill newly-created posts and those in expanding departments. Their lack of expertise and the expanding economy will themselves spur growth in this profession.

Related Occupations: Career counsellors, human resources officers, personnel managers and training consultants.

Personnel or Human Resources and Training Managers

Job Description: Personnel or human resources managers provide a link between the employer and employees.

The personnel manager's duties includes some or all of the following:

- recruiting staff;
- assigning the appropriate personnel to the most suitable position;
- keeping staff records;
- planning and organising employee welfare programmes;
- providing information and advice on personnel policies and procedures;
- advising on the provisions of workplace legislation and related regulations like superannuating, wages, etc.;
- developing and implementing equal opportunity, anti-discriminatory and occupational health and safety regulations;
- providing a link between the management and unions, and mediating during discussions regarding pay, hours of work, etc.

A training manager may perform some or all of the following tasks:

- conducting induction of new employees;
- analysing training needs based on the objectives and goals of the organisation;
- designing and implementing staff training programmes depending on organisational needs;
- compiling training manuals and using them to provide the necessary training;
- evaluating the effectiveness of training programmes;
- getting information on external courses and recommending them, if required.

Education: A degree in human resources, personnel administration or industrial and labour relations is preferred. Other suitable courses include business administration, economics, psychology, sociology and statistics. Knowledge of local labour laws is essential.

Personal Attributes: Possesses good organisational, communication and interpersonal skills; has a sense of integrity and fair-mindedness, is persuasive and congenial.

Job Outlook: As with any other specialist role, there will be a great demand in the future for personnel and training managers since most private organisations place a lot of emphasis on productivity, staff morale, and training and development.

Related Occupations: Career counsellors, lawyers, psychologists, social workers, sociologists, public relations specialists and teachers.

Purchasing Managers

Job Description: Purchasing managers usually plan and schedule the delivery of goods and services required by their employers. Opportunities exist in industrial, commercial and government establishments.

The scope of work normally includes some or all of the following:

- identifying the best available commodities and suppliers of the products;
- obtaining the highest quality merchandise at the lowest possible price;
- awarding contracts and ensuring that the right amounts of products are received on time;
- studying sales records and inventory levels of current stocks and recommending new sources and materials;
- keeping abreast of changes affecting both supply and demand for the products and materials under their supervision.

Education: A degree in business is usually acceptable. Often, purchasing managers are promoted from the ranks of buyers.

Personal Attributes: Possesses planning, organisational and supervisory skills; has good judgement and communication skills; has a sound knowledge of computer systems, e.g. spreadsheets, etc.

Job Outlook: It is expected that employment growth in this area will increase faster than that in most other occupations. However, demand for purchasing managers will not keep pace with the rising level of economic activity because mergers and the resulting consolidations of buying departments along with other changes such as limited sources and long-term contracting will reduce the need for them.

Consequently, most job openings will result from the need to replace those who leave the occupation.

Related Occupations: Merchandise managers and procurement service managers.

Sources of Additional Information:

Malaysian Institute of Purchasing and Materials Management
No. 5 Jalan Hargraves
11600 Penang

No. 16B Jalan SS15/4D
Subang Jaya
47500 Petaling Jaya

Real Estate Managers

Job Description: A real estate manager's main objective is to increase or maintain the value of real estate investments of investors. He/She can be involved in the administration of income-producing commercial and residential properties. Owners who are too busy to manage their properties usually acquire or contract the services of a real estate manager of a real estate management company. He/She then acts as the owner's agent and adviser for the property.

The duties of a real estate manager may be divided into those that involve the rental of property and those involved with the sale and purchase of property.

In the *rental of property*, the work includes some or all of the following:

- selling vacant space to prospective tenants through advertising or other methods, and establishing rental rates according to prevailing local conditions;
- analysing the tenant's needs and working within them;
- negotiating the terms and conditions of rental agreements with tenants, and preparing these agreements;
- collecting rent payments;
- negotiating contracts for the upkeep of grounds, for security, trash removal and other services.

In the *sale and purchase* of property, the scope of work involves some or all of the following:

- planning and directing the sale and purchase of a property;
- advising on property tax and other legal matters.

Education: Most employers prefer a degree in real estate, business administration, finance or a related field. Holders of degrees in liberal arts, however, are often also accepted.

In Malaysia, all practising real estate agents need to be registered with the Board of Valuers, Appraisers and Real Estate Agents. The Board also conducts courses.

Personal Attributes: Possesses good communication skills; is adept at persuading and handling people.

Job Outlook: Employment growth is expected to increase because as demand for office buildings and retail establishments grows, so will employment of property and real estate managers.

Related Occupations: Land economists and valuers.

Sources of Additional Information:

Board of Valuers, Appraisers and Estate Agents
Suite 5.3E 5th Floor
Wisma Sime Darby
Jalan Raja Laut
50350 Kuala Lumpur
Tel:(03) 2937839

UK

The College of Estate Management
Whiteknights
Reading, Berkshire
England RG6 2AW

Remisiers

Job Description: Remisiers are agents of stockbroking companies and must not be confused with stockbrokers. They have to clear a lengthy process involving intensive interviews with the Licensing Officer and the KLSE (Kuala Lumpur Stock Exchange) before being granted a dealing licence.

They have an in-depth knowledge of financial regulations applicable in Malaysia. Before trading commences a remisier has to place a

deposit with his/her stockbroking firm to cover any losses which might occur.

Remisiers' revenue or earnings come from commissions and are dependent on market activity.

Education: A bachelor's degree in business administration, economics or finance is required.

Personal Attributes: Possesses good interpersonal skills and an aptitude for numbers; is sensitive to the market; is self-disciplined and trustworthy.

Job Outlook: A career in stockbroking is subject to a lot of ups and downs, but a disciplined and hardworking work attitude will bring good returns. Job prospects will be good in this field.

Related Occupation: Stock analysts.

Restaurant Managers

Job Description: Restaurant managers and assistant managers help restaurants to operate efficiently and profitably.

The scope of work includes some or all of the following:

- dealing with suppliers and estimating daily food consumption;
- ensuring that food and other supplies are used efficiently;
- checking for consistency in the quality of food preparation and service;
- recruiting and training adequate numbers of workers, and supervising staff;
- attending to the various administrative aspects of the business.

In large establishments such as international fast-food chains, the management team may consist of the *general manager*, a few *assistant managers* and *executive chefs*.

The *assistant managers* oversee service in dining rooms and other areas of operations.

The *executive chef* is responsible for kitchen operations and his/her duties include some or all of the following:

- selecting menu items, taking into account the likely numbers of customers, the past

popularity of various dishes, the need for variety on the menu, the availability of foods due to seasons, the need to reduce wastage of food and other considerations;

- determining food, labour and overhead costs;
- assigning prices to the menu items.

Personal Attributes: Possesses leadership, communication and interpersonal skills; able to solve problems; has a neat and clean appearance.

Education: Restaurant managers are often promoted from the ranks of service workers and those experienced in food and beverage preparation. However, those who hold a degree in business administration are at an advantage. Many executive chefs are trained in food preparation through culinary programmes.

Job Outlook: Employment opportunities for restaurant managers are expected to increase in the future. The highest number of job opportunities will be found in the food outlet industry. The continued increase in the number of food outlets is due in part to population growth and rising personal income and the increasing number of meals consumed outside the home.

Experienced managers may also set up their own food and beverage outlets.

Related Occupations: Hotel managers and health service administrators.

Retail Managers

Job Description: The retail manager's job is to run a retail business smoothly and efficiently, and provide quality goods and service to customers. He/She plans and co-ordinates the operations of retail outlets. Retail managers have many responsibilities, depending on the size and type of establishment.

The tasks include some or all of the following:

- co-ordinating and directing all aspects of retail trade, including orders, inspections, pricing and inventory of goods;
- drawing up staff rosters and supervising chefs, cooks and other kitchen workers, food and beverage service workers, retail sales workers, cashiers, customer service staff, stock and inventory clerks, and grocery clerks;
- interviewing, hiring and training employees;

- monitoring sales activity, profit and losses and developing merchandising plans;
- co-ordinating displays, advertisements and sales announcements;
- maintaining good customer relations.

In large retail stores, there may be several levels of managers.

- At supervisory level, there are *department managers* who are responsible for their specific departments.
- At mid-level, there are *store managers* who handle the sales goals, budgets and procedures of the whole store.
- At senior level in large chains or franchises, there are *district, area or regional managers* who co-ordinate sales and distribution in a specific area or district.

Education: Most managerial positions are filled by experienced personnel who began their careers as sales assistants or cashiers. Those who have attended business courses or who hold a bachelor's degree in liberal arts are at an advantage.

Personal Attributes: Possesses organisational, supervisory and communication skills; has good judgement and is decisive; is motivated and enjoys working with people.

Job Outlook: Employment opportunities for retail managers are expected to grow due to the growing number and size of retail establishments. However, as with other industries, corporate downsizing and restructuring may dampen the demand for retail managers. Some managers who have had many years of experience in the retail industry may open their own stores.

Related Occupations: Managers in wholesale trade and other industries.

Tax Agents

Job Description: Tax agents provide information and advice to individuals and business organisations on tax related matters.

They usually do some or all of the following work:

- meet with clients, and discuss and provide advice on taxable income, deductions and the technicalities of taxation laws;
- make and file tax returns;
- handle queries and assist in settling disputed claims;
- communicate with the tax department for clarifications on tax-related matters and extensions.

Education: A bachelor's degree in accountancy, commerce, economics or law is required.

Personal Attributes: Possesses a good character and integrity.

Job Outlook: Job prospects include self-employment or work with large companies or accounting firms.

Related Occupation: Accountants.

Top Executives

Job Description: Top executives include those who are chief executive officers, corporate presidents, directors, general managers and office managers. These people have an extensive knowledge base and exposure in the business world. No organisation can achieve its business objectives without the aid of these professionals.

People under this category belong to the upper level of management or what is also known as Senior Managerial Level. Their main duties are the following:

- formulating policies;
- providing direction for the operations of the organisation;
- working together with other top executives to ensure that the organisation's objectives are achieved;
- being responsible for the effective management of major resources like staff, equipment, building and finances.

The chief executive officer who is usually the managing director is often the ultimate authority. He/She may delegate authority to other top executives to oversee a certain project or department.

General managers usually manage their individual

department's activities within the guidelines of the organisation's overall plan.

A manager can also be the overall controller of a business organisation.

Education: Top executives, perhaps with the exception of those who own the business, must have at least a bachelor's degree in business administration, liberal arts and social science. Their major often is related to the departments they manage – for instance, computer science for a general manager of information systems. Professional qualifications and a master's degree are common.

Personal Attributes: Possesses considerable business acumen, expertise and experience; has good leadership qualities, interpersonal skills and an eye for detail; has excellent written and oral communication skills; is self-confident, motivated and well-groomed.

Job Outlook: Employment opportunities for top executives are usually limited as most companies practise restructuring of the available managerial hierarchies but there is still a need for such professionals in large firms. Service industries have a higher demand compared to industries such as manufacturing.

Top executives may become members of the board of directors of an organisation.

Underwriters

Job Description: Each year, insurance companies assume billions of dollars' worth of risks by writing policies that transfer the risk of loss from their policyholders to themselves. Underwriters are therefore needed to appraise and select the risks their company will insure against. An insurance company may lose out to others if the underwriter is too conservative in his/her appraisal of risks or it may have to pay more in claims if the underwriting has been too liberal.

The responsibilities of an underwriter include some or all of the following:

- analysing information in insurance applications, medical reports and actuarial studies (actuarial reports describe the probability of insured loss) to help companies decide if a risk is worth underwriting;

- outlining the terms, conditions and premium of a policy;
- liaising with policy holders and insurance agents.

Most underwriters specialise in either life insurance or general insurance; the later includes fire, motor vehicle, and personal accident policies.

Education: A degree in business administration or finance is normally required. There are also opportunities for experienced underwriting clerks to be promoted to the position of underwriters, especially those who have completed insurance courses.

Personal Attributes: Enjoys working with details and analysing information; has good judgement and is decisive.

Job Outlook: With the growing concern for financial security and liability contributing to a demand for more insurance protection for homes, automobiles, pleasure craft and other valuables, the demand for underwriters too will grow.

Related Occupations: Appraisers and risk managers.

PROFESSIONAL SPECIALITY OCCUPATIONS

ARCHITECTS AND SURVEYORS

Architects

Job Description: Designing a building involves far more than its physical and aesthetic appearance. Buildings need to be functional, safe and economical, and they must meet the needs of the people who use them. Architects must consider all these things when they design buildings such as airport terminals, apartments, factories, hospitals, houses, offices, places of worship and schools, and structures such as college campuses, industrial parks, multi-storey complexes and urban centres. Their clients could be contractors, government agencies or local authorities, individuals or town planners.

When an architect works on a project, he/she needs a number of skills such as design, engineering, managerial, communication and supervisory skills.

Architects provide a variety of professional services to individuals and organisations planning a construction project and these include some or all of the following:

- conducting a feasibility study on the project;
- conceiving the original concept of structures;
- preparing sketches and cost estimates;
- developing a building design that must adhere to all building codes and regulations;
- producing scale construction drawings, which, nowadays, is often done with the aid of computers;
- specifying the building materials required and, in some cases, making recommendations on the interior furnishing;
- preparing land use studies and carrying out long-range planning for land development;
- supervising on-site construction.

Education: A degree in architecture is essential. All practising architects in Malaysia must be registered with Persatuan Akitek Malaysia (PAM).

Personal Attributes: Possesses an aptitude for mathematics and physics and a knowledge of computer-aided design and drafting (CADD); is accurate and meticulous with detail; has a flair for art and is creative and imaginative; able to conceptualise.

Job Outlook: Employment opportunities for architects depend on the economy. They are usually highly dependent on the development of local construction, particularly of non-residential structures such as office buildings and shopping centres.

Most young architects work in established architect firms, larger building companies, government departments or with local authorities. Some will eventually set up their own firms. Architects may also opt to teach in schools of architecture or do research.

Related Occupations: Building contractors, civil engineers, graphic, interior or industrial designers, landscape architects, real estate developers and urban planners.

Sources of Additional Information:

Pertubuhan Akitek Malaysia
4-6 Jalan Tangsi
PO Box 10855
50726 Kuala Lumpur
The Public Service Department

Landscape Architects

Job Description: Landscape architects design areas that are functional, beautiful and compatible with the natural environment. Their designs are developed with the preservation of the natural environment in mind.

Their scope of work involves some or all of the following:

- planning the location of buildings, roads and walkways and the arrangement of vegetation such as flowers, shrubs and trees;
- analysing the natural elements of the site such as the climate, soil, slope of the land, drainage and vegetation;
- examining the site from various angles including observing where sunlight falls at different times of the day;
- creating detailed plans indicating new topography, vegetation, walkways and landscape amenities;
- drawing up all the necessary documents of the site including written reports, land-use studies and cost estimates and submitting them for approval to the client and regulatory agencies.

Landscape architects are hired by many types of organisations ranging from real-estate development firms to municipalities. They may be asked to redesign streets to limit automobile traffic and to improve pedestrian access and safety, or to landscape public parks. Landscape architects may work independently or along with engineers, town planners and architects.

Personal Attributes: Possesses creativity and imagination; likes to work outdoors.

Education: A diploma in civil engineering with architectural studies or a bachelor's degree in landscape architecture is preferred.

Job Outlook: In the long run, demand for the services of landscape architects will increase due to the anticipated growth in construction and the increased development of open spaces into recreation areas, wildlife sanctuaries and parks. Employment growth will also be sparked off by continued public concern for the environment.

Related Occupations: Architects, civil engineers, interior designers, and urban and regional planners.

Surveyors

Job Description: Surveying encompasses many areas of specialisation but with a common base. There are many kinds of surveyors. Land surveyors, survey technicians and mapping scientists are one group of workers who measure and map the earth's surface. Surveyors who establish official boundaries must be licensed by the State in which they work.

Land surveyors perform some or all of the following duties:

- establish official boundaries of land, air, space and water;
- conduct engineering and land surveys for construction and mineral sites;
- plan the field work, select known survey reference points and determine the precise location of all important features of the survey area;
- manage survey parties;
- record the survey, verify the accuracy of the data and prepare maps and reports.

Survey technicians assist land surveyors by operating the surveying equipment.

Mapping scientists, on the other hand, collect geographic information and prepare maps and charts of large areas. They measure distances, directions, angles between points and elevations of points, lines and contours on the earth's surface.

Other types of surveyors are the following:

- *geodetic surveyors*, who use high-accuracy techniques, including satellites observations, to measure large areas of the earth's surface;
- *geophysical prospecting surveyors*, who mark sites for subsurface exploration, usually petroleum-related;
- *marine surveyors*, who work at harbours, rivers and other bodies of water to determine shorelines, topography of the bottom, water depth and other features;

- *mine surveyors*, who measure underground and open-cut mine workings in full detail;
- *quantity surveyors*, who estimate and monitor building costs; they work with architects and builders.

Education: A diploma in quantity surveying or a bachelor's degree in surveying is essential. Land surveyors need a qualification recognised by the Board of Land Surveyors.

Personal Attributes: Possesses an interest in mathematics, science and technology; able to grasp legal and environmental implications and visualise objects, distances, sizes and other abstract forms; thinks accurately, logically and precisely; has good interpersonal skills and is in good physical condition.

Job Outlook: Employment for surveyors are expected to grow more slowly than for other occupations. However, this may fluctuate along with construction activities, as growth in construction should create jobs for surveyors involved in the laying of streets and the development of factories, housing projects, office buildings, recreation areas and shopping centres.

Related Occupations: Architects, cartographers, civil engineers, estate officers and mining engineers.

Sources of Additional Information:

Board of Land Surveyors
Lot 6.11 & 6.12
6th Floor, Wisma Central
Jalan Ampang
50450, Kuala Lumpur
Tel: 03-2617000

Institution of Surveyors
Bangunan Jurukur
64-66 Jalan 52/4
46200 Petaling Jaya

The Board of Quantity Surveyors
c/o Hew & Co.
7th Floor, South Block
Wisma Selangor Dredging
142-C Jalan Ampang
50450 Kuala Lumpur
Tel: 03-2615671

UK

The Royal Institution of Chartered Surveyors (RICS)
Surveyor Court
Westwood Way
Coventry CV4 8JE

COMMUNICATIONS OCCUPATIONS

Copy-writers

Job Description: Copy-writers write and compose material for advertisements. They interpret reactions of the target audience to various advertisement proposals.

They may do some or all of the following work:

- write copy, suggest names for new products, write slogans and design packaging;
- co-ordinate with clients to decide on various aspects of the advertisement;
- compare products or services to find selling points;
- make advertisements appealing and catchy;
- write advertisements for newspapers, magazines, television, billboards or shops;
- produce brochures, promotional literature, annual reports or other reports.

Education: A degree in journalism or communications is preferred.

Personal Attributes: Possesses clear concise writing skills and the ability to work under pressure; has an understanding of the behavioural and motivational needs of people; is inquisitive, creative and original.

Job Outlook: Employment opportunities are expected to grow as advertising is playing an increasingly important role in business.

Related Occupations: Advertising account executives, editors, journalists and public relations officers.

Desktop Publishers

Job Description: Desktop publishers utilise computers to produce professionally designed and presented documents.

The work involves some or all of the following:

- preparing proposals to win work contracts;
- discussing job requirements or design concepts with clients;
- producing graphics for the approval of clients.

Desktop publishers may specialise in simple office documents or in graphically complex colourful publications.

Education: A certificate or diploma in the field or prior experience is required. Some employers provide on-the-job training and do not insist on formal training but may require applicants to have some artistry inclination.

Personal Attributes: Able to work long hours; is deadline-oriented.

Job Outlook: The advertising, commercial art, graphic design and publishing industries are flourishing in Malaysia. The prospects look good while the economy is buoyant. Self-employment is possible through free-lance basis. However, desktop publishing jobs are very competitive.

Related Occupation: Editors.

Editors

Job Description: Editors select and prepare material for publication or broadcasting and supervise writers. Editors write and almost always review, rewrite and edit the work of writers.

Their primary duties include some or all of the following:

- planning the contents and layout of books, magazines or newspapers and supervising preparations;
- deciding what appeals to readers and assigning topics to reporters and writers;
- hiring writers, reporters or other employees, planning budgets and negotiating contracts with freelance writers;
- editing written material for consistency in style and content;
- preparing manuscripts for production, interacting with the production department, and proof-reading.

Editors could specialise as book editors, sub-editors or associate editors. They often have assistants

and they are the assistant editors, copy editors, editorial assistants or production assistants.

Education: A degree in journalism or mass communication is often required.

Personal Attributes: Possesses an excellent knowledge of grammar and language, and excellent organisational, supervisory and management skills; has good judgement in deciding what material to accept and what to reject; is computer literate.

Job Outlook: Employment for salaried editors by newspapers, periodicals, book publishers and non-profit organisations is expected to increase with the growing demand for publications.

Related Occupations: Advertising and public relations workers, correspondents, newspaper reporters, radio and television announcers and teachers.

Film and Television Editors

Job Description: Film and television editors assess the film footage supplied by the director and edit it for film or television productions.

The work involves some or all of the following:

- reviewing and evaluating the film with production staff to choose the appropriate scenes, as well as determining the scenes which need to be filmed again;
- editing and joining the film footage in specific sequence and length to enable the story to be presented with the best effect;
- filling in and balancing the music and other special effects;
- utilising any stock shots from the film library to incorporate them into the film.

Education: A degree in a relevant discipline or prior work experience in film companies, television stations and video production houses is required.

Personal Attributes: Is artistic, meticulous, patient and willing to work irregular and long hours; has team spirit.

Job Outlook: Opportunities lie in film or television production and post-production houses.

Related Occupations: Film or stage or television directors or producers.

Proof Readers

Job Description: Proof readers usually work for publishing companies or magazines and newspapers. Their job involves reading typeset proofs and computer printouts to find and rectify any errors before the final printing of the book, magazine or newspaper.

They usually do some or all of the following jobs:

- use the edited copy or material to compare proofs and check the final version for any errors in printing, punctuation or spelling, either manually or using visual display terminals for proofing;
- ensure that text in all the artwork is correct;
- use special symbols and markings to inform printers of any corrections or changes;
- inspect the corrected proofs from the printer to ensure the changes have been made.

Education: A degree in English is preferred.

Personal Attributes: Possesses an excellent foundation and skills in spelling, grammar and punctuation; has a high level of concentration and attention to detail; able to spend long hours checking written work.

Job Outlook: Work is available in newspaper firms, publishing houses and other organisations dealing in printed material and publications.

Related Occupations: Desktop publishers, editors, journalists and writers.

Public Relations Specialists

Job Description: Public relations specialists serve as advocates for businesses, hospitals, schools, universities and other organisations, and strive to build and maintain positive relationships with the public.

The work they do can include some or all of the following:

- handle media, community, consumer and governmental relations; political campaigns; interest-group representation; conflict mediation, or employee and investor relations;

- establish and maintain cooperative relationships with representatives of community, consumer, employee and public interest groups, and those in print and broadcast journalism, to improve communications;
- put together information that keeps the general public, interest groups and stockholders aware of an organisation's policies, activities and accomplishments;
- prepare press releases and contact people in the media who might print or broadcast their material;
- arrange and conduct programmes for contact between organisation representatives and the public;
- represent employers at community projects and plan conventions;
- make films, slides or other visual presentations at meetings;
- take responsibility for preparing annual reports and writing proposals for various projects, using the services of professional writers if needed;
- work as press secretaries, information officers, public affairs specialists or communications specialists for government departments, and keep the public informed about the activities of the government agencies and officials.

Public relations officers can also specialise as fund-raising officers, media or press officers or promotions officers.

Education: A bachelor's degree majoring in public relations, journalism, advertising or communications is preferred.

Personal Attributes: Possesses excellent communication skills, and good organisational, analytical and research skills; is good at problem-solving and decision-making; able to perform under pressure; has creativity, initiative and good judgement.

Job Outlook: Keen competition for public relations jobs will probably continue as the number of applicants is expected to exceed the number of job openings. Recognition of the need for good public relations in an increasingly competitive business environment should spur demand for public relations specialists in organisations of all sizes.

Related Occupations: Account executives, advertising managers, fund-raisers, journalists, lobbyists and promotions managers.

Publishers

Job Description: Publishers take care of all aspects of publishing, i.e. commissioning, handling production and marketing, selecting and editing materials, working with in-house staff or freelance writers and designers, and coordinating the circulation and distribution of the publications.

The work involves some or all of the following:

- employing writers, designers and photographers if required;
- liaising with sales and marketing personnel;
- organising promotional activities, utilising the press, radio and television, for the publication;
- maintaining good contacts in the printing trade as well as with book and magazine wholesalers and retailers;
- handling administrative tasks and clerical;
- maintaining an accounting system.

Education: A degree in journalism, communication, business studies or marketing or relevant experience is essential.

Personal Attributes: Has business and management aptitude, and good oral and written skills; able to administer sound judgement and work under pressure.

Job Outlook: The publishing business is growing. Publishers are usually employed by book, newspaper and magazine publishing companies. Many set up their own publishing houses.

Related Occupations: Copywriters, desktop publishers, editors, journalists and writers.

Radio and Television Announcers and Newscasters

Job Description: Announcers and newscasters are well-known personalities to radio and television audiences. Radio announcers, often called disc jockeys, select and introduce recorded music, and present news, sports and weather reports.

They may do some or all of the following:

- air commercials, introduce personalities, interview guests, report on community activities and other matters of interest to their audience;

- compare panel and talk shows, live performances and entertainment programmes;
- make announcements regarding the community, time and station;
- do research for writing scripts, often "ad-lib" much of the commentary and write commercial and news copy;
- operate the control board and sell commercial time to advertisers;
- specialise in sports, weather or in general news at large stations, and may be called newscasters, anchors or even news analysts.

Specialists in this field include the following:

- *broadcast news analysts*, who are also called commentators, and who present news stories, and interpret them and discuss how they might affect the nation or listeners personally.
- *news anchors*, who present news stories and introduce in-depth videotaped news or live transmission from on-the-scene reporters.
- *show hosts or hostesses*, who interview guests about their lives, their work or current topics of interest.
- *sportscasters*, who select, write and deliver sports news which may include interviews with sports personalities and live coverage of games.
- *weathercasters*, who report and forecast weather conditions by gathering information from national satellite weather services, wire services and other local or regional weather bureaux.

Education: There are no specific educational requirements although formal training in broadcast journalism is an advantage.

Personal Attributes: Possesses clear enunciation (speaking skills), a good command of language and good general knowledge; has a pleasant and well-controlled voice, and neat and pleasing appearance; able to "ad lib" and work under tight deadlines.

Job Outlook: Employment growth for this career is expected to be as fast as the other occupations as more and more new radio and television stations are licensed and the number of cable

television systems continues to grow. Competition will be keen as the broadcasting field typically attracts many more job seekers than there are jobs.

Related Occupations: Actors, film and television producers, interpreters and public relations specialists.

Reporters and Correspondents

Job Description: Reporters and correspondents gather information and prepare stories that inform us about local, state, national and international events.

They do some or all of the following:

- present points of view on current issues and report on the actions of public officials, corporate executives, special interest groups and others who exercise power;
- investigate leads and news tips, look at documents, observe the scene, conduct background research and interview people, while covering a story;
- take notes, photographs or shoot videos during interviews;
- organise their material, determine their focus, write their stories and edit videos, if needed;
- understand the applicable laws for copyright, contempt and defamation;
- write or produce speeches, media releases and promotional literature.

An experienced journalist can specialise in any of the following fields:

- *columnists*, who have a regular segment and write articles on their particular area of interest like cooking, fashion or politics;
- *feature writers*, who write detailed stories on specific topics;
- *general assignment reporters*, who write on assigned topics, such as an accident, political rally, celebrity visit or a company going out of business;
- *investigative reporters*, who cover stories that take many days or weeks of information gathering;

- *sub editors*, who edit material, design the layout of pages and allocate space to the various articles.

Education: A bachelor's degree in journalism is preferred. To train as a journalist you can also complete a set training period as an apprentice with a newspaper. Entry to this is based on stringent tests of aptitude and on samples of written work.

Personal Attributes: Possesses clear, concise and objective writing ability, keyboard skills and an interest in current affairs; has a good general knowledge base and a "nose for news"; is dedicated to providing accurate and impartial news; has initiative, persistence, resourcefulness and the physical stamina and emotional stability to deal with pressing deadlines and irregular hours.

Job Outlook: Employment growth will be spurred mainly by an increase in the number of newspapers. Some growth is expected in radio and television stations. Most job openings will arise from the need to replace reporters and correspondents who leave the occupation. Turnover is relatively high in this job, as some journalists find this work stressful and hectic.

Related Occupations: Advertising copy-writers, biographers, editors, proof readers, public relations workers and writers.

Translators

Job Description: Translators transcribe the spoken word or translate written documents from one language to another while maintaining its/their original meaning.

The work involves some or all of the following:

- studying the text and transcribing it to another language without losing its actual meaning;
- ensuring that all terminology used is legal, acceptable and accurate.

Translators may be an expert in one or more languages, or in a specific field of work.

Education: Oral and written fluency in the English language and at least one foreign language is essential.

Personal Attributes: Able to understand and

accept various cultures; possesses good research and memory retention abilities; has initiative; is objective in opinion.

Job Outlook: The need for translators depends largely on the level of international trade and tourism. Translators are mostly employed by government or foreign dignitaries for trade purposes or at international functions.

Related Occupations: Journalists, teachers and writers.

Writers

Job Description: Writers communicate through the written word. They develop original fiction and non-fiction for books, magazines, trade journals, newspapers, technical reports, company newsletters, radio and television broadcasts, movies and advertisements.

They may do some or all of the following work:

- select a topic or work on one assigned by an editor;
- gather information through personal observation, research and interviews;
- select and organise the material and put it into words that most effectively convey it to the reader;
- revise or rewrite sections, searching for the best organisation of the materials or just the right phrasing;
- work closely with other specialists like scriptwriters, graphic designers or illustrators.

Established writers may work on a freelance basis. They can sell their work to publishers or publication units, manufacturing firms, and public relations and advertising departments or agencies.

Writers can specialise in children's literature, fiction, non-fiction, plays and a wide variety of other topics.

- *Technical writers* put scientific and technical information into readily understandable language. They prepare catalogues, sales promotion material, project proposals, parts lists, assembly instructions and operating and maintenance manuals.
- *Copy-writers* write advertising copy for use by publications or the broadcast media to promote goods or services.

Education: A degree in English, communications or journalism is preferred.

Personal Attributes: Possesses excellent writing and language skills; is familiar with electronic publishing; able to concentrate and produce under pressure; has creative skills and perseverance.

Job Outlook: Employment for salaried writers by newspapers, periodicals, book publishers and non-profit organisations is expected to increase with the growing demand for publications. Demand for technical writers is expected to increase because of the continuing expansion of scientific and technical information and the continued need to communicate it.

Related Occupations: Advertising and public relations workers, correspondents, newspaper reporters, radio and television announcers and teachers.

COMPUTER, MATHEMATICAL AND OPERATIONS RESEARCH OCCUPATIONS

Actuaries

Job Description: An actuary works at relating the mathematical probability theory to all kinds of practical problems. Most actuaries are employed by insurance companies. A minority are consultants or in government service.

Their scope of work involves some or all of the following:

- assembling and analysing statistics to calculate probabilities of death, sickness, injury, disability, unemployment, retirement and property loss to determine the expected insured loss;
- calculating insurance premium rates and determining policy contract provisions for each type of insurance offered;
- ensuring that the charged premiums will not only enable the company to pay all claims and expenses as they occur, but will also ensure they remain profitable and compare favourably with those of other insurance companies;
- designing insurance and pension plans, and ensuring that they are maintained on a sound financial basis.

An actuary usually specialises in one of the following:

- accident and health insurance;
- life insurance and pension plans;
- property and liability insurance.

The small number of actuaries that work for the Government usually deal with a particular insurance or pension programme, such as social security or life insurance for veterans and members of the Armed Forces.

Consulting actuaries provide advice for a fee to various clients, including insurance companies, corporations, hospitals, labour unions, government agencies and attorneys.

In order to be efficient, they must keep up with changes in general economic and social trends and legislative, health and other developments that may affect insurance practices. Their expertise and knowledge base make them invaluable to investment, underwriting, or pension planning departments.

Actuaries may need to work with the following:

- *accountants*, to evaluate present financial standing;
- *investment officers*, to predict what company receipts might be a decade ahead;
- *lawyers*, to devise appropriate contract language;
- *marketing and underwriting personnel*, to decide on the type of benefits to offer;
- *medical officers and underwriters*, to establish rules governing acceptance of policies.

Education: The basic requirement is a bachelor's degree with a major in mathematics, statistics, economics or preferably in actuarial science itself. Training lasts 4-5 years, and may take up to 7 years without a previous degree. It includes approved practical experience with study for professional examinations of the Institute of Actuaries, London or the Faculty of Actuaries, Scotland. Courses in accounting, computer science and insurance also are useful.

Personal Attributes: Has a strong aptitude for mathematics; possesses good communication and

interpersonal skills; possesses a practical outlook, an analytical mind, good judgement, imagination and clear logical thinking.

Job Outlook: Employment opportunities for actuaries are expected to grow rather quickly compared to other occupations. However, there may be stiff competition for jobs due to favourable publicity about the actuarial profession.

Actuaries command a good salary and are greatly in demand as there are so few qualified practitioners on the job market. This shortfall is largely due to the heavy responsibilities and rigorous training period involved and the need for exceptional intellect.

Employment growth in the area of consultancy is expected to be faster than that for opportunities in life insurance companies, which have traditionally been the major employer of actuaries.

Related Occupations: Accountants, economists, financial analysts, mathematicians, risk managers and statisticians.

Sources of Additional Information:

Malaysian Insurance Institute
Wisma MII
32 Jalan 1/82B
Bangsar Utama
59000 Kuala Lumpur

UK

The Institute of Actuaries
Staple Inn Hall
High Holborn
London WC1V 7QJ
England

The Faculty of Actuaries
23 St Andrew Square
Edinburgh EH2 1AQ
Scotland

Computer Programmers

Job Description: Computer programmers write, update and maintain programs or software. They usually work directly with experts from various fields to create software designed for specific clients or packaged software for general use which may include games, educational software,

desktop publishing programs, financial planning programs and spreadsheets.

They usually do some or all of the following work:

- write specific programs by breaking down each step into a logical series of instructions for the computer to follow;
- code these instructions in a conventional programming language like C or FORTRAN, or into one of the more advanced artificial intelligence or object oriented languages;
- handle the updating, repairing and modifying of codes for existing programs;
- inform other users when modifying codes by inserting comments in the coded instructions so others can understand the program;
- use computer-aided software engineering (CASE) and concentrate on writing the more unique parts of the program while the computer automates some of the more basic processes, thus ensuring reliability and consistency;
- test programs by executing them to ensure the instructions are correct and will produce the desired information;
- prepare sample data to test every part of the program and assess results after trial runs for any errors;
- "debug" the program in case of errors by changing and rechecking until it produces the correct results;
- prepare instructions for the computer operator in a mainframe environment, depending on the user and type of information to be accessed or generated.

There are various specialists in this field.

Applications programmers usually work in business, engineering or science and write software to handle specific jobs, like a program used to guide a missile after it has been fired and they also may work alone to revise existing packaged software.

Systems programmers maintain the software that controls the operation of an entire computer system. They may do some or all of the following:

- change the sets of instructions that control the central processing unit of the system, that it handles;
- use their knowledge of the entire computer

system to help applications programmers identify the source of problems occurring in their programs.

Education: A bachelor's degree in computer science or information systems is required.

Personal Attributes: Possesses good problem-solving and communication skills; is willing to learn and update skills regularly; has team spirit and patience.

Job Outlook: Job opportunities for programmers will increase. The rising demand for information, increasing automation of offices and factories, advances in health and medicine, and continuing scientific research will also stimulate the need for skilled programmers.

Competition for jobs will be keen since employers are becoming more selective and are increasingly interested in experienced workers who can combine more than one skill. In addition, the introduction of database management systems and greater use of packaged software may moderate the growth in demand for applications programmers.

Jobs for both systems and applications programmers should be particularly plentiful in computer consulting businesses, data processing service firms and software houses. Development is also expected in data communications.

Prospects should be good for college graduates who are familiar with a variety of programming languages, in particular newer languages that apply to computer networking, database management and artificial intelligence.

Related Occupations: Engineers, operations research analysts and systems analysts.

Computer Scientists and Systems Analysts

Job Description: Computer scientists as well as computer engineers conduct research, design computers, and discover and use the principles of applying computers.

A computer scientist's job is distinguished by the higher level of theoretical expertise needed to solve complex problems and the innovative ideas which are essential for the application or creation of new technology.

In academic institutions, computer scientists work in areas ranging from theory, hardware to language design. Scientists in private industry

work in areas such as applying theory, developing specialist languages, or designing programming tools, knowledge-based systems or computer games.

A systems analyst's work involves some or all of the following:

- defining business, scientific or engineering problems and designing their solutions through using computers;
- planning and developing new computer systems or devising ways to apply existing systems to operations which are still completed manually or by some less efficient method;
- testing and installing new programs and correcting any errors found;
- training other staff in the use and maintenance of systems;
- writing user manuals.

Most systems analysts work with private organisations, multinationals and government agencies. Others are employed as consultants by software companies to provide software services to their clients. Opportunities exist in sales, marketing and research.

Education: Some computer programmers are promoted to systems analyst positions but a degree in computer information systems, computer science or data processing is preferred. For the more complex jobs, a degree in computer engineering, electrical engineering or mathematics is required.

Professional courses are also widely available locally. The popular bodies are:

Institute for the Certificate of Computer Professional (ICCP) USA

Institute of Data Processing Management (IDPM) UK

National Computing Centre (NCC) UK*

The Australian Computer Society (ACS)

The British Computer Society (BCS) UK*

The City and Guilds of London Institute

* These are not recognised by the Malaysian Government.

Personal Attributes: Possesses an aptitude for mathematics and science and an understanding of computer operations and applications; able to use research, logic and creativity to solve business

problems; has good communication skills and a methodical and systematic approach to work.

Job Outlook: Career opportunities in this line of work will be among the fastest-growing compared to other occupations. The demand for computer scientists is expected to increase as organisations attempt to maximise the efficiency of their computer systems. In the face of increasing competition, organisations will face growing pressure to use technological advances in areas such as office and factory automation, and telecommunication technology. Hence, more computer scientists will be needed to develop innovative and increasingly sophisticated systems. In addition, there will be tens of thousands of job openings as a result of workers either moving into managerial positions or other occupations, or leaving the labour force.

Those who show leadership qualities can advance to management positions such as manager of information systems. Some experienced systems analysts may start their own consulting firms.

Related Occupations: Computer programmers, management analysts and operations research analysts.

Sources of Additional Information:

Malaysian National Computer Confederation (MNCC)
46A 552/66
47300 Petaling Jaya

UK

British Computer Society
PO Box 1454, Station Road
Swindon SN1 1TG

Institute of Data Processing Management
IDPM House
Edgington Way, Ruxely Corner
Sidcup, Kent DA14 5HR

National Computing Centre
Oxford House
Oxford Road, Manchester M1 7ED

USA

American Federation of Information

Mathematicians

Job Description: Mathematics is one of the oldest and most basic sciences. Mathematicians today are engaged in a variety of activities, using mathematical knowledge and computational tools.

These activities can include the following:

- analysing complex processes from sectors such as engineering and manufacturing and translating these processes into mathematical models;
- analysing statistics to find models for consumer research, insurance risks, market analysis and traffic flow;
- applying mathematical principles when designing objects in architecture and robotics;
- carrying out network analysis for the study of airline routes and road systems;
- creating new mathematical, communications and information theories and techniques involving the latest technology;
- developing and improving mathematical models to describe various natural phenomena like biological or environmental behaviour;
- engaging in image and signal processing for astronomy, cartography, medical and radar imaging;
- solving business, economic, engineering and scientific problems using mathematical knowledge and computational tools.

Based on the field of mathematics, the specialists are as follows:

- *theoretical mathematicians*, who advance mathematical science by developing new principles and new relationships between existing principles of mathematics; this pure and abstract knowledge has been instrumental in producing or furthering many engineering and scientific achievements;
- *applied mathematicians*, who use theories and techniques, such as computational methods, and mathematical modelling to formulate and solve practical problems in business, engineering, government, and the life, physical and social sciences.

- *cryptanalysts*, who analyse and decipher encryption or code systems designed to transmit national security-related information.

Education: A bachelor's degree in mathematics is essential but it is still not quite sufficient for jobs as mathematicians in the private sector where a master's degree is preferred. To obtain jobs in related fields, a double major in mathematics and either computer science, statistics, or one of the sciences is useful.

A master's degree in mathematics is adequate for a teaching post but for research and development positions, a doctorate is necessary.

Personal Attributes: Possesses a good knowledge of computer programming; has high levels of accuracy, good reasoning ability and initiative; is analytical, persistent and able to work as part of a team.

Job Outlook: Employment opportunities for people whose educational background is solely mathematics are not expected to increase significantly. However, a strong background in mathematics facilitates employment in fields such as economics, engineering, finance and physics.

Related Occupations: Actuaries, computer programmers, economists, engineers, finance specialists, operations research analysts, statisticians, systems analysts, systems engineers and physicists.

Operations Research Analysts

Job Description: Operations research analysts are problem solvers. The operations research analyst's role is to help organisations co-ordinate and operate in the most efficient manner by applying scientific methods and mathematical principles to organisational problems. Managers can then evaluate the alternatives and decide on the best course of action.

Operations research analysts may perform some or all of the following tasks:

- work on problems that are commonly encountered in large business organisations, like in areas of distribution systems, facilities layout, forecasting, inventory control, personnel schedules, resource allocation and strategy;
- use methods that revolve around a mathematical model or set of equations to

explain how things happen within the organisation;

- use models or simplified representations to break down systems into their component parts, assign numerical values to each component and examine the mathematical relationships between them.

Operations research analysts use computers extensively in working on a variety of problems depending on the type of industry.

Education: Employers prefer applicants with a master's degree in operations research or management science or other quantitative disciplines. A high level of computer skills is also required.

Personal Attributes: An aptitude for mathematics, science and statistics; has good oral and written skills; able to think logically and work well with people.

Job Outlook: Due to the growing acceptance of a systematic approach to decision-making, organisations are increasingly using operations research analysts to reduce costs and to improve productivity and quality. Even small firms now have access to operations research applications because of more affordable computers. The interplay of these two trends should greatly stimulate demand for this field of work in the years ahead. Much job growth is expected in the finance, manufacturing, service sectors and transportation. Good employment opportunities are available with consulting firms.

Related Occupations: Applied mathematicians, computer scientists, economists and statisticians.

Statisticians

Job Description: Statisticians design, implement, compile and interpret the numerical results of surveys and experiments. They often apply knowledge of statistical methods to particular subject areas such as biology, economics, engineering, medicine or psychology.

The scope of work may involve some or all of the following:

- deciding where and how to gather data, determining the type and size of a sample group, developing a survey questionnaire or

reporting form as well as preparing instructions for the staff who will collect and tabulate the data;

- assessing the accuracy of data obtained, its interpretation and subsequent evaluation to produce graphs and reports;
- ensuring the efficient use of available measurement resources;
- using statistical techniques to predict population growth or economic conditions;
- assessing the nature of environmental problems;
- analysing legal and social problems;
- developing quality control tests for manufactured products;
- assisting business managers and government officials in making decisions and evaluating the results of new programmes.

Specialists include the following:

- *biometricians*, who usually work in areas of experimental design and analysis and statistical modelling, and who specialise in developing statistical methods to deal with biological problems;
- *generalist statisticians*, who collect, interpret and present current statistics, and predict the future of economic-related topics like banking, cost of living and industry; they also help predict the future of demographic details like births, deaths, migration and population changes;
- *mathematical statisticians*, who design and analyse experiments, develop new statistical theories and forecasting models, and design sample surveys and quality control systems.

Education: A bachelor's degree with a major in statistics or mathematics is essential. A strong background in engineering, or physical or computer science is an asset.

Personal Attributes: Possesses an aptitude for mathematics; has a strong background in computer science and excellent analytical, reasoning and problem-solving skills; able to communicate well and work independently if required.

Job Outlook: Job opportunities should remain favourable as there will be a need for statisticians

in fields such as agriculture, consumer and producer surveys, demography, education, energy conservation, environmental quality control, health, social security and transportation.

Opportunities for promotion are best for those with advanced degrees. Master's degree holders and Ph.D holders may engage in research or become statistical consultants.

Related Occupations: Actuaries, computer programmers, financial analysts, market researchers, mathematicians, operations research analysts and social scientists.

Sources of Additional Information:

Canada

Statistician Agriculture Canada Research
Station, Lethbridge
Alberta T1J 4B1

UK

The Institute of Statisticians
43 St Peter's Square
Preston PR1 7BQ
Lancashire

The Royal Statistical Society
25, Enford Street
London W1M 2BH

USA

American Statistical Association
06, 14th Street NW (check this address)
Washington DC 20005

ENGINEERS

Aerospace Engineers

Job Description: Aerospace or aeronautical engineers design, develop, test and help manufacture commercial and military aircraft, missiles, and spacecraft as well as their components and support equipment. They may be experts in aerodynamics, acoustics, celestial mechanics, propulsion, structures, thermodynamics or in guidance and control systems.

They usually perform some or all of the following tasks:

- assessing mechanical systems and aircraft performance, and participating in test flights;
- ensuring airworthiness of aircraft for the Civil Aviation Safety Authority;
- conducting investigations on failed engines;
- developing repair systems for aviation components;
- evaluating specifications of new aircraft and advising on their purchase;
- supervising aircraft assembly and installation of engines, instruments and other equipment;
- developing new technologies in commercial aviation, defence system and space exploration.

Their areas of specialisation include one or more of the following:

- structural design;
- production methods;
- guidance, navigation and control;
- instrumentation and communication;
- manufacture of various types of aerospace products such as commercial transport, helicopters, spacecraft or rockets.

Education: A degree in aerospace engineering is essential.

Personal Attributes: Possesses an aptitude for mathematics and science; is good at problem-solving; able to think in abstract terms; has normal colour vision.

Job Outlook: The job market is highly competitive as the number of job opportunities is expected to be significantly fewer than the relatively large pool of aerospace engineering graduates. Consequently, employment growth is expected to be slower than in other occupations. Most job openings are the result of aerospace engineers transferring to other occupations or leaving the labour force.

Related Occupations: Aircraft maintenance engineers and spacecraft engineers.

Agricultural Engineers

Job Description: Agricultural engineers study the application of engineering principles to agricultural production and the management of natural resources. They give advice and apply their knowledge and skills to solve various problems

like the environmental impact of intensive agriculture, post-harvest handling of agricultural and other primary products, etc. Both indoor and outdoor work are involved.

The work of an agricultural engineer may include some or all of the following:

- analysing and planning for the control of water logging, soil salinity and effective soil conservation;
- conducting research and preparing and presenting reports in areas like farms, forests and research stations;
- developing new and improved methods for food processing and production;
- manufacturing and designing new types of agricultural equipment;
- performing environmental impact assessments;
- planning and supervising the construction of farms and related buildings;
- planning, managing and supervising the construction of irrigation, drainage, flood and water control systems.

Agricultural engineers may specialise in various overlapping fields like:

- *agricultural production*, which includes methods like crop establishment and protection, and farming and horticultural systems;
- *food and food processing*, which deals with the various stages of processing like cleaning, grading, milling, processing, packaging and distribution;
- *power and machinery*, which deals with the mechanical aspects of agricultural production;
- *soil and water*, which includes flood and water management systems, soil erosion, salinity control, and irrigation and drainage designs;
- *structures and environment*, which include agricultural buildings, storage facilities, waste management and the control of various environmental factors.

Education: A bachelor's degree in agricultural engineering is essential.

Personal Attributes: Possesses communication,

computing and design skills; able to identify, analyse and solve problems as well as integrate natural resource information; able to work independently and take on responsibilities.

Job Outlook: Agricultural engineers can work in environmental agencies, government departments, private industries and soil and water conservation organisations. They can also become consultants to farming groups and agricultural businesses.

Related Occupations: Agricultural scientists, agricultural technical officers, environmental engineers, environmental scientists and food technologists.

Aircraft Maintenance Engineers

Job Description: Generally speaking, aircraft maintenance engineers specialise in one or another particular aspect of the work but the occupational area covers the installation, maintenance and repair of aircraft engines, airframe systems, electrical instrument and radio systems.

The major specialist areas cover:

- *avionics* – electrical, electronic, instrument and radio systems including integrated flight systems, radar, navigation and communication systems;
- *mechanical* – airframe and engine systems and components like brakes, landing gear and wheels;
- *structures* – metal and non-metal material components.

Maintenance engineers work with many kinds of hand and power tools either on the aircraft itself or in a workshop setting.

Education: A degree in aerospace, electrical or mechanical engineering is essential.

Personal Attributes: Possesses good hand-eye coordination; has good eyesight and hearing; is methodical and accurate.

Job Outlook: The airline business is expanding in line with the country's economic growth and development, so prospects should be good.

Related Occupations: Electrical and electronics engineers.

Chemical Engineers

Job Description: Chemical engineers apply the principles of chemistry and engineering to solve problems involving the production or use of chemicals. Many chemical engineers are involved in the manufacturing of chemicals and useful chemical products.

Their job can include some or all of the following:

- designing equipment and developing processes for manufacturing chemicals in chemical plants;
- designing and building pilot plants to depict how full-scale plants will operate;
- detecting and correcting faulty procedures in the day-to-day operations of plants;
- planning and testing methods of manufacturing the product and supervising the production, while ensuring environment-friendly operation of equipment;
- preparing feasibility studies, reports and cost analysis of various processes.

Their areas of specialisation include one or more of the following:

- biomedical engineering;
- microbiological engineering;
- pollution control, water control and environmental control;
- control of procedures such as combustion, oxidation or polymerisation;
- production of specific products like automotive plastics, chlorine bleach, pharmaceuticals, etc.;
- smelting engineering.

Chemical engineers also work in manufacturing plants in food, palm oil, and petroleum and refining industries. They may work as consultants, either independently, or on a contractual basis for the government.

Education: A degree in chemical engineering is essential.

Personal Attributes: Possesses an aptitude for chemistry, mathematics and science; is analytical and has problem-solving, computing and design skills; able to work independently.

Job Outlook: Much of the projected growth in employment will be in non-manufacturing industries, especially service industries such as engineering services and consulting firms.

Related Occupations: Chemists, industrial engineers, mining engineers and petroleum engineers.

Civil Engineers

Job Description: Civil engineers work in the oldest branch of engineering. Their job is to design and supervise the construction of airports, bridges, buildings, roads, sewage systems, tunnels and water supply systems.

The job involves some or all of the following:

- assisting in the detailed drawing phase, using computer-aided drawing to estimate stresses in the bridges and tunnels which have been built, if the project proves viable;
- travelling to sites, analysing soil and rock samples, and checking the routes;
- organising manpower and materials on-site, carrying out cost analysis and ensuring that projects are completed on time.

Their areas of specialisation include one or more of the following:

- *construction engineering*, which involves the planning and construction of public buildings and private projects; construction engineers also determine project requirements like equipment, materials and human resources;
- *environmental engineering*, which involves the study of design proposals and then advising on their environmental impact, thus ensuring maintenance of a safe environment;
- *geotechnical engineering*, which involves designing and constructing foundations, underground structures, tunnels and dams; geotechnical engineers also evaluate the effects of groundwater seepage, slides, earth shifts and earthquakes;
- *materials and testing engineering*, which involves conducting research, development tests and evaluating the quality or suitability of materials and products related to projects;

- *structural engineering*, which involves designing large load-bearing structures such as bridges, towers and off-shore platforms, keeping in mind the stresses that these structures are subjected to; structural engineers also study the development of new materials and methods and their impact on design;
- *transport engineering*, which involves planning and assigning transportation systems like airports and mass rapid transits, and advising on their maintenance;
- *water resources engineering*, which involves the design and management of systems that store and distribute water; water resource engineers also oversee the construction and maintenance of hydroelectric power systems.

Employment opportunities also exist in manufacturing industries and in the public service, mainly with local authorities, in government departments and public utilities. Many civil engineers hold supervisory or administrative positions ranging from supervisor of a construction site to city engineer. Others may work in research and teaching.

Education: A degree in civil engineering is essential.

Personal Attributes: Possesses a strong aptitude for graphs, mathematics, measurements, physics and statistics; has excellent problem-solving skills and an eye for detail; is imaginative and adaptable; able to work independently.

Job Outlook: Spurred by population growth and an expanding economy, employment opportunities for civil engineers is expected to increase. More civil engineers will be needed to design and construct higher capacity transportation and water supply systems, large buildings and other structures, and to repair or replace existing bridges, roads and other public structures. Most job openings, however, will arise from the need to replace civil engineers who leave for other occupations or quit the labour force.

Related Occupations: Architects, environmental engineers and mining engineers.

Electrical Engineers

Job Description: Electrical engineers design,

develop, test and supervise the manufacture of electrical equipment. Electrical equipment includes power-generating and transmission equipment used by electric utilities, electric motors, machinery controls, and in the lighting and wiring in buildings, automobiles and aircraft.

Their job involves some or all of the following:

- conducting research on new products;
- writing, preparing and interpreting specifications, drawings, standards and regulations about electric power equipment and its use;
- developing maintenance schedules;
- testing equipment and solving operating problems;
- estimating time and cost of engineering projects.

Their areas of specialisation include one or more of the following:

- biomedical engineering;
- electrical equipment manufacturing;
- integrated circuits (IC);
- lasers;
- microwave and optic fibre communications;
- power generation, transmission and distribution.

Engineering graduates usually start their careers under the close supervision of senior engineers. As they gain experience, they are given more responsibilities and independence to develop designs and solve on-site problems. Electrical engineers may become technical specialists or administrators, or they may supervise a team of engineers and technicians.

Education: A degree in electrical engineering is essential.

Personal Attributes: Possesses an analytical mind and an aptitude for computing and design; has problem-solving and communication skills; is creative.

Job Outlook: With Malaysia striving to realise its vision of becoming an industrialised nation, employment opportunities for electrical engineers are expected to be good. Most job openings will result from job growth and the need to replace electrical engineers who move to management support jobs or sales jobs. These openings should be sufficient to absorb new graduates.

Job growth will be faster in industrial sectors rather than manufacturing. Further research resulting in increase in consumer demand for electrical goods should create additional jobs.

Related Occupations: Electronics engineers, radio and television engineers, railways (signals) engineers, sound system engineers and telecommunications engineers.

Electronics Engineers

Job Description: Electronic engineering involves the application of scientific and engineering methodology to the creation, development and maintenance of electronic products, systems and components.

An electronics engineer designs, develops and tests electronic products and equipment. Electronic equipment encompasses radar, computer hardware, and communications and video equipment. It is used in instrumentation, telecommunication, navigation, computers, medicine and entertainment.

Electronics engineers can specialise in the following areas:

- *design engineering*, which involves conducting research to develop models of future products and modifying them if required;
- *management engineering*, which involves overseeing and co-ordinating the work of other technocrats in production or product design;
- *process engineering*, which involves designing the process for manufacturing products;
- *quality control engineering*, which involves inspecting and testing products, and installing electronics systems; products must meet with stringent specifications and safety standards, while ensuring high-quality production;
- *research engineering*, which involves undertaking research within the electronics field.

Electronics engineers may work as *consulting engineers*, wherein they study design proposals and draft reports. They make recommendations pertaining to the design, development and manufacture of products that can be marketed. Engineers with experience may work in management if they

wish to. A degree in business administration is a definite advantage.

Education: A bachelor's degree with a major in electronics is essential. Graduates usually enter firms manufacturing electronic, professional and scientific equipment, as trainees. They can achieve professional status by gaining appropriate industrial training and experience.

Personal Attributes: Possesses an aptitude for scientific and technical matters, and mathematics; has an eye for detail; has good problem-solving skills; communicates well and is creative and innovative.

Job Outlook: Given the fact that electronic engineering is a rapidly expanding field and Malaysia is a leading exporter of electronic components, career opportunities for electronics engineers are excellent. An increasing demand by businesses and government for computers and communications equipment is expected to account for much of the projected employment growth.

Related Occupations: Specialists in aviation electronics and industrial robots.

Environmental Engineers

Job Description: Environmental engineers plan and manage pollution and waste engineering concerns. They deal with liquid and solid wastes, and air and noise pollution as well as develop an ecological approach to convert toxic waste into non-toxic end products.

The work involves some or all of the following:

- coordinating and assessing the environmental impact of the engineering projects;
- indulging in research and development of new methods to improve the environmental acceptability of the engineering projects;
- working to reduce excessive waste generation and conducting processes to treat waste to an acceptable level for discharge or recycling purposes;
- writing reports and presenting analysis studies to support approaches to environmental sustainability.

Environmental engineers usually specialise in specific areas: environmental impact assessment (EIA),

waste treatment or specific industry sectors like mining. They can further advance to corporate management positions.

Education: A degree in environmental engineering is essential.

Personal Attributes: Possesses well-developed oral and written skills, and computing and design knowledge; is analytical, independent and responsible.

Job Outlook: Environmental engineers are often employed by government departments and agencies, engineering firms and certain industrial organisations. Opportunities have been good lately due to increasing environmental concerns and projects in environmentally sensitive areas.

Related Occupation: Environmental scientists.

Industrial Engineers

Job Description: The industrial engineer's job is to determine the most effective ways an organisation can utilise the basic factors of production, for example, manpower, machines, materials, information and energy. They are the bridge between management and operations.

Unlike other speciality engineers, who generally work with products or processes, industrial engineers are more concerned with increasing productivity without compromising safety. This is done through the management of people and methods of business organisation

To solve production and organisational problems, industrial engineers carefully study the product and its requirements. They design manufacturing and information systems and use mathematical analysis methods such as operations research, to meet those requirements.

The industrial engineer's work includes some or all of the following:

- designing production planning and control systems to co-ordinate activities and control product quality;
- designing or improving systems for the physical distribution of goods and services;
- developing management control systems to assist in financial planning and cost analysis.

Education: A degree in engineering (Manufacturing, Industrial and Computing, Manufacturing and

Management, Materials Manufacturing) is essential.

Personal Attributes: Possesses an aptitude for mathematics and science; has excellent problem-solving skills and a logical, practical approach to work.

Job Outlook: More firms are seeking to reduce costs and increase productivity through scientific management and safety engineering. Since the main function of an industrial engineer is to make higher quality products, in as efficient a way as possible, his/her services should be in demand in the manufacturing sector. Most job openings will result from the need to replace those who change occupations or leave the labour force.

Related Occupations: Chemical engineers, plant managers and production managers.

Mechanical Engineers

Job Description: Mechanical engineers deal mainly with the planning and designing tools, engines, machines and other mechanical equipment. They design and develop power-producing machines such as the following:

- internal combustion engines;
- jet and rocket engines;
- steam and gas turbines.

They also design and develop power-using machines such as the following:

- industrial production equipment;
- machine tools;
- materials handling systems;
- refrigeration and air-conditioning equipment;
- robots.

A mechanical engineer's work varies depending on the type of industry and functions involved. Their areas of specialisation include one or more of the following:

- applied mechanics;
- design engineering;
- heat transfer;
- power plant engineering;
- pressure vessels and piping;
- underwater technology.

Mechanical engineering is the broadest engineering discipline and includes many

interdependent areas of specialisation. Mechanical engineers may work in production operations, maintenance, technical sales and may even take on the roles of administrators and managers.

Education: A degree in mechanical engineering is essential.

Personal Attributes: Possesses an aptitude for mathematics and science; has perseverance and an eye for detail, has a logical and practical approach to work; is imaginative.

Job Outlook: Although overall employment in the manufacturing industry is expected to decline, opportunities for mechanical engineers to work in this sector should increase. This is due to the expanding demand for machinery and machine tools and the increasing complexity of industrial machinery and processes. Mechanical engineers specialising in robotics are at a great advantage.

Related Occupations: Aerospace engineers, air-conditioning and refrigeration engineers, automobile engineers, marine engineers and systems engineers.

Metallurgical, Ceramic and Materials Engineers

Job Description: Metallurgical, ceramic and materials engineers are the people who develop new types of metal alloys, ceramics, composites and special materials which such as those for alloy turbine blades in a jet and those used in the production of space shuttles.

Metallurgical engineering graduates carry out research, and control and develop processes for extracting metals from their ores or for refining them. They are usually employed by gold, copper, tin and coal companies.

Specialists in this field work in one of the three main branches of metallurgy.

- *Extractive or chemical metallurgists* discover how to remove metals from ores and refine and alloy them to obtain useful metals.
- *Physical metallurgists* study the nature, structure and physical properties of metals and their alloys, and explore methods of processing metals into final products.
- *Mechanical metallurgists* develop and improve

metalworking processes such as casting, forging, rolling, and drawing.

Ceramic engineers develop new ceramic materials and find methods for turning them into useful products. They are involved in the manufacture of a variety of products such as automobile and aircraft engine components, electric power line insulators, fibre-optic phone lines, glassware, semiconductors and tiles.

Materials engineers evaluate technical requirements and specifications for developing usable materials. They also test, evaluate and develop new materials, such as composite materials now being used in "stealth" aircraft.

Education: A degree in material engineering or mineral engineering is essential.

Personal Attributes: Possesses an aptitude for mathematics and science; has a logical and practical approach to work and an eye for detail.

Job Outlook: Career opportunities for metallurgical, ceramic and materials engineers are expected to increase. Growth is anticipated in service industries such as architectural, engineering, research and testing services. These sectors develop and improve materials for their industrial customers.

Related Occupations: Chemical engineers, geological engineers and mineral-processing engineers.

Mining Engineers

Job Description: Mining engineers find, extract, and prepare metals and minerals for use in manufacturing industries.

Their job involves some or all of the following:

- creating methods for transporting minerals to processing plants;
- designing open pits and underground mines;
- conducting investigations and undertaking subsequent evaluation of mineral deposits;
- supervising the construction of mine shafts and tunnels in underground operations;
- taking responsibility for the safe, economical, and environmentally sound operation of these mines.

Education: A degree in mining engineering is essential.

Personal Attributes: Possesses an aptitude for mathematics and science; has excellent problem-solving skills; has determination, patience and perseverance; able to work as a team.

Job Outlook: Opportunities in the mining industry are closely related to the price of metals and minerals. Little change is expected in employment opportunities in the near future. Mining companies will only invest in the multi-million dollar, material-moving equipment and ore-processing technology needed to operate a mine if they are assured of high returns.

Related Occupations: Civil engineers, environmental engineers, geologists and geotechnical engineers.

Nuclear Engineers

Job Description: Nuclear engineers basically conduct research on the properties of nuclear energy and radiation. They design, develop, monitor and operate nuclear power plants such as the ones used to generate electricity and power naval ships. Some nuclear engineers are specialists in the development of nuclear weapons. Others develop industrial and medical uses for radioactive materials such as in the diagnosis and treatment of medical problems.

Education: A degree in nuclear engineering is essential.

Personal Attributes: Possesses a strong aptitude for mathematics and science; has excellent problem-solving skills, able to think clearly and logically.

Job Outlook: Because of concerns over the cost and safety of nuclear power, it is unlikely that any new nuclear power plants will be built in the near future. However, nuclear engineers will continue to be needed to operate existing plants and to enforce safety standards.

Petroleum Engineers

Job Description: Petroleum engineers are involved in the exploration and production of oil and natural gas.

Their work may involve some or all of the following:

- determining and developing the most efficient production methods of extracting oil or natural gas to ensure the maximum profitable recovery from a reservoir;
- undertaking geological and geophysical studies to decide suitable drilling methods and equipment;
- taking the necessary steps to prevent any leakage from the reservoir;
- planning efficient ways of transporting oil and natural gas.

Education: A degree in petroleum engineering is essential.

Personal Attributes: Possesses a strong aptitude for mathematics and science; has a logical and practical approach to work; able to work independently; is determined, patient and responsible.

Job Outlook: Job openings for petroleum engineers are expected to decline unless oil and gas prices unexpectedly increase, thus encouraging more exploration for oil in this country. However, employment opportunities for petroleum engineers should still be good because there are very few petroleum engineering graduates.

Related Occupations: Environmental engineers and geological engineers.

Stationary Engineers

Job Description: Stationary engineers operate and maintain stationary equipment including air-conditioning and refrigeration equipment, boilers, condensers, compressors, diesel engines, generators, pumps and turbines. These are used mainly in large buildings and industrial plants.

Stationary engineers do some or all of the following:

- start up, regulate and shut down equipment;
- monitor it with special instruments or computerised controls to ensure it operates safely, economically and within established limits, making adjustments if required;
- use hand and power tools for repair and routine maintenance, like lubricating moving parts, replacing filters, and removing soot and corrosion that can affect operating efficiency;

- record relevant events and facts concerning operation and maintenance for example, fuel consumption, power output, steam pressure, temperature and water level in an equipment log;
- monitor machinery, conduct routine checks on safety devices, identify and correct any faults;
- test boiler water and add chemicals to prevent corrosion and harmful deposits.

Education: Skills are acquired through on-the-job training, apprenticeship or engineering courses.

Personal Attributes: Possesses mechanical aptitude, manual dexterity and good physical condition.

Job Outlook: Employment growth for stationary engineers will be slow compared to other occupations. This is due to automated and computerised controls making newly installed equipment more efficient.

The increasing complexity of power-generating systems requires that new entrants complete an apprenticeship training or vocational school courses in computerised controls and instrumentation, to increase their chances of getting a job.

Related Occupations: Chemical operators, nuclear reactor operators, power station operators, refinery operators, water and wastewater treatment plant operators, and waterworks pump-station operators.

Sources of Additional Information:

Institute of Engineers
Bangunan Ingenieur
60/62 Jalan 52/4
46720 Petaling Jaya

Lembaga Jurutera Malaysia
d/a Jabatan Kerjaraya
Jalan Mahameru
50480 Kuala Lumpur

UK

The Engineering Council
Canberra House
10-16 Maltravers Street
London WC2R 3ER

HEALTH ASSESSMENT AND TREATING OCCUPATIONS

Acupuncturists

Job Description: Acupuncturists treat illnesses and diseases by utilising the traditional Chinese method of inserting fine needles into the skin at acupuncture points to activate the body's defence mechanism, with the aim of restoring the imbalance of "chi" or energy in the body.

The work involves some or all of the following:

- diagnosis – discussing with the patient, checking the patient's pulse and observing the patient's face and body features;
- treatment – inserting the needles into chosen areas and massaging or utilising heat treatment to activate the acupuncture points, using a herb called moxa.

Acupuncturists usually work on their own or within established clinics where other traditional health care methods are being practised.

Education: A degree in health science in acupuncture or relevant training is required.

Personal Attributes: Is skillful with the hands, and is confident and patient.

Job Outlook: More Malaysians are seeking alternative forms of treatment for illnesses or diseases. Prospects look good due to this growing interest and acceptance.

Related Occupations: Chiropractors, naturopaths and osteopaths.

Dieticians and Nutritionists

Job Description: Dieticians and nutritionists plan nutrition programmes and supervise the preparation and serving of meals. They help prevent and treat illnesses by promoting healthy eating habits.

Their work normally involves some or all of the following:

- scientifically evaluating clients' diets and suggesting modifications such as less salt for those with high blood pressure;
- running food service systems for institutions

such as hospitals and schools and promoting sound eating habits through education and research;

- researching on topics related to food and nutrition;
- formulating diet plans for sporting teams to improve performance;
- advising the consumer organisations, food industry, government and schools on strategies, development of resource material, food policies, and other related issues;
- working as educators and researchers.

Dietitians can also specialise as the following:

administrative or management dietitians, whose work involves some or all of the following:

- overseeing large-scale meal planning and preparation in places like health care facilities, company cafeterias, prisons and schools;
- hiring, training and directing other dietitians and food service workers;
- budgeting for and purchasing food, equipment and supplies;
- enforcing sanitary and safety regulations;
- preparing records and reports.

clinical dietitians, whose work includes some or all of the following:

- providing nutritional services for patients in institutions such as hospitals and nursing homes;
- assessing patients' nutritional needs, developing and implementing nutrition programmes, and evaluating and reporting the results;
- conferring with doctors and other health care professionals in order to co-ordinate medical and nutritional needs.

community dietitians, who counsel individuals and groups about nutritional practices designed to prevent disease and promote good health.

Education: A bachelor's degree with a major in dietetics, foods and nutrition, food service systems management or a related area is required.

Personal Attributes: Possesses an interest in food and its preparation; able to work as part of a team.

Job Outlook: Employment for dietitians is

expected to grow as fast as other occupations. This is due to the growing demand for meals and nutritional counselling in community health programmes, diet workshops, health clubs, home health, nursing homes, prisons and schools. Public interest in nutrition and the emphasis on health education and prudent lifestyles will add to the demand.

Related Occupations: Food service managers, health promotion officers and hospital diet supervisors.

Sources of Additional Information:

Bahagian Pemakanan
Institut Penyelidikan Perubatan
Jalan Pahang
50588 Kuala Lumpur

Occupational Therapists

Job Description: Occupational therapists help individuals with developmentally, emotionally, mentally or physically disabling conditions to develop, recover or maintain daily living and work skills. They not only help patients improve basic motor functions and reasoning abilities but also to compensate for permanent loss of function.

Their goals and scope of work include some or all of the following:

- helping patients have independent, productive and satisfying lifestyles;
- evaluating a patient's capabilities, and planning and implementing appropriate therapeutic programmes involving a variety of activities like social, recreational or vocational activities;
- researching into and designing or making special equipment needed at home or at work;
- developing and teaching patients to operate computer-aided adaptive equipment such as microprocessing devices that permit individuals with severe limitations to communicate, walk, operate telephones and television sets, and control other aspects of their environment;
- organising health, leisure and recreational education programmes;
- working with individuals, a particular age group or particular disabilities;
- offering consultancy services to government departments, private organisations and schools;

- helping develop special programmes for disabled children and teaching in academic institutions.

Occupational therapists can specialise in a variety of fields such as the following:

- general medicine work in hospitals or private clinics to assess and treat victims of burns, heart attacks, strokes, etc.
- industrial therapy to help patients find jobs, arrange for employment, plan work activities and evaluate the patient's progress.
- paediatrics to help children with disabilities.
- psychiatric evaluation and treatment of patients with mental or behavioural disorders.
- vocational rehabilitation work in private practice or for government departments to help injured workers get back to work.

Education: A bachelor's degree in occupational therapy is the minimal requirement.

Personal Attributes: Possesses the ability to solve problems and to adapt activities to individual needs; has good communication skills; is flexible, patient and warm.

Job Outlook: Employment for occupational therapists is expected to grow faster than other occupations. This is due to anticipated growth in demand for rehabilitation and long term care services. Several factors are increasing the need for rehabilitation services. Medical advances are now making it possible for more patients with critical problems to survive. These patients will need extensive therapy. There is also a rising rate in the incidence of heart attacks and strokes. Due to industry growth and more intensive care, hospitals will continue to employ the largest number of occupational therapists.

Related Occupations: Physical therapists, recreational therapists, rehabilitation counsellors and speech pathologists and audiologists.

Pharmacists

Job Description: Pharmacists dispense drugs prescribed by physicians and other health practitioners and provide information to patients

about medications and their use.

Their scope of work includes some or all of the following:

- advising physicians and other health practitioners on the selection, dosages and side effects of medications;
- understanding the use, composition, and effects of drugs (compounding or the actual mixing of ingredients to form capsules, ointments, powders, tablets and solutions is only a small part of a pharmacist's work);
- answering customers' queries about prescription drugs such as possible adverse reactions and interactions;
- answering questions about over the counter drugs and making recommendations after asking a series of health questions;
- advising on health equipment and health care supplies;
- dispensing medication and advising the medical staff on the selection and effects of the drugs, in clinics and hospitals;
- carrying out research and development work in medicines and other health related products, and managing pharmaceutical companies.

Specialists in this field include the following:

- *community pharmacists*, who provide primary health care, advice on selecting drugs and educate customers on proper drug usage;
- *hospital pharmacists*, who work as part of a health care team and counsel patients about medication, monitor usage of medicines and prepare various sterile or non-sterile products for patients use;
- *industrial pharmacists*, who work with pharmaceutical companies and carry out research and development activities, manufacturing, testing analysis and marketing of the products.

Education: A bachelor's degree in pharmacy is essential. Recognised degrees are offered by certain universities in other countries. You must check with the Pharmacy Board if the university of your choice is registered before applying for a course of study. Graduates from these universities may need to complete an extra year of housemanship with the Ministry of Health to be an officially registered pharmacist.

Personal Attributes: Possesses manual dexterity and scientific aptitude; is very careful and methodical in work; able to work independently without supervision.

Job Outlook: Employment for this career is expected to grow. This is mainly due to the increased pharmaceutical needs of a larger and older population and greater use of medication. As in other occupations, most job openings will result from the need to replace pharmacists who leave the profession.

The increase in middle-aged and elderly people will spur demand in all practice settings. Other factors for the likely increase in demand include scientific advances that will make more drug products available, new developments in administering medications and increasingly sophisticated customers who seek more information on drugs.

Related Occupations: Chemists, forensic scientists, medical scientists and pharmaceutical chemists.

Sources of Additional Information:

Malaysia Pharmaceutical Society
41A Lorong SS21/1A
Damansara Utama
47400 Petaling Jaya

Bahagian Farmasi, Ministry of Health
Tingkat 1, Bangunan MMA
Jalan Pahang
53000 Kuala Lumpur

Physical Therapists

Job Description: Physical therapists improve mobility, relieve pain and prevent or limit the permanent physical disabilities of patients suffering from injuries or disease. Their patients include accident victims and disabled individuals with conditions such as amputations, arthritis, burns, cerebral palsy, fractures, head injuries, heart diseases, low back pain, multiple sclerosis and nerve injuries.

The work of a physical therapist can involve some or all of the following:

- evaluating a patient's medical history, and testing and measuring his/her strength, range of motion, and ability to function;

- developing written treatment plans, which may be based on physician's orders, and describing the treatment to be provided, its purpose and the anticipated outcome;
- teaching and motivating patients to use crutches, prostheses and wheelchairs to perform day-to-day activities, and showing them the exercises to be done at home;
- documenting evaluations, daily progress, medical team conferences and reports to referring practitioners and insurance companies.

Some physical therapists treat a wide variety of problems, while others specialise in areas like cardiopulmonary physical therapy, geriatrics, neurology, orthopaedics, paediatrics and sports physical therapy.

Education: Graduate education is required.

Personal Attributes: Possesses manual dexterity and physical stamina; is patient, persuasive, resourceful, emotionally stable and tactful.

Job Outlook: Growth will occur as new medical technologies save more people, who will then need therapy. Demand for physical therapists will increase as new technologies permit more disabling conditions to be treated and as populations grow and age. The rapidly growing elderly population is particularly vulnerable to chronic and debilitating conditions that will require more therapeutic services.

Related Occupations: Acupuncturists, athletic trainers, audiologists, chiropractors, corrective therapists, respiratory therapists and speech pathologists.

Physician Assistants

Job Description: Physician assistants support physicians. However, they should not be confused with medical assistants.

Physician assistants are formally trained to perform many routine but time-consuming tasks that physicians usually do, such as the following:

- taking medical histories, examining patients, ordering and interpreting laboratory tests and x-rays, and making preliminary diagnoses;
- treating minor injuries;
- undertaking managerial duties like ordering

medical equipment and supplies and supervising technicians and assistants.

Physician assistants normally work under the supervision of a physician. They may also specialise in surgery and are called surgeon assistants.

Education: Graduate education is required.

Personal Attributes: Possesses leadership skills, self-confidence and emotional stability; is willing to keep up with medical advances.

Job Outlook: Employment growth for this career is expected to grow due to anticipated expansion of the health service industry and an emphasis on cost containment.

Physicians and institutions are expected to employ more physician assistants to provide primary care and assist with medical and surgical procedures, thus freeing physicians to perform more complicated and revenue generating tasks.

Related Occupation: Nurse practitioners.

Physiotherapists

Job Description: Physiotherapists examine and treat problems of human movements and advise people on proper bodily movements to prevent injury.

The work involves some or all of the following:

- examining the physical condition of patients to identify problems and planning appropriate treatment;
- utilising exercise programmes or equipment which enhance muscle movements or help in muscle re-education;
- training patients to walk again or to use devices such as crutches, splints, walking frames and wheelchairs;
- helping individuals with permanent disabilities to cope with everyday physical demands;
- conducting educational classes or having reading materials for patients, their families and the community on healthy living and injury prevention;
- coordinating community fitness programmes.

Physiotherapists may choose to concentrate on amputations, arthritis, burns, cerebral palsy, fractures, head injuries, heart diseases, low back pain,

multiple sclerosis and nerve injuries. Physiotherapists may work in a team with health care specialists or independently in private practice, or as consultants in industry.

Education: A degree in physiotherapy or a comparable qualification is essential.

Personal Attributes: Possesses good problem-solving skills and an interest in people; is patient, healthy and physically fit.

Job Outlook: The prospect of this job is good with the government emphasising on sports excellence and the increase of nursing homes in this country.

Related Occupations: Chiropractors, massage therapists, medical practitioners, occupational therapists, osteopaths and speech pathologists.

Recreational Therapists

Job Description: Recreational therapists employ activities to treat or maintain the physical, mental and emotional well-being of patients. Their work usually involves some or all of the following:

- organising and planning activities like arts and crafts, drama, games, music and sports as well as field trips for ball games, picnics or sightseeing;
- encouraging participation to help individuals build confidence, socialise effectively and remedy the effects of illness or disability;
- treating and rehabilitating individuals with specific medical problems in clinical settings such as hospitals and rehabilitation centres;
- interacting and taking help from nurses, physical and occupational therapists, physicians, psychologists and social workers, to assist patients;
- observing and recording patients' participation, reactions and progress.

Education: A bachelor's degree in therapeutic recreation is required.

Personal Attributes: Possesses ingenuity, imagination and good physical coordination; is comfortable working with disabled people; is patient, persuasive and tactful.

Job Outlook: Employment growth for this career is expected to be fast. This is essentially because of

anticipated expansion in long term care, and physical and psychiatric rehabilitation services for the disabled.

Hospitals will provide a large number of recreational therapy jobs. The rapidly growing number of older people is expected to spur job growth for activity directors in adult day care programmes, nursing homes and social service agencies.

Related Occupation: Rehabilitation counsellors.

Registered Nurses

Job Description: Registered nurses care for the sick and injured and help people stay well. They are typically concerned with providing for the all-round needs, that is, the physical, mental and emotional needs of their patients.

They usually do some or all of the following:

- observe, assess and record symptoms, monitor reactions and progress, assist physicians during treatment and examinations, administer medication and first aid, and assist in convalescence;
- perform difficult procedures such as starting intravenous fluids and monitoring equipment;
- ready patients for operations, manage all aspects of post-operative care and assist rehabilitation;
- develop and manage nursing care programmes;
- instruct patients and their families in proper health care methods, and help individuals and groups take steps to improve or maintain their health;
- undertake a variety of supervisory tasks like training licensed practical nurses and handle administrative jobs like maintaining records.

Registered nurses may specialise as one of the following:

- *clinical nurses*, who usually specialise in one particular area of medicine;
- *head nurses or nurse supervisors*, who direct nursing activities like planning work schedules, assigning duties to nurses, and handling serious disability, illness, substance abuse, etc.;
- *hospital nurses*, who are the largest group of

nurses and who are assigned to areas such as maternity, paediatrics, surgery and others;

- *nursing home nurses*, who manage nursing care for residents with diverse conditions ranging from a fracture to Alzheimer's disease;
- *occupational health or industrial nurses*, who provide nursing care at worksites to employees, customers and others with minor injuries and illnesses;
- *office nurses*, who assist physicians in clinics, emergency medical centres, health maintenance organisations, private practice and surgical centres;
- *private duty nurses*, who care for patients needing constant attention and who normally work directly for families on a contract basis, or for a nursing or temporary help agency which assigns them to patients;
- *psychiatric nurses*, who manage patients with mental or behavioural problems undergoing treatment at hospitals, clinics, homes or health centres;
- *public health nurses*, who work in government and private agencies and clinics, schools, retirement communities and other community settings, and who arrange for immunisations, blood pressure testing, and other forms of health screening.

Education: Applicants must undergo a nursing course in an accredited nursing school.

Personal Attributes: Possesses leadership qualities, patience, tact and team spirit; able to accept responsibility, follow orders precisely and willing to take the initiative during an emergency; is caring and sympathetic.

Job Outlook: Job prospects in nursing are good. Driving the growth will be technological advances in patient care, which permit a greater number of medical problems to be treated, and an increasing emphasis on primary care.

Employment prospects will be bright in ambulatory surgical centres, emergency medical centres and physicians' offices and clinics as health care expands. Employment in nursing homes is also expected to grow very fast due to an increase

in the number of people in their eighties and nineties, many whom will require long-term care.

Related Occupations: Physical therapists and physician assistants.

Sources of Additional Information:

The Hospital Administrator
Kinta Medical Centre
20 Jalan Chung Thye Phin
30250 Kuala Lumpur

The Principal Tutor
Pantai Medical Centre
8 Jalan Bukit Pantai
59100 Kuala Lumpur

The Principal
School of Nursing
Hospital Lam Wah Ee
Jalan Batu Lanchang
11600 Penang

The Principal Tutor
Tun Tan Cheng Lock School of Nursing
Assunta Hospital
46050 Petaling Jaya

Respiratory Therapists

Job Description: Respiratory therapists evaluate, treat and care for patients with breathing disorders. They test the capacity of the lungs and analyse the oxygen, carbon dioxide concentration and potential of hydrogen (pH), a measure of acidity or alkalinity level of the blood.

They may do some or all of the following:

- treat all sorts of patients, including premature infants whose lungs are not fully developed or elderly people whose lungs are diseased;
- provide temporary relief to patients with chronic asthma or emphysema, and emergency care for heart failure, stroke, drowning or shock victims;
- commonly use oxygen or oxygen mixtures, chest physiotherapy and aerosol medications;
- place an oxygen mask or nasal cannula on a patient and set the oxygen flow at the level prescribed by a physician to increase a patient's concentration of oxygen;
- connect patients, who cannot breathe on their

own, to ventilators which deliver pressurised air into the lungs;

- regularly check on patients and equipment;
- perform chest physiotherapy on patients to remove mucus from their lungs and make it easier for them to breathe.

Education: Graduate education is required.

Personal Attributes: Is sensitive to patients' physical and psychological needs, and is attentive to detail; able to follow instructions and work as part of a team.

Job Outlook: Employment growth for this career is expected to be faster than in the other occupations. This is because of substantial growth of the middle-aged and elderly population, a development that will heighten the incidence of cardiopulmonary disease. As the number of elderly people increases, the need for respiratory therapists will increase as well.

In addition, advances in treating victims of heart attacks, accident victims and premature infants will require the services of respiratory therapists. Very rapid growth is expected in home health service, equipment rental companies and firms providing respiratory care on a contract basis.

Related Occupations: Dialysis technicians, physical therapists, radiation therapy technologists and registered nurses.

Speech-Language Pathologists and Audiologists

Job Description: Speech-language pathologists and audiologists assess and treat persons with speech, language, voice and fluency disorders.

Speech-language pathologists work with people who cannot make speech sounds or cannot make them clearly.

Their work involves some or all of the following:

- working with people having speech rhythm and fluency problems such as stuttering and speech quality problems like understanding and producing language;
- working with people who have oral motor problems that cause eating and swallowing difficulties and people with defects as a result of surgery, disease or brain disorders;

- using special instruments as well as written and oral tests to determine the nature and extent of impairment, and recording and analysing speech irregularities;
- developing and devising appropriate methods of treatment.

Audiologists assess and treat those with hearing and related disorders.

Their work involves some or all of the following:

- working with people who have hearing and related problems;
- prescribing, fitting and assessing the effectiveness of hearing devices;
- using audiometers and other testing devices to measure the loudness at which a person begins to hear sounds, assessing their ability to distinguish between sounds and other tests of the nature, and evaluating the extent of their hearing loss;
- co-ordinating these results with medical, educational and psychological information, making a diagnosis, and determining a course of treatment;
- evaluating hearing levels of personnel in the armed forces or aviation industry;
- undertaking research, providing consultancy services, organising rehabilitation programmes, working with cochlear implant teams, and devising and implementing noise control and hearing conservation policies.

Most speech-language pathologists and audiologists provide direct clinical services to individuals with communication disorders.

Education: A bachelor's degree is required but a master's degree is preferred.

Personal Attributes: Possesses good communication skills; able to inspire confidence and cooperation in people; is patient, compassionate and tactful when dealing with other people's problems.

Job Outlook: Employment in the health services industry will increase as a result of several factors. Because hearing loss is strongly associated with older age, rapid growth in the population age 75 and over will cause the number of hearing-impaired persons to increase markedly. The number of speech-language pathologists and audiologists in private practice, though small, is expected to rise sharply.

Related Occupation: Physical therapists.

HEALTH DIAGNOSING PRACTITIONERS

Chiropractors

Job Description: Chiropractors diagnose and treat patients whose health problems are associated with the body's muscular, nervous and skeletal systems, especially the spine. Chiropractors believe that the misalignment of spinal vertebrae or irritation of the spinal nerves can alter many important body functions by affecting the nervous system.

Chiropractors' approach to health care is holistic, stressing the patient's overall well-being. It recognises that many factors affect health including diet, exercise, environment, heredity and rest.

Their scope of work involves some or all of the following:

- using natural, drugless, non-surgical health treatments and relying on the body's inherent recuperative abilities;
- recommending lifestyle changes such as eating and sleeping;
- prescribing corrective exercises to help and speed the healing process;
- following a standard routine to secure information for diagnosis;
- taking a patient's medical history, conducting physical, neurological and orthopaedic examinations, and even ordering laboratory tests if required;
- manually manipulating or adjusting the spinal column, if diagnosis points to the musculoskeletal structures;
- using water, light, massage, ultrasound, electric and heat therapy, and applying support such as braces, straps and tapes.

Chiropractors can specialise in athletic injuries, internal disorders, neurology, nutrition and orthopaedics. They usually work in clinics with other health professional or in their own private practice.

Education: Graduate education is required.

Personal Attributes: Possesses good reflexes and hand-eye coordination; has a caring attitude and an interest in people; able to work independently; is physically fit and healthy.

Job Outlook: Demand for chiropractors is related to the ability of patients to pay, either directly or through health insurance, and to the growing public awareness of the profession.

The rapidly expanding older population with their increased likelihood of mechanical and structural problems will also increase demand.

Related Occupations: Acupuncturists, massage therapists, naturopaths, osteopaths, physical therapists, physicians and podiatrists.

Dentists

Job Description: Dentists diagnose, prevent and treat problems of the teeth and tissues of the mouth. Their work involves some or all of the following:

- removing decayed teeth and filling cavities, examining x-rays, placing protective plastic sealant on children's teeth, straightening teeth, and repairing fractured teeth;
- performing corrective surgery of the gums and supporting bones to treat gum diseases;
- extracting teeth and making moulds and measurements for dentures, to replace missing teeth;
- providing instructions in brushing, diet, flossing and other aspects of dental care;
- diagnosing and treating other lesions or mouth problems, and referring to other dental specialists if needed;
- overseeing a variety of administrative tasks in private practice including bookkeeping and buying equipment and supplies.

Most dentists are general practitioners who handle a wide variety of dental needs. Other dentists practise in any one of the following eight speciality areas:

- *dental public health*;
- *endodontics*, which involves root canal therapy;
- *oral and maxillofacial surgery*, which involves operating on the mouth and jaws;
- *oral pathology*, which is the study of diseases of the mouth;
- *orthodontics*, which involves straightening teeth;

- *paediatric dentistry*, which is dentistry for children;
- *periodontics*, which is the treatment of gum diseases and the bone supporting the teeth;
- *prosthodontics*, which deals with making artificial teeth or dentures.

Education: Degrees from selected overseas universities are recognised. You should, however, check with the Public Service Department's recognition list before enrolling.

Personal Attributes: Possesses a high degree of manual dexterity and excellent judgment of space and shape; able to concentrate and do precise and detailed work.

Job Outlook: Employment growth for dentists is expected to be as fast as the average for all occupations.

Related Occupations: Dental therapists and optometrists.

Sources of Additional Information:

The Public Service Department
11th Floor, Bangunan Perkim
Jalan Ipoh
51200 Kuala Lumpur

Malaysia Dental Association
69-2 2nd Floor
Medan Setia
Plaza Damansara
Bukit Damansara
50490 Kuala Lumpur

Optometrists

Job Description: Optometrists provide most of the primary vision care that people need. They examine people's eyes to diagnose vision problems and eye diseases, and prescribe lenses or other optical aids.

Their work normally involves some or all of the following:

- treating vision problems and certain eye diseases such as conjunctivitis or corneal infections;

- using specialised instruments and observation techniques to examine eye health and to test patients' visual acuity, depth and colour perception, and their ability to focus and co-ordinate the eyes;
- prescribing contact lenses, eyeglasses, low vision aids and vision therapy;
- advising on visual safety standards and contributing to industrial safety programmes;
- checking eyeglasses and lenses, and advising their clients how to use and maintain them;
- referring people to specialists for treatment, if abnormalities are detected, for example.

Optometrists should not be confused with dispensing opticians, ophthalmologists and optical technicians.

- *Dispensing opticians* fit and adjust eyeglasses and contact lenses according to prescriptions written by ophthalmologists or optometrists.
- *Ophthalmologists* are physicians who diagnose and treat eye diseases and injuries. They perform eye surgery and prescribe drug.
- *Optical technicians* make and fit lenses into frames.

Education: A bachelor's degree in optometry is required. Those who wish to do research may study for a master's or Ph.D degree.

Personal Attributes: Possesses the ability to perform accurate and precise work; able to deal tactfully with patients; is patient and self-disciplined.

Job Outlook: Employment growth for optometrists is expected to grow about as fast as the average for all occupations in response to the vision care need of a growing and ageing population. The maturing of the baby-boom generation, together with rapid growth in the elderly population will drive this growth. In addition, a greater recognition to the importance of vision care will also contribute to the growth.

Related Occupations: Audiologists, dentists, optical dispensers and speech-language pathologists.

Sources of Additional Information:

Canada

School of Optometry
University of Waterloo
Waterloo
Ontario N2L 3G1

UK

British College of Optometrists
10 Knareborough Place
Earls Court
London SW5 OTG

Association of Optometrists
Bridge House
233-234 Blackfriars Road
London SE1 8NW

General Optical Council
41 Harley Street
London W1N 2OJ

USA

American Optometrist Association
243 North Lindbergh Blvd
St Louis
MO 63141

Osteopaths

Job Description: Osteopathy is a form of alternative medicine. Osteopaths diagnose and treat illnesses and injuries by assessing and treating the musculoskeletal-skeletal system of the body. They use manual techniques to overcome mechanical stresses and improve body functions.

They usually do some or all of the following:

- use case histories, physical examination, manual palpitation and various test results to diagnose the problem;
- use manual techniques like gentle mobilisation and muscle relaxation to treat patients;
- treat bio-mechanical complaints like asthma, backache, breathing problems, joint problems, sports injuries, stress and strain injuries, and other medical ailments;
- treat children for after-effects of birth trauma and accidents;
- use special electrical equipment for treatment and develop exercise programmes and diets;
- interact with and assist other medical practitioners.

Osteopaths can work from clinics or run their own private practice.

Education: A bachelor's degree in osteopathic science is the minimum requirement.

Personal Attributes: Possesses an interest in people and their health; has manual dexterity.

Job Outlook: Demand for osteopaths is good due to the growing public awareness of the profession.

Related Occupations: Acupuncturists, chiropractors, massage therapists, medical practitioners, naturopaths and physiotherapists.

Physicians

Job Description: Physicians examine patients, obtain medical histories, and order, perform and interpret diagnostic tests. Physicians usually specialise in one of the many branches of medicine like allergies, cardiology, internal medicine, neurology, paediatrics, to name just a few.

Physicians may do some or all of the following:

- diagnose illnesses, inoculate against illnesses, and prescribe and administer treatment for people suffering from injury or disease;
- counsel patients on diet, hygiene and preventive health care;
- arrange for admission into hospital and provide follow-up treatment at home on discharge;
- attend to emergencies and perform operations if required;
- advise and assist the elderly, physically disabled, and expectant mothers;
- refer patients to other specialists if required.

Some other careers in this field include:

- *anaesthetists*, who administer anaesthesia to patients during surgery;
- *paediatricians*, who treat children and adolescents;
- *pathologists*, who use laboratory techniques to study and pin-point probable sources of infection, among other things;

- *surgeons*, who can specialise in cancer surgery, orthopaedic surgery (bones and joints), plastic surgery, etc.

General and family practitioners, general internists and paediatricians are often called primary care physicians since they are the first health professionals patients usually consult.

Education: Most physicians have at least a bachelor's degree in medicine and many have advanced degrees.

Personal Attributes: Possesses the desire to serve patients and the ability to make decisions in emergencies; able to survive the pressures and long hours; is willing to keep up with medical advances; has a good bedside manner and emotional stability; is self-motivated.

Job Outlook: Employment growth for physicians is expected to be faster than for other occupations due to continued expansion of the health industry. In addition, the population is growing and ageing, and health care needs increase sharply with age. Jobs prospects are good for primary care physicians such as family practitioners and internists, and for geriatric and preventive care specialists.

Related Occupations: Other types of medical and surgical specialists.

Sources of Additional Information:

The Secretary
Malaysian Medical Association
No. 124 Jalan Pahang
53000 Kuala Lumpur

Malaysian Medical Council
c/o Ministry of Health
Jalan Cenderasari
50480 Kuala Lumpur

India

Director of Admissions
Dr. T.M.A. Pai Foundation
Kasturba Medical College
Academy House
Manipal 576 119, Karnataka

Principal
M.S. Ramaiah Medical College
Gokula Extension
Bangalore 560 054, Karnataka
Principal
Jawaharlal Nehru Medical College
Belgaum 590 010, Karnataka

UK

British Medical Association
BMA House
Tavistock Square
London WC1H 9JP

Podiatrists

Job Description: Podiatrists are also known as doctors of podiatric medicine (DPM's). They diagnose and treat disorders, diseases and injuries of the foot and lower leg, to keep this part of the body working properly.

Podiatrists may do some or all of the following:

- treat arch problems, bunions, calluses, corns, ingrown toenails and heel spurs;
- treat ankle and foot injuries, deformities and infections, and foot complaints associated with diseases such as diabetes;
- prescribe drugs, recommend use of appropriate footwear, order physical therapy, set fractures and perform surgery, to treat these problems;
- fit corrective inserts called orthotics, and design plaster casts and strapping to correct deformities like flat feet;
- consult with and refer patients to other health practitioners when they spot systemic diseases, such as arthritis, diabetes and heart diseases.

Most podiatrists have a general practice. Some specialise in orthopaedics, public health or surgery. Besides these, podiatrists may also practice a sub-specialty such as dermatology, diabetic foot care, geriatrics, paediatrics, radiology and sports medicine.

Education: A bachelor's degree in podiatric medicine is required.

Personal Attributes: Possesses manual dexterity, an interest in health care and the desire to work individually with people; is highly motivated and independent.

Job Outlook: Employment for podiatrists is expected to grow faster than for other occupations. More people will turn to podiatrists for foot care as the elderly population grows. The elderly have more foot problems than the younger generation. Like dental services, podiatric care is more dependent on disposable income than other medical services.

Related Occupations: Chiropractors, dentists, massage therapists, optometrists and physicians.

Psychiatrists

Job Description: Psychiatrists are recognised medical practitioners who detect and treat mental, emotional and behavioural problems or disorders.

The work involves some or all of the following:

- discussing with the patient his/her medical and mental history, and physical and psychological condition to determine the nature and extent of the problem;
- treating the patient with the appropriate medication and therapy, or recommending and arranging a rehabilitation programme;
- developing and implementing programmes to prevent mental disorders and educating health care or community service groups.

Psychiatrists may specialise in various areas such as research, child, adolescent, adult or geriatric psychiatry, or criminal psychiatry. Psychiatrists practise at hospitals, clinics or work privately. They work with other medical practitioners, psychologists, nurses, social workers and other health staff involved in treating mental illnesses.

Education: A degree in medicine with psychiatry training is essential.

Personal Attributes: Possesses excellent communication and interpersonal skills; able to relate to various personalities; is mature, confident and patient.

Job Outlook: There is only a handful of psychiatrists in Malaysia. Job prospects look good.

Related Occupations: Medical practitioners, psychologists and social workers.

Veterinarians

Job Description: Veterinarians care for pets, livestock, sporting and laboratory animals, and protect humans against diseases carried by animals.

Veterinarians' work includes some or all of the following:

- diagnosing medical problems, dressing wounds, setting broken bones, performing surgery, prescribing and administering medicines, and vaccinating animals against diseases;
- advising owners on pet care, and on feeding and breeding to maximise production;
- caring for zoo or aquarium animals;
- developing long term care and preventive medication programmes on a consultant basis;
- helping to prevent outbreak and spread of animal diseases such as rabies;
- participating in animal shows and track events to assess the condition of the animals;
- helping in public awareness programmes on animal welfare.

Most veterinarians are in private practice. Some have general practices, treating all animals, but the majority just treat small companion animals such as birds, cats and dogs. There are others who specialise in fish and poultry. Yet others treat larger animals such as cattle, horses, sheep and swine. They provide advice to farmers on the breeding, care and management of livestock.

Veterinarians who are livestock inspectors, check animals for disease, advise owners on treatment and may quarantine animals if necessary.

Veterinarians who are meat inspectors, examine slaughtering and processing plants, check live animals and carcasses for disease, and enforce government food purity as well as sanitation regulations.

Education: A bachelor's degree in veterinary science is required.

Personal Attributes: Possesses an aptitude for science and manual dexterity; likes animals and cares for their health; has the ability to handle animals confidently and patiently.

Job Outlook: Employment for veterinarians is

expected to grow faster than the average for all occupations. The number of pets is expected to show a steady increase because of rising incomes and the movement of baby boomers into the 34-59 year age group, for which pet ownership is the highest.

Pet owners are also more willing to pay for intensive pet care than in the past. The outlook is good for veterinarians with speciality training. Demand for specialists in laboratory animal medicine, pathology and toxicology is expected to increase.

Jobs are also available in government departments like the Ministry of Agriculture which offers work in disease control and monitoring epidemics. Employment is also available in welfare clinics, like those run by the Society for the Prevention of Cruelty to Animals (SPCA), and in food processing industries to ensure humane and hygienic conditions are maintained.

Related Occupations: Animal trainers, naturalists, veterinary technicians and zoologists.

Sources of Additional Information:

UK

Royal College of Veterinary Surgeons
32 Belgrave Square
London SW1X 8QP

USA

American Veterinary Medical Association
930 N Meacham Road
Schaumburg Ill 60196

JUDGES AND LAWYERS

Judges

Job Description: Judges apply the law. They supervise the legal process in the courts of law, resolve civil disputes and determine guilt in criminal cases according to Federal and State laws and those of local jurisdictions.

Judges may do some or all of the following:

- preside over a myriad of cases which covers every aspect of society, from traffic offences to disputes over management of professional sports;

- preside over trials or hearings and listen to the arguments put forth by attorneys representing the parties involved;
- hold pre-trial hearings for cases and listen to allegations before a trial can be held, then determine if there is enough merit for a trial to be held, based on the evidence presented;
- in criminal cases, decide if the accused person should be held in jail pending his or her trial, or set conditions for his or her release throughout the trial;
- decide the methods of conducting testimony and if the evidence presented is admissible;
- ensure that trials and hearings are conducted fairly and that the court administers justice while simultaneously safeguarding the legal rights of all parties involved.

Judges also work outside the courtroom "in chambers". Here in their private offices, they do some or all of the following:

- conduct other kinds of work such as reading documents on pleadings and motions;
- research legal issues and write opinions;
- hold hearings with lawyers;
- generally oversee the court's operations.

Judges are known by a variety of titles but among the most common are municipal court judges, district court judges, magistrates or justices of the peace.

Education: Most judges have been lawyers and they are appointed by the Lord President of the judicial system.

Personal Attributes: Possesses good oral and writing skills in Bahasa Malaysia; able to think logically and objectively; has integrity and a good character.

Job Outlook: Compared with other occupations, there are fewer employment opportunities for judges. Many opposing social forces affect the demand for judges. On one hand, public concerns about crime, safety and efficient administration of justice create a need, while tight public funding slows job growth.

Most vacancies will generally open up when judges retire.

Related Occupations: Arbitrators, corporate executives and political office holders.

Sources of Additional Information:

UK

The Secretary of External Students
University of London
Room 201, Senate House
Malet Street
London,
UK WC1E 8HU

Lawyers

Job Description: Lawyers, sometimes called attorneys, act as both advocates and advisors in our society. They usually perform some or all of a variety of tasks:

- As advocates, they represent one of the opposing parties in criminal and civil trials by presenting evidence that supports their client in court.
- As advisors, lawyers counsel their clients as to their legal rights and obligations, and suggest particular courses of action in business and personal matters.
- Whether acting as advocates or advisors, all attorneys interpret the law and apply it to specific situations.
- Lawyers perform in-depth research into the purposes behind the applicable laws into judicial decisions that have been applied to those laws under circumstances similar to those currently faced by the client.
- They advise what actions clients may take and draw up legal documents such as wills and contracts, for clients.

The detailed aspect of a lawyer's work depends on his or her specialisation and position. He/She might specialise in trials, bankruptcy, probate or international law.

- Some lawyers concentrate on intellectual properties such as helping protect clients' claims to copyrights, art work under contract, product designs and computer programs.
- In criminal law, lawyers represent persons who have been charged with crimes and argue their cases in courts of law.
- Lawyers are sometimes employed full time by a single client. If the client is a corporation, the lawyer is known as "house counsel".
- In civil law, attorneys assist clients with litigation, wills, trusts, contracts, mortgages, titles

and leases. Some manage a person's property as a trustee or as an executor and ensure that provisions of a client's will are carried out.

- Attorneys employed at various levels of government make up another category such as prosecutors and public defenders.
- Still others work for legal aid societies (private, non-profit organisations established to serve disadvantaged people).

Education: Lawyers who wish to practise in Malaysia must pass the Certificate in Legal Practice.

Personal Attributes: Possesses good oral and writing skills in Bahasa Malaysia; able to think logically and understand, analyse and quickly use facts to advantage; has integrity and a good character.

Job Outlook: Employment for lawyers has grown very rapidly since the early 1970s and is expected to continue to grow faster than the average for all occupations. The strong growth in demand for lawyers will result from growth in the population. Demand will also be spurred by growth of legal action in such areas as consumer protection, criminal prosecutions, employee benefits, the environment and finance. Employment growth for lawyers will be concentrated in salaried jobs, as businesses and all levels of government employ a growing number of staff attorneys, and as employment in legal services industry is increasingly concentrated in large law firms. The number of self-employed attorneys is expected to grow slowly, reflecting the difficulty of establishing a profitable new practice in the face of competition from larger, established firms.

Related Occupations: Arbitrators, corporate executives, industrial relations officers, legislative assistants, lobbyists, paralegals, patent agents, political office holders and title examiners.

Sources of Additional Information:

Malaysian Bar Council
5, Jalan Tun Perak
50050 Kuala Lumpur

UK

Legal Education Information Unit

The Law Society, Ipsley Court
Berrington Close, Redditch
Worcestershire B98 0TD

The Council of Legal Education
39 Eagle Street
London WC1R 4AJ

The Secretary of External Students
University of London
Room 201, Senate House
Malet Street
London,
UK WC1E 8HU

LIFE SCIENTISTS

Agricultural Scientists

Job Description: Agricultural scientists study and develop ways of improving the quantity and quality of farm crops and animals. Agricultural science is closely related to biological science, and agricultural scientists use the principles of biology, chemistry and other sciences to find solutions to agricultural problems.

The work of an agricultural scientist may include some or all of the following:

- conducting research into methods of converting raw agricultural commodities into attractive and healthy food products for consumers;
- controlling pests and weeds in a safer and more effective manner, and conserving soil and water;
- looking for ways to improve crop yield and quality with minimum labour;
- managing or administering research and development programmes, or managing marketing or production operations in companies that produce food products or agricultural chemicals, supplies and machinery;
- studying the environmental impact of agriculture and devising better environmental control methods.

The nature of the work varies depending on the agricultural scientist's area of specialisation. This may include the following:

- *animal science* — animal scientists develop better, more efficient ways of producing and processing eggs, meat, milk, and poultry.

Animal breeders, dairy scientists, poultry scientists and other related scientists study the genetics, growth and development, nutrition and reproduction of domestic farm animals.

- **biotechnology** — agricultural biotechnologists use methods like genetic engineering to improve the quality of plant and animal products;
- **entomology** — agricultural entomologists investigate outbreaks of insect pests and devise methods to control these and other future outbreaks using biological and chemical management, and integrated pest control;
- **food science** — food scientists or technologists are usually employed by the federal government or universities, or work in the food processing industry. They help meet consumer demand for healthier and convenient food products. Food scientists develop better ways of preserving, processing, packaging, storing, and delivering foods. They work on discovering new food sources, analysing food content, or searching for substitutes for harmful or undesirable additives. Others enforce government regulations, inspect food processing areas and ensure that quality, sanitation, safety and waste management standards are met;
- **microbiology** — agricultural microbiologists identify and control disease organisms, and operate in the fields of environmental management and food technology;
- **plant science** — plant scientists analyse plants and their growth, thus helping producers of food, feed and fibre crops to continue feeding a growing population. They also use production methods which conserve natural resources and the environment;
- **soil science** — soil scientists investigate the biological, chemical, mineralogical and physical composition of soils and their relation to plant or crop growth. They also study the effects of fertilisers, tillage practices and crop rotation on various soil types. This information is useful for food producers to determine effective ways of utilising their land.

Education: Candidates aiming for agricultural science jobs should have a bachelor's degree in

agricultural science or at least a degree in a related science such as biology, chemistry or physics, or in related engineering specialities. A master's or doctoral degree is required for basic research.

Personal Attributes: Possesses an aptitude for science; has an interest in agriculture and the environment and an understanding of basic business principles; able to observe and record accurately and work in a team environment; has good organisational, supervisory and communication skills.

Job Outlook: Employment growth for agricultural scientists is expected to be average. Enrolment in agricultural science programmes has begun to increase again, after a decline during the 1980s, and opportunities should be available in most major sub-fields of agricultural science.

Related Occupations: Biologists, chemists, farm managers, farmers, horticulturists, landscape architects, physicists, soil conservationists, soil scientists and veterinarians.

Biochemists

Job Description: Biochemistry involves the study of the chemistry of living organisms and provides the basis for all life sciences. Biochemists develop this knowledge for environmental, manufacturing, medical and veterinary applications.

Their scope of work may involve some or all of the following:

- isolating, identifying and developing enzymes, hormones, minerals and vitamins;
- preparing various serums, vaccines, thyroid and pituitary extracts;
- studying chemical processes occurring within individual cells;
- studying processes like growth or digestion, which involve whole organisms;
- using sophisticated instruments and techniques to carry out detailed chemical analysis, and detailed studies of DNA technology and immune systems;
- using their experimental data to prepare scientific reports and papers for journals.

Specialists in biochemistry include the following:

- **clinical biochemists**, who usually work in hospi-

tal laboratories; they study the chemical compositions of body fluids and tissues to help diagnose and treat diseases;

- *industrial biochemists*, who carry out research and analytical work in areas like controlling the purity of food and beverages and the enzymatic production of fuels from waste using fermentation;
- *research scientists*, who are employed by agricultural, medical and veterinary institutes, biotechnology organisations and universities. They carry out research work in laboratories on areas like growth, metabolism and reproduction in animals, bacteria, fungi and plants. They also study viruses and use the latest genetic-engineering and molecular-biology tools and techniques in the course of their work.

Education: A bachelor's degree in science majoring in biochemistry is the minimum requirement.

Personal Attributes: Possesses an interest in biology, chemistry and mathematics; is accurate, careful, creative, meticulous, patient and persistent; has the ability to think analytically and logically; able to work as part of a team.

Job Outlook: Job opportunities are limited at present but are expected to grow as Malaysia looks towards the future.

Biochemists can be employed by biotechnical industries, food companies, government departments, industrial laboratories, medical research centres and universities.

Related Occupations: Chemists, forensic scientists, medical scientists and pharmacologists.

Sources of Additional Information:

Canada

Canadian Biochemical Society
c/o Department of Biochemistry
University of Western Ontario
London Ontario N6A 5C1

UK

Association of Clinical Biochemists
Burlington House

London W1V 0BN
The Biochemical Society
59, Portland Place
London W1N 3AJ

USA

American Society of Biological Chemists
9650, Rockville Pike, Bethesda
MD. 20014

Biological Scientists

Job Description: Biological scientists study all aspects of living organisms and their relationship to their environment. They usually work in areas of research and development to find practical applications in the fields of agriculture, environment, fisheries and medicine, among others.

Their scope of work is wide and may include some or all of the following:

- conducting basic research or applied research, and using the knowledge provided by basic research to develop medicines, increase crop yields and improve the environment;
- maximising the long-term benefits of biological resources;
- predicting the effect of human and other disturbances on natural communities of mixed organisms, and studying the way they function within themselves;
- working as consultants to business firms or to government agencies, where they test and inspect foods, drugs and other products;
- working in management or administration where they may plan and administer programmes like testing foods and drugs, or directing activities at zoos or botanical gardens;
- writing scientific reports on their investigations to provide more information to a variety of people in scientific, political and other fields.

Biological scientists are classified by the type of organisms they study or by the specific activity they perform. Specialists include the following:

- *biochemists*, who study the chemical composition of living things and investigate the complex chemical combinations and reactions involved in growth, heredity, metabolism and reproduction;

- **geneticists**, who specialise in hereditary mechanisms;
- **botanists**, who study plants and their environment;
- **ecologists**, who examine the relationship among organisms and between organisms, their environment and the effects of influences such as pollutants, population, rainfall and size;
- **marine biologists**, who study salt water organisms (compared with *limnologists* who study fresh water organisms); marine biologists are sometimes called *oceanographers* but this refers specifically to the study of the ocean and the ocean floor;
- **microbiologists**, who examine the growth and characteristics of microscopic organisms such as algae, bacteria and fungi; other microbiologists may specialise in environment, food, agricultural or industrial microbiology, virology (the study of viruses), or immunology (the study of infection-fighting mechanisms);
- **physiologists**, who study the life functions of plants and animals, both in whole organisms and at the cellular or molecular level, under normal and abnormal conditions;
- **zoologists**, who study animals, their origin, behaviour, diseases, and life processes; zoologists are identified by the animal groups they specialise in, such as *ichthyologists* (fish), *herpetologists* (reptiles), *mammalogists* (mammals) and *ornithologists* (birds).

Education: A Ph.D in biological science is generally required for college teaching and independent research while a master's degree is adequate for some jobs in applied research and for jobs in management, inspection, sales and service. The bachelor's degree is sufficient for some non-research jobs.

Personal Attributes: Has an aptitude for research; able to think logically and carry out detailed and accurate work; possesses team spirit and good communication skills.

Job Outlook: Biological scientists will continue to conduct biotechnological research and assist in developing and manufacturing products using

new biological methods. Hence, employment opportunities for biological scientists are expected to increase. In addition, the on-going concern to clean up and preserve the environment will continue to add to their prospects.

Related Occupations: Agricultural scientists, animal breeders, conservationists, environmental scientists, foresters, horticulturists, life science technicians, range managers and soil scientists.

Botanists

Job Description: Botanists study plant biology and apply the results to areas like agriculture, biotechnology, conservation and management of natural resources, forestry and medicine.

Their work may involve some or all of the following:

- studying the effects of the environment (soil, rainfall, temperature, topography, disease, etc.) on plant growth;
- examining patterns of plant evolution, environmental impact and genetic variables, by growing plants under controlled conditions;
- using biochemical and molecular techniques to study plant genetics, plant chromosomes, cells and tissues;
- finding and classifying new plant species, and identifying existing ones by conducting field and laboratory studies;
- preparing plant identification handbooks, scientific reports and papers;
- working with other scientists to develop drugs, medicines and other useful products from plants.

Specialists in botany include the following:

- **agronomists**, who study agricultural crops and grasses;
- **plant ecologists**, who study the relationship between plants and the effects of the environment like pollution, diseases as well as the relationship between plants and animal pollinators and dispensers;
- **plant pathologists**, who study plant diseases in economically important plants;
- **plant physiologists**, who study internal plant

functions and their chemistry to understand their nutrients, reproduction, growth and other processes;

- *plant taxonomists*, who study and record the different plant forms and develop classifications based on evolutionary relationships between various species.

Education: A bachelor's degree in science, preferably majoring in biotechnology, is essential.

Personal Attributes: Has an interest in plants and research; possesses initiative, perseverance and analytical and communication skills.

Job Outlook: The demand for botanists depends on industries expanding their use of biotechnology, funding from government, business and research foundations and concerns with finding environmentally friendly solutions to agricultural and industrial production problems. On the whole, employment opportunities are expected to increase.

Related Occupations: Environmental scientists and horticulturists.

Food Technologists

Job Description: Food technologists develop food products and standardise their production, packaging and marketing. They can work in areas of production, quality control and research and development. They are employed in administrative, management, marketing and supervisory capacities. They can specialise in fields like dairy products, frozen foods, seafood, etc.

The work of a food technologist involves some or all of the following:

- conducting studies and surveys of competing brands, and keeping the management updated;
- developing new products and their production techniques;
- maintaining hygienic conditions during processing, packaging and especially during storage;
- supervising the transportation of perishable foodstuff;
- supervising the upkeep of food processing machinery;

- testing raw materials and finished products for nutritional value and bacteria, and checking foods for colour and flavour.

Education: You can enter this career at the professional or technical level. At the professional level you require a bachelor's degree in applied science; at the technical level you must have at least a certificate or diploma.

Personal Attributes: Possesses accuracy and observational skills; is healthy and has initiative.

Job Outlook: Most food technologists are employed by food processing firms and companies involved in marketing and distributing food products. Employment opportunities also exist in related government departments.

Related Occupations: Agricultural technical officers, biotechnologists, laboratory workers and microbiologists.

Foresters and Conservation Scientists

Job Description: Foresters and conservation scientists manage, develop, use and help protect natural resources. Foresters perform a variety of duties in managing timberland and the work normally involves some or all of the following:

- procuring timber from private landowners by contacting local forest owners to gain permission to take an inventory of the type, amount and location of all standing timber on the property;
- selecting and preparing the site, either using controlled burning, bulldozers, or herbicides to clear weeds, brush and logging debris;
- initiating regeneration, where they supervise the planting and growing of new trees;
- monitoring the trees to ensure healthy growth and determining the best time for harvesting;
- implementing fire prevention and detection control programmes;
- managing public parks and forests for State and Federal governments;
- working with private landowners to protect and manage forest land outside of the public domain.

Range managers are also known as range conservationists, range ecologists, or range scientists. Their work includes managing, improving, and

protecting range lands to maximise their use without damaging the environment.

Soil conservationists provide technical assistance to farmers, ranchers and others concerned with the conservation of soil, water and related natural resources. They design programmes to utilise the land to the maximum without damaging it.

Foresters and conservation scientists often specialise in areas such as forest economics, forest resource management, urban forestry or wood technology.

Education: A bachelor's degree in forestry is the minimum education requirement for professional careers in forestry. Most soil conservationists have degrees in agronomy, general agriculture or soil science.

Personal Attributes: Possesses an aptitude for science; has a liking for the outdoors; is physically fit.

Job Outlook: Demand will continue to increase due to the emphasis on environmental protection and responsible land management.

Related Occupations: Agricultural engineers, agricultural scientists, biological scientists, environmental scientists, farm managers, park rangers and range managers.

Horticulturists

Job Description: Horticulturists are involved in cultivating and propagating plants through use of their scientific skills. The work can be physically demanding at times, with some outdoor work in a variety of conditions.

Their scope of work can include some or all of the following:

- experimenting and investigating processes like cultivation, production, storage and transportation of plants, trees, flowers, seeds, etc.;
- experimenting with plants to provide new improved species resistant to pests and with higher yields and nutritional value;
- helping to regenerate degraded land;
- providing technical information to nursery operators and farmers growing fruits, vegetables and flowers, as well as commercial

- organisations dealing in horticultural products;
- specialising in landscape design for recreational areas, and the conservation and preservation of natural resources.

Education: A degree in applied science is required.

Personal Attributes: Able to carry out scientific research and experimental work; does not suffer from allergies to chemicals or plants.

Job Outlook: Horticulturists can be employed in government departments, horticultural enterprises, universities, and as consultants to public and private companies. They can also work as research and technical officers.

Related Occupations: Agricultural scientists, agricultural technical officers, botanists, gardeners and horticultural managers.

Marine Biologists

Job Description: Marine biologists study the origin, structure, functions and behaviour of all forms of marine life, and their relationship with one another and the environment.

The work involves some or all of the following:

- preparing scientific research studies on the variety of marine organisms;
- preparing information and giving recommendations on the development of marine conservation and harvesting policies;
- developing long term monitoring programmes of environmental pollution;
- preparing scientific work for publication;
- providing training for students and staff seeking entry into the field;
- teaching the discipline of marine biology in schools and tertiary institutions.

Education: A degree in science, specialising or majoring in biological sciences, botany, marine biology or zoology is essential.

Personal Attributes: Possesses good reporting and writing skills; is analytical; able to identify problems.

Job Outlook: Marine biologists usually work for government departments such as environmental

protection, fisheries and others. However, consultancy work is also possible, depending on the funding level of the various research studies.

Related Occupations: Biological scientists, environmental scientists, fisheries officers and marine scientists.

Medical Scientists

Job Description: Medical scientists conduct biomedical research. They usually work in medical laboratories conducting tests to provide information for the diagnosis, treatment and prevention of disease. Medical biologists also work in research and development, especially in teaching hospital laboratories.

The scope of work can include some or all of the following:

- analysing blood and urine samples to test for diseases like diabetes and liver or kidney malfunction;
- identifying blood diseases like anaemia, checking blood for various diseases like AIDS and hepatitis, and testing it for antibodies and compatibility;
- advising doctors on the interpretation of test results;
- identifying the various changes occurring in cells, chromosomes, or even genes that signal the development of medical problems such as the different types of cancer, and then working on the treatment of problems;
- preparing specimens of body tissue for pathological examination.

Specialists in the field of medical science include the following:

- *immunologists*, who study an organism's defence mechanism against disease;
- *haematologists*, who study the different aspects of blood and blood-related diseases, and help match blood for transfusions;
- *medical microbiologists*, who analyse the relationship between organisms and disease or the effects of antibiotics on micro-organisms.

Education: A bachelor's degree in applied science is the minimum requirement.

Personal Attributes: Able to make accurate, clear and precise observations; has an eye for detail.

Job Outlook: Opportunities exist in the health industry as well as government departments, usually to monitor, test, and ensure maintenance and health standards.

Related Occupations: Dentists, medical doctors and veterinarians.

Microbiologists

Job Description: Microbiologists study bacteria, fungi, viruses, and other micro-organisms to develop applications for use in medicine, industry, environment, etc. Microbiology is the foundation for molecular biology, which in turn forms the basis of biotechnology.

Their scope of work includes some or all of the following:

- examining and analysing samples for microbial infections;
- studying epidemics and their prevention;
- applying microbiology successfully to the production of vaccines against viral and bacterial disease;
- using antibiotics to treat disease;
- analysing meats, milk, etc. for specific disease-causing microbes;
- conducting research in the effects of micro-organisms on production and quality control of foods;
- studying the role of micro-organisms in plant diseases and their effect on soil fertility;
- preparing scientific reports and papers.

Education: A relevant science degree is essential.

Personal Attributes: Possesses the ability to produce detailed and accurate work; has good observational powers, manual dexterity, initiative and perseverance; able to work as part of a team.

Job Outlook: The demand for microbiologists is determined by the amount of biological research being done by government-funded organisations and private organisations.

Related Occupations: Biochemists, biological scientists, botanists, forensic scientists and medical scientists.

Zoologists

Job Description: Zoologists study animals and their characteristics, functions, ecology, environment and various other aspects. They use this information for viable applications in agriculture, conservation, medicine and wildlife.

Their scope of work includes some or all of the following:

- studying the relationship between animals and their environment, both in the wild and in captivity;
- studying and performing experiments to identify species;
- gathering data on growth, nutrition, reproduction, prey and predators;
- studying the development and functions of animal organisms;
- finding ways to control the population of pests and vermin;
- helping to increase the population of endangered wildlife;
- participating in wildlife awareness programmes;
- preparing reports and scientific papers, and lecturing at universities.

Zoologists can specialise in any one of the many different fields, for example:

- *ecology* (environment of animals);
- *entomology* (insects);
- *ethnology* (animal behaviour);
- *ornithology* (birds);
- *parasitology* (internal and external parasites);
- *physiology* (animal functions).

Education: A degree in science, applied science or agricultural science is essential.

Personal Attributes: Possesses an interest in research and in the study of living organisms; has good communication, observational and problem-solving skills; is precise; able to work as part of a team.

Job Outlook: Job opportunities for zoologists are

fairly limited but there is a slow increase in opportunities available. Employment is possible as teachers in colleges and schools, and as consultants in medical research facilities, museums and zoos.

Related Occupations: Agricultural scientists, biological scientists and botanists.

PERFORMING ARTS OCCUPATIONS

Actors

Job Description: Actors entertain and communicate with people through their portrayal of a variety of roles, using the medium of live performances and recorded performances. Live performances could include ballet, opera and theatre, while recorded performances are usually roles in films, on television or in commercials, to name a few.

They usually do some or all of the following:

- read and analyse scripts to decide how to interpret the role they will enact, conducting research if needed;
- consult directors and voice coaches for guidance on the best portrayal of their characters and the appropriate facial and verbal expressions as well as body movements, for creative effect;
- sing and dance for some roles and use props and costumes for effective communication of ideas;
- memorise and rehearse lines and stage directions;
- put on their own make-up and attend fitting for costumes.

Education: Talent is more important than formal training. However, it is advantageous for aspiring actors to enrol in a drama school to learn the finer points of acting.

Personal Attributes: Possesses an excellent memory; is determined, self-confident and adaptable.

Job Outlook: The field will be very competitive due to the lack of formal entry requirements and the large number of people desiring acting careers. Only the most talented will continue to find regular employment. Job prospects look

good in recorded media and in live productions. The growing popularity of live theatrical performances may also spur growth in this industry.

Related Occupations: Dancers, disc jockeys, drama teachers or coaches, film and television producers, film, stage and television directors, and radio and television announcers.

Dancers

Job Description: Dancers are performers who express ideas, stories, rhythm and sound with their bodies. Their performances can include both stylised and traditional repertoires. They work either with dance companies or as freelance artistes.

They usually do some or all of the following:

- train regularly, attend rehearsals and take guidance from a choreographer;
- perform modern dance, which allows more free movement and self-expression;
- analyse and interpret their role, and perform in a variety of adaptations for musical shows;
- put on their make-up for the performance;
- perform folk, ethnic, jazz, tap dances and other popular kinds of dances;
- sing and act as well as dance, since it complements commercials, movies, music videos, musical comedy, opera and television;
- usually perform as a group, although a few talented artistes dance solo;
- combine stage work with teaching or choreography.

Dancers can specialise in a variety of fields.

- *Choreographers* create original dances or develop new interpretations to traditional dances, audition performers and guide performers during rehearsals.
- *Dance teachers* work in dance studios or operate their own dancing schools, and may even teach in universities and schools if they possess the required qualifications.
- *Dance therapists* are specially trained to teach dance as a means of therapy to elderly people, people with disabilities, children and people with special needs.

Education: Professional dancers generally require formal training through dance courses.

Personal Attributes: Has good muscular coordination, a sense of rhythm and an understanding of music; possesses technical and interpretative skills, and effective communication skills; is disciplined and dedicated.

Job Outlook: Employment growth for dancers will be average as the job market is highly competitive and only talented persons can expect regular employment. Most openings will be a result of dancers leaving the occupation. Television and motion pictures will also offer some opportunities. Teaching opportunities will be available with dance groups affiliated to colleges and universities as popularity of dance grows.

Related Occupations: Actors, dance critics, dance instructors, ice skaters and musicians.

Film and Television Producers

Job Description: Film and television producers manage technical and artistic resources during the course of producing a programme. They are usually experienced persons from the media industry with an established track record of entrepreneurship. Television producers do a lot of directing and are often called producers/directors.

Film and television producers usually do some or all of the following:

- organise finances for the project, prepare and maintain budgets;
- interact with other project related personnel and finalise artists, draw up contracts, select scripts and organise rehearsals;
- manage production quality and supervise production personnel like directors, managers, writers, and other personnel;
- oversee the editing of recorded material on film or videotapes.

Education: Formal training is not essential but an asset if the candidate is to be technically sound in all aspects of film and television production.

Personal Attributes: Possesses a flair for entrepreneurship, and good managerial and organisational capabilities; able to motivate people; is artistically inclined.

Job Outlook: The field will be very competitive due to the lack of formal entry requirements and only the most talented will continue to find regular employment. Job prospects look good in recorded media and in live productions. The growing popularity of live theatrical performances may also spur growth in this industry.

Related Occupations: Booking managers, film, stage and television directors, playwrights, publicists and agents of actors, scriptwriters and stage managers

Film, Stage and Television Directors

Job Description: Film, stage and television directors are responsible for directing all or some specific aspects of the production of films or shows for television and stage. They ensure that everything is ready for filming or the performance.

Film, stage and television directors usually do some or all of the following:

- read and analyse the script to finalise its interpretation;
- organise auditions and screen tests and then select a cast;
- approve the choreography, costumes, music and props;
- direct camera operators during shoots on positions and angles, manage lighting and sound effects, and coordinate other related aspects of filming or taping;
- use their knowledge of acting, voice and movement to achieve the best possible performance;
- edit the recorded material and add sound tracks and special effects as required;
- supervise the performers, studio or stage crews and technicians during rehearsals and productions.

Education: Some actors, film editors and writers often enter this field. It is advantageous to have formal training in directing.

Personal Attributes: Possesses good communication skills; able to operate calmly under pressure; is authoritative, motivated and artistically inclined.

Job Outlook: The field will be very competitive due to the lack of formal entry requirements and only the most talented will continue to find regular employment. Job prospects look good in

recorded media and in live productions. The growing popularity of live theatrical performances may also spur growth in this industry.

Related Occupations: Drama teachers or coaches, film and television editors, film and television producers, and stage managers.

Music Therapists

Job Description: Music therapists utilise music as a form of therapy to people of all ages, specifically to those with special needs due to emotional, mental and socio-psychological impairments.

The work involves some or all of the following:

- identifying the individual needs in a group to devise treatment programmes;
- organising musical and creative activities such as drama and singing to encourage clients to carry through their best possible level of functioning within their specific situations;
- assessing the effectiveness of the programmes by analysing the results.

Music therapists work closely with other medical and health personnel, families and the community.

Education: A diploma or degree in music, specialising in music therapy is required.

Personal Attributes: Appreciates the varieties of music styles; is flexible, approachable, sincere and concerned about the well-being of others.

Job Outlook: Job opportunities are scarce in this field as Malaysians are not aware or exposed to this form of treatment.

Related Occupations: Musicians and occupational therapists.

Musicians

Job Description: Musicians play a variety of musical instruments, create musical compositions or conduct performances. They may be soloists or perform as part of a group. Performances can be live, on radio and in recording studios for television or movie productions.

Musicians can specialise in a wide variety of fields.

Choral directors conduct choirs and glee clubs, organise auditions, select singers and direct them at rehearsals and performances for impeccable performances.

Composers create original music such as operas, popular songs, sonatas or symphonies. They usually do some or all of the following:

- write out their ideas into musical notation and specialise in a particular kind of music;
- compose and edit music for their own songs using computers;
- operate a musical keyboard linked to a computer that compiles the digital information into musical notation while playing;
- feed the composition in musical notation into the computer and have it played back.

Instrumental musicians specialise in a particular instrument like string, brass, woodwind, or percussion instruments in an orchestra, band, rock group, or jazz "combo".

Music critics work for newspapers and magazines and report on performances and musicians, both locally and world-wide.

Music directors usually work for film and stage productions. They may do the following:

- consult directors and composer to choose music, singers and instrumentalists;
- select or compose, and insert appropriate music for different situations.

Orchestra conductors lead orchestras and bands. They usually do some or all of the following:

- audition and select musicians;
- decide which music pieces will be performed during rehearsals and performances;
- arrange musicians and apply conducting techniques to achieve the desired musical effects.

Singers analyse and perform music based on their experience and understanding of voice production, melody and harmony. They usually do some or all of the following:

- sing character parts or perform in their own individual styles;
- specialise depending on their voice range as baritone, bass, contralto, soprano or tenor;

- perform a particular type of music like country and western, folk, opera, reggae and rock.

Education: Many people who become professional musicians begin studying an instrument at an early age. It is also advantageous to have formal training through music courses.

Personal Attributes: Possesses talent in the branch of music chosen and has a flair for entertainment; has stamina, self-confidence, will-power and a high degree of concentration; able to handle stress.

Job Outlook: Employment growth for musicians will be average. A majority of opening will occur due to musicians leaving the field for better paying jobs. The field is highly competitive and jobs will be hard to get even for talented musicians. The situation is marginally better for those persons who can play more than one instrument. There will be fewer jobs available in bars and restaurants.

Self-employment is a possible alternative for musicians, as music teachers in elementary and secondary schools, music conservatories, colleges and universities.

Related Occupations: Actors, dancers, music therapists, and song writers and arrangers.

Sources of Additional Information:

Akademi Filem Malaysia
Komplek Studio Merdeka
Ulu Kelang, 68000 Ampang

Canada

American Federation of Musicians of
the United States and Canada (AFM)
Suite 404
86 Overlea Boulevard
Toronto, Ontario M4H 1C6UK

UK

UK Council for Music Education and Training
13 Back Lane, South Luffenham
Oakham, Leics LE15 8NQ, UK
Association of Professional Composers
34 Hanway Street
London W1P 9DE, UK

National Association of Schools of Music
11250 Roger Bacon Dr Reston
VA 22090, USA

Stage Managers

Job Description: Stage managers plan and coordinate all rehearsals of a show in the areas of production, management and technical requirements.

The work involves some or all of the following:

- assessing all relevant technical and production information;
- working with the management, designers and director on all requirements for rehearsals and performances;
- preparing all necessary resources, documentation, props, moving scenery, rehearsal space, etc.;
- supervising staff and the stage management crew;
- providing the cues for all performance elements such as cast entrances, light, etc.;
- storing all resources at a safe place.

Education: A certificate, diploma or degree in arts, specialising in technical production or having relevant experience is an advantage.

Personal Attributes: Possesses supervisory skills and team spirit; is practical yet artistic, and is willing to work long hours and travel extensively.

Job Outlook: Stage managers work for producers of various "live" shows such as theatre, dance and musicals. Many freelance to work on a project for a period of time. The industry in the country is small and exclusive, hence, those who want to pursue a career in this field will need to obtain experience to progress in the industry.

Related Occupations: Film, stage or television directors.

Stunt Performers

Job Description: Stunt performers take the place of actors or actresses in hazardous situations, giving the maximum visual impact with few safety measures.

The work involves some or all of the following:

- driving fast cars and crashing into vehicles or trees e.g. Jackie Chan in 'Thunderbolt';
- entering into an inferno, e.g. Kurt Russell in 'Backdraft';
- jumping from great heights, e.g. Jackie Chan in 'Rumble in the Bronx';
- performing other stunts which involve high risks.

Education: No academic qualifications are required. Training is provided at film and television companies.

Personal Attributes: Possesses right attitude towards safety measures; has good reflexes and eyesight; is flexible and physically fit.

Job Outlook: Job prospects are low as stunt performers need to prove their skills and experience before obtaining employment.

Related Occupation: Actors.

PHYSICAL SCIENTISTS

Astronomers

Job Description: Astronomy is often considered a sub-field of physics. Astronomers study the fundamental nature of the universe including the sun, moon, planets, stars and galaxies using the principles of physics and mathematics. Almost all astronomers engage in research.

Their scope of work may include some or all of the following:

- analysing data gathered by observatories and satellites and writing scientific papers or reports on their findings;
- applying their knowledge to create solutions to problems in navigation and space flight;
- investigating the formation of our solar system;
- making computerised star catalogues and measurement tables for navigational and other purposes;
- observing objects in space from the earth or from satellites, using sophisticated equipment;
- using principles of physics and mathematics to study the behaviour of matter and energy far away in space.

Education: Bachelor of Science with Honours (Physics or Applied Physics) is required. Astronomers often go for further studies in astronomy up to doctorate level.

Personal Attributes: Has an aptitude for computing, mathematics and science; possesses an inquiring mind and good communication skills.

Job Outlook: A majority of astronomers work on research projects. On the whole, employment opportunities are very limited.

Related Occupations: Geologists, geophysicists, mathematicians and physicists.

Chemists

Job Description: Chemists search for new information on chemicals and put them to practical use. They have developed an incredible variety of new products, for example, synthetic fibres and paints, and improved oil refining and petrochemical processing methods. Many chemists work in research and development. Some chemists work as marketing or sales representatives who provide technical information on chemical products.

Their work usually involves some or all of the following:

- conducting basic research to investigate the properties, composition, and structure of matter and the laws that govern the combination of elements and reactions of substances;
- creating new products and processes or improving existing ones, often working with knowledge gained from basic research;
- preparing instructions for plant workers, specifying ingredients and mixing procedures for adhesives, drugs, electronic components, lubricants and other products, and setting temperatures for each stage in the process;
- monitoring automated processes to ensure the proper product yield;
- conducting tests on samples to ensure they meet industry and government standards;
- improving production by developing processes which save energy and reduce pollution.

Specialists are as follows:

- *analytical chemists and clinical chemists*, who ascertain the structure, composition and nature

of substances, and develop analytical techniques;

- *biochemists*, who study the chemistry of living things;
- *developmental chemists*, who apply research material to develop new products and improve existing processes;
- *environmental chemists*, who monitor pollutants, the product of pollutants and natural chemicals; they also find ways to reduce the harmful effects of chemicals which are released into the environment as well as devise environment-friendly industrial processes;
- *geochemists*, who study the chemistry of earth materials;
- *industrial chemists*, who are in charge of the industrial production of chemicals and materials;
- *inorganic chemists*, who study compounds consisting mainly of elements; they also explore the physical characteristics of atoms and molecules and investigate how chemical reactions work;
- *organic chemists*, who examine the chemistry of the vast number of carbon compounds;
- *physical chemists*, who study the physical characteristics of matter.

Education: A bachelor's degree in chemistry or a related discipline is usually the minimum requirement for work as a chemist. A Ph.D is necessary for most research and college teaching jobs.

Personal Attributes: Possesses an interest in science and research; has an aptitude for accurate work and details; is creative and curious; able to think logically, work independently and write clear concise reports.

Job Outlook: The chemical industry will have to meet continued demand for goods such as new and better pharmaceuticals and personal care products, and more speciality chemicals designed to address specific problems or applications. This will contribute to employment growth for chemists.

Related Occupations: Agricultural scientists, biological scientists, chemical engineers, environmental engineers and metallurgists.

Sources of Additional Information:

UK

The Royal Society of Chemistry
Burlington House
Piccadilly, London W1V 0BN
The Biochemical Society
7 Warwick Court
Holborn, London WC1R 5DP

USA

American Chemical Society
1155 16th St. NW
Washington DC 20036

Geologists and Geophysicists

Job Description: Geologists study the composition, structure and history of the earth's crust while geophysicists use the principles of physics and mathematics to study not only the earth's surface but also its atmosphere, ground waters, internal composition as well as its electrical, gravitational and magnetic forces.

Both geologists and geophysicists gather and analyse information for the purposes of searching for natural resources and solving environmental problems. Their work may include some or all of the following:

- studying the composition, structure and history of the earth's crust to find out how rocks were formed and what has happened to them since their formation;
- planning, conducting and interpreting geophysical surveys in exploring for oil, natural gas, minerals and underground water;
- locating geologically suitable sites for bridges, dams, roads, tunnels, etc.;
- designing and monitoring waste disposal sites, preserving water supplies and reclaiming contaminated land and water to comply with environmental rules;
- studying fossilised life forms;
- studying earthquakes and earthquake risk (siesmology), time variations and the distribution of the earth's magnetic and gravity fields;

- researching new methods and developing instrumentation for taking physical measurements in surveys;
- preparing geological reports and maps;
- using computers to integrate and interpret geological data.

Specialists in geology include the following:

- *engineering geologists*, who work with engineers and carry out geological mapping, assess the quality of materials used in construction of roads and assess mine safety and building foundations;
- *environmental geologists*, who study the effects of pollution on ground and surface waters, soil movements, erosion, etc.;
- *hydrogeologists*, who study the properties of ground water for agricultural, industrial and domestic uses;
- *palaeontologists*, who study and classify fossils;
- *petroleum geologists*, who investigate the earth's surface layers to locate petroleum and natural gas and recommend the appropriate extraction methods.

Education: A bachelor's degree in geology or geophysics is essential.

Personal Attributes: Possesses an aptitude for mathematics and physics; able to prepare accurate records and reports; has team spirit; is physically fit and likes working outdoors including in remote areas.

Job Outlook: Employment growth is expected to be as fast as the average occupation. Most jobs for geologists and geophysicists are in the petroleum and natural gas industry or in related industries, especially the upstream activities of oil and gas exploration.

Related Occupations: Environmental scientists, geological engineers, mapping scientists, marine scientists, natural resource managers, petroleum engineers, soil scientists and surveyors.

Hydrologists or Hydrogeologists

Job Description: Hydrology or the science of

water deals with surface water processes like rainfall, evaporation, floods and droughts, erosion and water pollution. Hydrogeology is concerned with ground-water and includes soil-moisture variation, amount, direction and speed of ground water flow, extraction and replenishment of groundwater, water chemistry and pollution.

Hydrologists and hydrogeologists deal with all aspects of water resource management and evaluation. Their scope of work may include some or all of the following:

- studying the various processes in the hydrological cycle and how it is affected by urbanisation, deforestation, etc.;
- carrying out exploration drilling for water supplies, advising on mining and engineering applications and supervising construction of borewells and wellfields;
- monitoring the quality of water supplies for industrial, agricultural and domestic use;
- finding ways to supply ground or surface water to semi-arid or dry areas;
- managing water resources and administering water management policies and their legal aspects;
- investigating the causes, impacts and remedies in cases of pollution.

Education: A bachelor's degree in a relevant discipline is the minimum requirement.

Personal Attributes: Possesses initiative, perseverance, logical reasoning and good observational and communication skills; has the ability to prepare accurate records and reports; able to work independently.

Job Outlook: Employment opportunities usually exist with government departments and universities. Hydrologists and hydrogeologists can also work with private organisations as consultants.

Related Occupations: Hydraulic or irrigation engineers, hydrochemists, resource managers, soil scientists and water conservationists.

Meteorologists

Job Description: Meteorology is the study of the atmosphere. Meteorologists study the physics and dynamics of the atmosphere and how they affect the rest of our environment.

The best-known application of meteorology is in forecasting the weather. Meteorologists who forecast the weather are known professionally as *operational meteorologists*. Their scope of work includes some or all of the following:

- forecasting and interpreting atmospheric weather and climate;
- compiling and examining information on air pressure, humidity, temperature and wind velocity;
- issuing cyclone, flood, gale and storm warnings;
- investigating methods to analyse and predict atmospheric conditions.

Climatologists collect, analyse and interpret past records of rainfall, sunshine, temperature and wind conditions in specific areas or regions.

Some meteorologists engage in research. For example, *physical meteorologists* study the atmosphere's chemical and physical properties, the transmission of light, sound and radio waves, and the transfer of energy in the atmosphere.

Education: A bachelor's degree with a major in meteorology is essential. A higher degree (Master's or Ph.D) is usually required for research and development and college teaching.

Personal Attributes: Possesses an aptitude for mathematics and physics.

Job Outlook: Employment for this career is expected to grow as fast as the average occupation.

Related Occupations: Environmental engineers, geologists and geophysicists, hydrologists, mathematicians and oceanographers.

Physicists

Job Description: Physicists explore and identify basic principles which govern the structure and behaviour of matter, the generation and transfer of energy and the interaction of matter and energy. These principles are used in theoretical areas such as the nature of time and the origin of the universe, or in practical areas such as the development of advanced materials, electronic and optical devices, and medical equipment.

The work of a physicist normally involves some or all of the following:

- observing events in the physical world like gravity, light, magnetism, sound, etc., and proposing theories and models to explain them and predict future phenomenon;
- designing and performing experiments with cyclotrons, lasers, mass spectrometers, telescopes and other equipment;
- finding ways to apply physical laws and theories to problems in fields such as aerospace technology, communications and nuclear energy;
- designing research equipment;
- planning, recording, analysing and reporting on research done.

Specialists in this area include the following:

- *atomic and molecular physicists*, who study atoms and molecules, and apply their research findings in the design and operation of lasers and analytical instruments;
- *condensed matter or solid-state physicists*, who research the properties and behaviour of solids and apply the results to reducing metal fatigue in manufacturing plants and instruments, and developing semiconductors for use in electronic systems;
- *health physicists*, who apply their research and development work to finding safer ways to operate medical radiation therapy equipment, establishing safe exposure limits and devising safety measures to deal with hazardous material;
- *materials scientists*, who study the structure and properties of materials and develop newer and more resistant materials for industrial use;
- *nuclear physicists*, who study the structure and mechanism of atomic nuclei, essentially radiation, and apply the findings to nuclear medicine, radioactive tracers in industry and the measurement of environmental radiation.

Other fields of specialisation include acoustics, elementary particle physics, optics, plasma physics and the physics of fluids.

Education: The usual educational requirement is a doctoral degree in physics; most jobs are in

research and development but physicists could also teach at universities.

Personal Attributes: Possesses an aptitude for science, mathematics and computing; has an interest in research; able to analyse, visualise and think clearly.

Job Outlook: Although research and development activities in private industries continue to grow, many research labs are expected to reduce basic research which is where physics research takes place. Hence, employment opportunities for physicists are expected to decline in the near future.

Related Occupations: Astronomers, chemists, geologists, geophysicists, materials engineers and mathematicians.

SOCIAL AND RECREATION WORKERS

Fitness Instructors

Job Description: Fitness instructors train and supervise people in health and fitness clubs, gyms, sports centres and community recreation organisations to maintain or increase their fitness levels.

The work involves some or all of the following:

- preparing exercise programmes for the different age groups and levels of fitness;
- giving advice to individuals on correct techniques of exercising with various equipment and exercising apparatus;
- instructing in a variety of fitness activities;
- helping in the maintenance of the centre or club and ensuring that all equipment is maintained and set up correctly;
- receiving enquiries at the counter to make bookings or relaying information about the facilities;
- working with doctors, dieticians and nutritionists to arrange for health and fitness programmes for members or clients.

Fitness instructors may specialise in areas such as aerobics, aqua-fitness, circuit training, diet and weight control, exercise for older people, personal training and water activities.

Fitness instructors may be employed on a freelance basis and work at different locations. Shift

work is common, including early mornings and late nights, depending on the schedules of clients.

Education: No minimum academic requirement is necessary. People who are active and fit and have the ability to demonstrate a high degree of proficiency with a wide range of exercising and training apparatus have an advantage. A degree in physical education is preferred.

Personal Attributes: Possesses a high level of physical fitness and a background in competitive sport; is enthusiastic and has an outgoing personality.

Job Outlook: Employment prospects are good as people are realising the importance of exercise for good health maintenance. Moreover, the positive growth in health clubs and gyms increases the demand for fitness instructors.

Related Occupations: Fitness counsellors, physical education teachers and sports coaches.

Human Services Workers

Job Description: Human services workers is a generic term for people with various job titles such as alcohol or drug abuse counsellor, child abuse worker and community outreach worker. They generally work under the direction of social workers or in some cases, psychologists. The amount of responsibility and supervision they are given varies a great deal. Some are on their own most of the time and have little direct supervision; others work under close direction.

Human services workers may perform some or all of the following tasks:

- help clients obtain benefits or services;
- assess the needs and establish the eligibility of clients for services;
- examine financial documents such as rent receipts and tax returns to determine whether the client is eligible for welfare programmes;
- inform clients on how to obtain services, arrange for transportation and escorts, if necessary, and provide emotional support;
- transport or accompany clients to adult day care programmes or doctors' offices;
- telephone or visit clients' homes to make sure services are being received or help resolve disagreements.

Education: Tertiary education is usually not a prerequisite.

Personal Attributes: Possesses a strong desire to help others and a strong sense of responsibility; has good communication skills; is patient and understanding.

Job Outlook: Opportunities for human services workers are expected to be excellent. However, these jobs are not attractive to everyone because the work is emotionally draining and most offer relatively poor pay.

Opportunities are expected to be best in job training programmes, residential settings and private social service agencies. Demand for these services will expand with the growing number of older people, who are more likely to need services. In addition, human service workers will continue to be needed to provide services to the mentally impaired and mentally disabled, those with substance abuse problems, and a wide variety of others.

Related Occupations: Community outreach workers, psychiatric aides, religious workers and social workers.

Probation Officers

Job Description: Probation officers are responsible for the supervision of offenders released on parole from prisons and those offenders who are sentenced to community service.

Their job normally involves some or all of the following:

- supervising a number of offenders and ensuring that they complete their sentences;
- contacting offenders and analysing their social history by interviewing their families, employers or teachers;
- helping the courts decide if parole is to be granted and the suitability of offenders for community service;
- advising offenders on various pertinent issues, helping them get employment and identifying their social needs;
- monitoring their progress regularly and keeping in touch with their families for readjustment and rehabilitation purposes;
- preparing reports and briefs for offenders who fail to comply;

- undertaking administrative work, and participating in community and staff development programmes.

Education: It is desirable to have a tertiary qualification in behavioural or social sciences, or related disciplines.

Personal Attributes: Possesses a genuine interest in people and their affairs; has the ability to correctly assess people and situations; is mature, patient, tolerant and discrete.

Job Outlook: Employment opportunities are limited.

Related Occupations: Prison officers, social workers and welfare workers.

Recreation Workers

Job Description: Recreation workers watch over recreational facilities and equipment, and plan, organise and direct the activities that these places offer. They help people to pursue their interest in art, crafts or sports. Recreation workers occupy a variety of positions at different levels of responsibility.

Their scope of work may include some or all of the following:

- organising teams and leagues so young people and adults can practise fair play and good sportsmanship through competitive sports;
- teaching people the correct use of equipment and facilities so that maximum benefits can be derived from their use without injury;
- organising and directing leisure activities and athletic programmes at work places, for employees and their families and generally for adults;
- taking responsibility for a recreation programme's daily operation, and organising and directing participants;
- leading and directing crafts, dance, drama, games and sports.

Recreation workers can specialise as one of the following:

- *activity specialists*, who provide instructions in specialities such as art, drama, music, swimming or tennis. They often conduct classes and coach people.

- *camp counsellors*, who lead and instruct child and teenage campers in outdoor-oriented forms of recreation such as hiking, horseback riding and swimming.

- *recreation supervisors*, who plan programmes to meet the needs of the population. They serve and supervise recreation leaders and activity specialists, sometimes over large regions also.

- *recreational therapists*, who help individuals recover from illness, disability or specific social problems.

Education: Full-time career professional positions usually require a bachelor's degree in any liberal arts field.

Personal Attributes: Possesses the capacity to organise and coordinate activities; able to motivate people and exercise good judgement; is outgoing, resourceful, sensitive to the needs of others and willing to accept responsibility; has good physical condition.

Job Outlook: Employment growth for recreation workers is expected to be faster than that for other occupations as growing numbers of people possess both leisure time and the money to purchase leisure services. Growth in these jobs will also be due to increased interest in fitness and health and rising demand for recreational opportunities for older adults in senior centre.

Jobs for recreation workers should also increase in the fast growing social services industry. More recreation workers will be needed to develop and lead activity programmes in children's homes, day care programmes for the mentally retarded, halfway houses and senior centres.

Related Occupations: Clinical and counselling psychologists, human relations counsellors, recreation therapists, school counsellors, social workers, sports coaches, teachers and youth workers.

Social Workers

Job Description: Social workers help people. They help individuals cope with problems such as antisocial behaviour, disability, financial management, inadequate housing, lack of job skills, serious illness, substance abuse, unemployment or unwanted pregnancies.

The scope of work may include some or all of the following responsibilities:

- working with families that have serious conflicts including those involving child and spouse abuse;
- through direct counselling, helping clients identify their real concerns and helping them to consider solutions and find resources;
- providing information for debt counselling, child care, applying for public assistance or other benefits, or how to admit an alcoholic or drug addict into a rehabilitation centre;
- reviewing eligibility requirements, filling out forms and applications, arranging for services, visiting clients on regular basis and helping out during emergencies;
- doing administrative work, writing reports, developing policies and evaluating programmes.

Most social workers specialise in clinical fields such as child welfare and family services, mental health, medical social work and school social work.

- *Child welfare and family services:* Social workers in child welfare or family services may counsel children and youths who have difficulty adjusting socially, or advise parents on how to care for disabled children. Social workers in child or adult protective services investigate reports of abuse and neglect, and intervene if necessary.
- *Mental health:* Mental health social workers provide services such as individual or group therapy, outreach, crisis intervention, social rehabilitation and training in skills of everyday living for persons with mental and emotional problems.
- *Medical social work:* Medical social workers help patients and their families cope with acute, chronic or terminal illnesses and handle problems that may stand in the way of recovery. They may organise support groups for diseases such as AIDS, Alzheimer's disease and cancer.
- *School social work:* School social workers diagnose students' problems, arrange the needed services, counsel children in trouble and help integrate disabled students into the general school population.

Education: A bachelor's degree in a relevant discipline is required.

Personal Attributes: Able to handle responsibility and maintain good working relationships; is objective, emotionally mature and sensitive to people and their problems.

Job Outlook: Employment of social workers is expected to increase faster than the average for all occupations. The number of older people, who are more likely to need these services, is growing rapidly. In addition, the requirement for social workers will grow with increases in the need for and concern about services to the mentally ill, mentally retarded and individuals and families in crisis.

The concentration will be in hospitals where growth is projected to be higher than the average. Employment in private social services is only expected to grow as fast as the average. Opportunities for social workers in private practice will expand because of the anticipated availability of funding from health insurance and from public sector contracts.

Related Occupations: Community development workers, counselling psychologists, counsellors, probation officers, welfare workers and vocational rehabilitation counsellors.

Sports Coaches

Job Description: Sports coaches train individuals and teams different techniques to improve their performance in the playing field.

The usually do some or all of the following:

- study the players' performance and determine the extent of training required;
- assist the player gain new skills and enhance existing skills;
- interact with other sports professionals and officials, and organise participation in competitions;
- develop and implement training programmes, and supervise practice sessions and athletic development;
- monitor progress of the game and give instructions and signals to players if required;
- devise and use new game strategies, analyse the game later and evaluate performance;
- carry out administrative work like organising

tours, booking venues, and planning and preparing budgets;

- hire new players and coaching staff.

Education: A degree in physical education is preferred.

Personal Attributes: Is very well-versed in all aspects of sports; possesses enthusiasm, dedication and the willingness to be flexible or innovative if it is required; able to work extended hours and travel extensively.

Job Outlook: Work is available with sporting clubs, state and national sporting organisations, and holiday centres and resorts specialising in a particular field of sports. Jobs are dependent on available funding and the increasing professionalism in sports.

Related Occupations: Fitness instructors and physical education teachers.

Welfare Workers

Job Description: Welfare workers help individuals, families, groups and communities work towards a better quality of life by educating, supporting and encouraging them to improve their social environment. They help people overcome difficulties of emotional, social or financial aspects of their lives.

They normally do some or all of the following:

- develop and maintain support services for the elderly or disabled like meal deliveries to their homes;
- establish community groups for families who have lost family members to accidents, illness or kidnapping;
- study and implement appropriate solutions for long-term and short-term problems, evaluate data and write reports, and submit request for funding when required;
- provide support and counselling services to victims of child abuse, domestic violence and marital difficulties, and help them find solutions;
- refer clients for specialised treatment or counselling;
- supervise, recruit and train volunteer staff.

Education: A bachelor's degree in social science is preferred.

Personal Attributes: Possesses planning, organisational and communication skills; able to comfortably handle stressful situations; has initiative and a non-judgmental attitude; is responsible and likes working with all kinds of people.

Job Outlook: Employment opportunities are expected to grow.

Related Occupations: Community development workers, probation officers, recreation officers, sociologists and youth workers.

SOCIAL SCIENTISTS AND URBAN PLANNERS

Anthropologists

Job Description: Anthropologists study various aspects of human societies and culture, like their origins, evolution and functioning, and their past or present existence. A lot of fieldwork and interaction with people being studied are involved. They cover complex areas like family setups, religion and political systems.

Anthropologists' work may involve some or all of the following:

- working in the various communities being researched, and collecting and analysing data;
- collecting and categorising objects of anthropological interest;
- attempting to trace the history of past civilisations from fossil remains and excavation sites.

Areas of specialisation often overlap and the specialists include the following:

- *applied anthropologists*, who cover various social aspects like community development, culture resource management, justice, planning, policy, etc.
- *biological or physical anthropologists*, who are more concerned with evolution and variations of the human species, and the interactions between biology, ecology and culture for individual life spans.
- *linguistic anthropologists*, who study the evolution, structure and function of languages of various non-western societies, and how they affect or are affected by the different factors in society.

- *social or cultural anthropologists*, who study and research small communities, cities or nations and conduct comparative studies of their cultures.

Education: A bachelor's degree in a relevant discipline is required.

Personal Attributes: Possesses an aptitude for research; able to do detailed and accurate practical work independently; is sensitive to other people and cultures.

Job Outlook: Employment opportunities are available in government departments, museums and universities. Work is also available in human services and social planning. There is a lot of scope in the field of applied anthropology.

Related Occupations: Archaeologists, criminologists and sociologists.

Archaeologists

Job Description: Archaeologists deal with the discovery, study and management of the material remains of human cultures from before and during recorded history. They attempt to piece together the customs and lifestyles of the people through artefacts like art, clothes, construction or tools. They even research the surrounding flora and fauna to discover whether they were farmers hunters, traders, etc.

An archaeologist would normally work at some or all of the following:

- discovering and recording archaeological sites, and leading an expedition to excavate the site;
- photographing or drawing the recovered articles, and cleaning them for display;
- analysing the finds and documenting the results;
- giving advice on matters relating to heritage, conservation of sites and legalities.

Areas of specialisation are decided by the class of artefacts, periods of history, geographical locations being studied or the work being done such as analysis of plant or animal remains and conservation work.

Education: A bachelor's degree in archaeology is required.

Personal Attributes: Possesses an interest in science and aptitude for research work; able to work as part of a team; has perseverance; is physically fit.

Job Outlook: Though limited, employment opportunities may be found with government agencies, museums, private development corporations and universities.

Related Occupations: Anthropologists, conservators, geographers, geologists, historians and museum curators.

Criminologists

Job Description: Criminologists examine the judicial systems used to convict people accused of crimes, analyse the reasons for criminal behaviour and suggest ways to reduce crime.

Criminologists' scope of work can include some or all of the following:

- researching into the operations of law enforcement agencies like courts, prison departments, probation departments and the police force;
- interpreting and analysing data;
- collecting and cataloguing crime statistics, and devising ways to use available resources to fight and solve crime;
- analysing and developing crime prevention strategies;
- evaluating the various aspects of the criminal justice system and crime itself.

Education: A bachelor's degree in a relevant discipline is required.

Personal Attributes: Possesses an analytical mind, an interest in welfare and human behaviours, and personal integrity.

Job Outlook: A very limited number of jobs are available in government departments, universities and in teaching and research.

Related Occupations: Lawyers, psychologists, social workers and sociologists.

Economists

Job Description: Economists study the ways a society uses scarce resources such as land, labour,

raw material and machinery to produce goods and services. They analyse the costs and benefits of distributing and consuming these goods and services. They study the effects of business economics, international trade, taxation and a number of other related topics. Economists conduct research, collect and analyse data, monitor economic trends and develop forecasts.

The work they do could involve some or all of the following:

- helping formulate government policies and studying their effects on the economy and society;
- investigating the effects of government spending and budget on the economy;
- devising ways to improve efficiency and international competitiveness;
- researching into issues like industrial relations, type of goods being produced and consumed in the country, and the effects of government labour programmes on economic growth and industrial development;
- teaching in colleges and universities, and contributing their articles to various publications;
- preparing economic forecasts, analysing trends and giving advice on various topics.

There are a number of speciality fields available and the specialists include the following:

- *agriculture and resource economists*, who study the economics of the efficient use of resources and its application in farm management, marketing and other related fields;
- *applied industry economists*, who study the economic aspects of industry structure and performance, usually in manufacturing or agriculture;
- *econometricians*, who develop quantified theoretical models, using economic theories, forecasting techniques and statistical methods;
- *environmental economists*, who research the environmental impact of projects and provide advice on it, and on other environmental issues and natural resource management;
- *financial economists*, who usually work for banks and investment firms and who study overall economic trends, monitor and analyse

various money market considerations, and provide advice on investments and capital requirements;

- *labour market economists*, who deal with the economic effects of labour problems on government policies, give advice and research various aspects of the labour market;
- *taxation economists*, who investigate and analyse government expenditure and sources of income, and the effects of taxation and fiscal policy on the national income and all businesses.

Education: A bachelor's degree in economics is required.

Personal Attributes: Possesses an aptitude for mathematics and statistics, and good oral and writing skills; able to work accurately with detail and think logically and analytically; has creativity, intellectual curiosity, patience and persistence;

Job Outlook: Employment for economists is expected to grow as fast as other occupations and opportunities for economists should be best as consultants in private industry and in research.

Related Occupations: Accountants, actuaries, auditors, budget officers, credit analysts, finance analysts, finance managers, loan officers and underwriters.

Environmental Scientists

Job Description: Environmental scientists assess and record the features of the environment and develop techniques to minimise the negative impacts of human activity on the environment.

The work involves some or all of the following:

- conducting research on the biological and physical nature of the environment;
- monitoring and developing methods to decrease the negative effects of production processes on the environment based on impact studies;
- assisting in developing policies on environmental management;
- providing advice on waste management and the recycling or disposal of hazardous materials;

- doing research on various long-term projects, and submitting reports and proposals to authorities.

Environmental scientists usually work with a number of professionals and technical personnel.

Education: A multidisciplinary degree in environmental science or other applied science, or agriculture degrees are essential.

Personal Attributes: Possesses problem-solving skills and team spirit; is analytical.

Job Outlook: Environmental scientists are often employed by certain industrial organisations, engineering firms and government authorities. Opportunities have been good lately due to increasing environmental concerns and projects in environmentally sensitive areas. This also generated some prospects of being self-employed as consultants for individuals with a substantial amount of work experience in the field, as well as teaching the subject at higher educational institutions.

Related Occupations: Agricultural and biological scientists, botanists, environmental engineers, geologists and natural resource managers.

Geographers

Job Description: Geographers are involved in the study and analysis of the links between human activities and the environment, natural and built up.

The work of geographers may involve some or all of the following:

- collecting and analysing data to draw maps on a variety of topics like climate, geological distributions, soils, vegetation, etc.;
- interpreting various types of data and make maps, for example using satellite imagery to map natural resources;
- giving advice on the locations of industries and public facilities, and environmental management;
- assisting and developing maps, atlases, etc., for cartographic use, geographic information systems, and regional and international development assistance projects;
- advising on a wide range of topics including boundary demarcations, erosion, military intelligence, resource planning and management and tourism.

Fields of specialisation are linked to the work being done.

- *Environmental geographers* deal with land and water management, urban and regional planning, and natural hazards. They integrate the various aspects of human and physical geography.
- *Human geographers* study the factors affecting population distribution, changes and patterns.
- *Physical geographers* study how the physical environment has been formed and the various phenomenon responsible for geographical changes such as coastal erosion, land degradation, river quality, etc. They study environmental changes and predict future ones.

Education: A bachelor's degree in geography is required.

Personal Attributes: Possesses an aptitude for mathematics, social or natural sciences, and statistics; has good analytical and computing skills.

Job Outlook: Opportunities exist in various areas like environmental management, policy analysis and programme administration, resource evaluation and teaching. Economic geographers can also work in banking or areas of commerce. Openings are available in government departments as well as private and public organisations.

Related Occupations: Cartographers, geologists, surveyors and town planners.

Historians

Job Description: Historians research into the past and attempt to explain the changes which have occurred since then. This research covers a wide variety of topics including histories of regions, organisations, buildings, particular eras, people and even ideas.

The work involved can include some or all of the following:

- analysing historical events using the work and assistance of other historians, reference material like artefacts, diaries, newspapers, etc., and interviewing people if necessary;

- cataloguing the information, verifying the details and accuracy, and drawing conclusions;
- teaching at school and university levels;
- using their knowledge to advise government departments, private and public organisations, or societies.

Education: A bachelor's degree in history is required.

Personal Attributes: Possesses an interest in history, human behaviour, politics and society; has problem-solving skills and an inquisitive mind; able to research meticulously.

Job Outlook: Jobs normally are available as teachers at the school level and in teaching as well as research at the university level. Employment is also possible in government departments, heritage bodies or museums.

Related Occupations: Anthropologists, sociologists and university lecturers.

Marketing Research Analysts

Job Description: Marketing research analysts are concerned with the design, promotion, price, and distribution of a product or service. They provide information which is used to identify and define marketing opportunities, generate, refine and evaluate marketing actions, and monitor marketing performance.

Market research analysts' work may include some or all of the following:

- providing management with information to make decisions on the design, distribution, pricing and promotion of company products or services;
- selecting sample groups and organising opinion polls, surveys and other similar operations to collect data from the target market, for primary research;
- undertaking secondary research, which involves data collection from company sales records, government statistics and information, e.g. population census;
- using computers, mathematical and statistical techniques to arrange and analyse all the data;
- explaining particular trends and writing reports on the final results of analysis.

Marketing research also employs interviewers who carry out observations studies, conduct face-to-face or telephone interviews, record answers and check information for consistency.

Education: Formal qualifications are not usually essential for market research interviewers although tertiary qualifications are generally looked for in market research analysts.

Personal Attributes: Possesses an aptitude for mathematics and statistics, and good oral and writing skills; able to work with others and to work accurately with detail; is patient, persistent, objective and systematic in work.

Job Outlook: Demand for market research analysts should be strong due to an increasingly competitive global economy. Marketing research provides organisations with valuable feedback from purchasers, allowing companies to evaluate consumer satisfaction and plan more effectively for the future.

Related Occupations: Employment research and planning directors, social welfare research workers, sociologists, and urban and regional planners.

Political Scientists

Job Description: Political scientists study the many facets of political institutions and movements like their theories, development, inter-relationships and functioning. They also study political behaviour of individuals and groups, their relationships, economy and culture.

Their work will normally include some or all of the following:

- researching into areas of political philosophy, theories and practices of political groups, international relations, and relations between the government and businesses;
- in the foreign service, analysing the implications of domestic and international politics on proposed strategies;
- organising research data on the lines of existing work and observations based on the work of contemporary political parties;
- making presentations to the government, international institutions, political parties and on television and radio;

- writing articles for the print media, catering to the general public.

Education: A bachelor's degree in political science is required.

Personal Attributes: Possesses analytical and excellent oral and writing skills; has the ability to research extensively.

Job Outlook: Job opportunities are available in schools and universities for teaching and research. Employment is also available in government departments, labour relations, private organisations and the media.

Related Occupations: Economists, sociologists and trade union officials.

Psychologists

Job Description: Psychologists study human behaviour and mental processes in a bid to understand, explain and change people's behaviour. They may analyse the way a person thinks, feels or behaves. Apart from personal problems, psychologists also examine behaviour in the community, schools and at the workplace. Knowledge and techniques of psychology are applied in a variety of areas including education, human services, law, management and sports.

The work done by psychologists includes some or all of the following:

- administering and assessing tests to identify and remedy problems;
- counselling individuals with emotional or interpersonal difficulties;
- studying the psychological aspects of various topics like occupational behaviour, organisational structures, study motivation, teaching skills and working conditions;
- constructing tests to evaluate and predict intellectual and emotional states;
- implementing and evaluating programmes to improve personal and organisational effectiveness.

Psychologists could specialise in any one of a variety of areas.

Clinical psychologists constitute the largest speciality, generally work in independent or group

practice, or in clinics and hospitals. They may perform some or all of the following tasks:

- help the emotionally or mentally disturbed adjust to life;
- help all kinds of medical and surgical patients deal with their illnesses or injuries;
- work in physical medicine and rehabilitation settings, treating patients with spinal cord injuries, chronic pain or illness, stroke, arthritis or neurological problems;
- help people deal with stresses such as ageing or divorce;
- interview patients, give diagnostic tests, provide individual, family and group psychotherapy, and design and implement behaviour modification programmes.

Counselling psychologists use several techniques, including interviewing and testing, to advise people on how to deal with problems of everyday living. They address problems which may be educational, personal, social or vocational in nature. They help their clients regain their self confidence and become aware of their skills and abilities. They work in health and welfare services, schools or the work place.

Development psychologists study patterns and causes of behavioural changes as people progress through life, from infancy to adulthood.

Educational psychologists evaluate student and teacher needs, and design and develop programmes to enhance the educational setting. They provide guidance and counselling services to their students.

Experimental psychologists study behaviour processes and work with human beings and animals such as monkeys, pigeons and rats. Some prominent areas of research include learning, motivation, retention and thinking.

Industrial and organisation psychologists apply psychological techniques to management, marketing problems and personnel administration. They are involved in applicant screening, counselling, organisational development, policy planning, psychological test research, and training and development.

Research psychologists investigate the cognitive, emotional, physical or social aspects of human

behaviour, using skills in computing, data analysis, research design and statistics.

Some relatively new specialities include cognitive psychology, geopsychology, health psychology and neuropsychology.

Education: A bachelor's degree in psychology is the minimum requirement for entry level jobs while those with a Ph.D qualify for a wide range of clinical, counselling, research and teaching positions in the government, private industry and universities.

Personal Attributes: Possesses an interest in people and human behaviour; able to deal effectively with people and to lead and inspire others; is emotionally stable, mature and patient; has sensitivity, compassion and perseverance.

Job Outlook: Psychologists have a strong attachment to their occupation, largely because of the substantial investment in training required to enter the specialised field. A few factors should stimulate employment growth and these include the following:

- programmes needed to combat the increase in alcohol abuse, crime, drug dependency, family violence, marital strife and other problems plaguing society;
- the increasing awareness towards mental health.

Job opportunities should remain strong in health care, particularly in organisations which provide health care, especially in health maintenance and preferred provider organisations, which focuses on mental health.

Employment opportunities will also arise in businesses as companies utilise psychological expertise in analysis, research and survey design, and to provide personnel testing, programme evaluation and statistical analysis.

Related Occupations: Counsellors, psychiatrists, social workers and sociologists.

Sources of Additional Information:

Canada

Canadian Psychological Association
Vincent Road

Old Chelsea
Quebec J0X 2N0

Registrar
The Psychologists Association of Alberta
400 Sun Life Place
10123 99 Street
Edmonton, Alberta T5J 3H1

UK

British Psychological Society
St Andrews House
48 Princes Road East
Leicester LE1 7DR

USA

American Psychological Association
Educational Affairs Office
1200 17th St NW
Washington DC 20036

Social Scientists

Job Description: Social scientists examine all aspects of human society and behaviour. These could be as diverse as the distribution of goods and services, the beliefs of newly formed religious groups or the modern mass transportation systems.

Research in social sciences is important for it provides insights that help us understand the different ways in which individuals and groups make decisions, exercise power or respond to change. Through their studies, social scientists and urban planners help business leaders, educators, government officials and others in solving economic, environmental and social problems.

A social scientist's work is mainly research-based. Existing or newly discovered methods are used to construct facts and theories that contribute to human knowledge. Social sciences are interdisciplinary in nature. Often, research work that is conducted in one field overlaps with work that is being conducted in another social science discipline.

There are various specialists in social studies.

- *Anthropologists* study the origins and the physical, social and cultural development and behaviour of humans. This includes the way of

life, remains, language or physical characteristics of people in various parts of the world. They also make comparisons of the customs, values and social patterns of different cultures.

- **Archaeologists** study material evidence of past human life and culture to determine the history, customs, living habits of earlier civilisations. They do this through the systematic recovery and examination of remains of objects such as buildings, graves, pottery and tools.
- **Economists** study the production, distribution and consumption of commodities and services. They may conduct surveys and analyse data to determine public preferences. Most surveys are concerned with areas like agriculture, energy, finance, health, labour or transportation.
- **Geographers** study the distribution of both physical and cultural phenomena on local, regional, continental and global scales.
- **Historians** research and analyse the past. They use many sources of information during their research, for example, films, government and institutional records, interviews, newspapers, periodicals, photographs and unpublished manuscripts.
- **Marketing research analysts** research market conditions at local, national, regional or international levels to determine potential sales of a product or service.
- **Political scientists** study the origin, development and operation of political systems.
- **Psychologists** constitute over half of all social scientists, study human behaviour and use their expertise to counsel or advise individuals or groups.
- **Sociologists** analyse the development, structure and behaviour of groups or social systems such as families, neighbourhoods or clubs.
- **Urban and regional planners** develop comprehensive plans and programmes to use land for industrial and public sites.

Education: A bachelor's degree in social science is essential for many different kinds of entry level

jobs such as research assistants. A postgraduate degree is required for most positions in colleges and universities and for advancement to many top level non-academic research and administrative posts.

Personal Attributes: Possesses intellectual curiosity, objectivity, open-mindedness and systematic work habits; able to analyse data and to think logically and methodically; has good oral and writing skills.

Job Outlook: Employment for social scientists is spurred by rising concern over the environment, crime, communicable disease, mental illness, the growing number of elderly and homeless populations, the increasingly competitive global economy and a wide range of other issues.

Related Occupations: Social workers and statisticians.

Sociologists

Job Description: Sociologists study human society and social behaviour by examining the groups and social institutions that people form, like families, communities and governments as well as various business, political, religious and social organisations.

A sociologist's work may include some or all of the following:

- studying the behaviour and interaction of groups, systematically interviewing selected people and living in the community being studied for better understanding;
- tracing their origin and growth, and analysing the influence of group activities on individual members;
- researching the characteristics of social groups, organisations and institutions, the way individuals are affected by each other and by the groups to which they belong, and the impact of social traits such as age, gender, or race on a person's daily life.

Sociologists usually work in one or more specialities, such as:

- education;
- ethnic and racial relations;
- family;

- gender roles and relations;
- peace, revolution and war;
- social organisation, stratification and mobility;
- social psychology, urban, rural, political and comparative sociology.

Other specialities include criminology, data analysis, environmental sociology, mental sociology and research design. Some sociologists are primarily administrators and a number are employed as consultants.

Education: A master's degree in sociology is required for employment in applied research or college teaching. The Ph.D. is important for most senior level positions in consulting firms, corporations, government agencies and research institutes.

Personal Attributes: Possesses keen intellectual curiosity and analytical skills; has good oral and writing skills; is objective and sensitive to social issues; able to get along well with people.

Job Outlook: Demand is expected to be stronger for sociologists with training in practical rather than theoretical sociology. Additional positions for sociologists will stem from the increasing demand for research in various fields such as criminology, demography, gerontology and medical sociology, and the need to evaluate and administer programmes designed to cope with social and welfare problems.

Related Occupations: Anthropologists, criminologists, intelligence specialists and psychologists.

Sources of Additional Information:

UK

Central Council for Education and Training in Social Work (CCETSW)
 CCETSW Information Service
 Derbyshire House
 St Chad's Street
 London WC1H 8AD

USA

American Sociological Association
 Career and Research Division
 1722 N St, NW
 Washington DC 20036

Urban and Regional Planners

Job Description: Urban and regional planners, often called community or city planners, develop programmes to provide for growth and revitalisation of urban, suburban and rural communities and their regions.

The scope of work could include some or all of the following:

- helping local officials make decisions on social, economic and environmental issues;
- devising plans outlining the best use of a community's land, for example, where commercial, recreational, residential and other human services should be placed;
- being involved in various other planning activities including resource development, social services and transportation;
- addressing such issues as air pollution, central city redevelopment, traffic congestion and the impact of growth and change on various areas;
- formulating capital improvement plans to construct new public housing, school buildings and sewage systems;
- examining community facilities such as health clinics and schools to ensure they meet the demands placed upon them, and helping to resolve differences over their location;
- keeping abreast of economic and legal issues involving community development and changes in building codes, environmental regulations or zoning codes, and ensuring that builders follow these codes and regulations;
- preparing for situations that are likely to develop as a result of population growth or social and economic change;
- estimating needs for business and industrial sites, housing and transportation;
- analysing and proposing alternative ways to achieve more efficient and attractive urban areas;
- providing information on the type of industries in the community, characteristics of the population and economic and employment trends;
- preparing materials to show how their programmes can be carried out and what they will cost;
- conferring with land developers, civic leaders and other public planning officials and even functioning as mediators in community disputes by presenting alternatives that are acceptable to opposing parties.

Urban and regional planners can specialise in areas like environmental impact assessment, heritage protection and urban design, among others.

Education: A bachelor's degree in a relevant discipline is required.

Personal Attributes: Possesses an interest in social, economic and environmental issues; has analytical and problem-solving skills; able to communicate ideas, is flexible.

Job Outlook: Employment for urban and regional planners is expected to grow about as fast as the average for all occupations. The continuing importance of transportation, environmental housing, economic and energy production planning will spur demand for urban and regional planners.

Specific factors contributing to the growth in the number of jobs include commercial development to support suburban areas with rapidly growing populations, legislation related to the environment, transportation, housing, and land use and development. Most new jobs for urban and regional planners will arise in rapidly expanding communities.

Related Occupations: Architects, civil engineers, construction economists, environmental engineers, geographers, landscape architects and surveyors.

TEACHERS, LIBRARIANS AND COUNSELLORS

Adult Education Teachers

Job Description: Adult education teachers usually teach vocational courses as well as courses specially designed for people taking re-employment.

They work in the following three main areas:

- adult, basic;
- adult, continuing education;
- adult, vocational-technical.

The work they do can include some or all of the following:

- instructing people who have graduated or left school for occupations that do not require a college degree such as farmers and welders;
- helping people update their job skills or adapt to technological advancements and providing

instructions in basic education courses for school dropouts or others who need to upgrade their skill to find a job;

- teaching courses such as cooking, dancing, exercise and physical fitness, photography and writing;
- lecturing in classrooms and also giving students hands-on experience;
- preparing lessons, assignments and grade papers, ordering supplies and doing related paperwork, attending faculty and professional meetings, and staying abreast of the developments in their field;
- advising and counselling students with career or personal problems, and referring them to professional counsellors if necessary.

Education: A bachelor's degree in a relevant discipline is required.

Personal Attributes: Possesses the ability to communicate concepts and instructions clearly; able to motivate students; is patient and understanding.

Job Outlook: Employment for adult education teachers is expected to grow faster than the average for all occupations. This is due to the continued and rising demand for adult education teachers. Opportunities will be best in fields such as automotive mechanics, computer technology and medical technology.

Participation in continuing education increases as the educational attainment of the population increases. More people are learning that life-long learning is important to the success of their careers. To keep abreast of advancing technologies, an increasing number of adults are taking courses for career advancement.

Related Occupations: Counsellors, other teachers, school administrators, social workers, training officers and university lecturers.

Archivists

Job Description: Archivists manage and maintain all types of recorded information, especially information which is to be permanently preserved. Archivists handle documents or objects that are retained because they originally accompanied the document and related specifically to it. They handle all aspects of making, documenting and storing records for later use. Archivists and record

managers are also responsible for regulating access and reference to the records.

The scope of work of an archivist could include some or all of the following:

- studying records held by other organisations;
- studying records to decide whether to destroy or retain them;
- ensuring that records essential to current operations are preserved;
- devising and implementing systems to document and control archives and records;
- compiling guides, inventories and other methods to help research and reference;
- providing access to records, assisting users in information retrieval and collecting records;
- selecting and reproducing documents using microfilming and publication;
- ensuring scientific maintenance of the storage and conservation of records;
- advising on issues like creation, maintenance and records management, and computerisation of such management systems.

Records could include books, diaries, files, letters, maps, plans or registers. Records in other media include films, microfilms, photographs, sound recordings, and electronic or computer disks and tapes.

Education: Graduate education is required.

Personal Attributes: Possesses an interest in preserving and managing records, and the ability to undertake highly detailed work; has good organisational skills and an aesthetic sense; is flexible.

Job Outlook: Archival jobs are expected in areas such as educational services and government departments. Archival jobs also will become available as institutions put emphasis on establishing archives and organising records and information. Archivists may be employed by banks, building societies, some large commercial organisations and universities.

Related Occupations: Conservators, historians, librarians and records managers.

College and University Lecturers

Job Description: College and university lecturers

teach and advise full-time or part-time college students.

They usually do some or all of the following:

- give lectures to several hundred students in large halls, lead small seminars and supervise students in laboratories;
- prepare lectures, exercises and laboratory experiments, grade students on their examination papers and advise and work individually with students;
- organise and lead field trips and excursions;
- counsel, advise, teach and supervise graduate student research in universities;
- do research in their particular field of study and publish the results in books and academic journals;
- study and meet with colleagues to keep up with developments in their field;
- serve on academic or administrative committees which deal with the policies of their institution, departmental matters, academic issues, curricula, budgets, equipment purchases and hiring;
- consult with business, community, government and non-profit organisations.

Lecturers can work full-time or part-time.

Education: An honours degree plus a higher degree, preferably a doctorate or equivalent research qualification are essential.

Personal Attributes: Possesses exceptional academic ability, an aptitude for research, interest in teaching and excellent communication skills; has plenty of confidence when handling queries and presenting information; able to establish rapport with students.

Job Outlook: Employment for college and university lecturers is expected to increase about as fast as the other occupations as enrolments in higher education increase. Many additional openings will arise as faculty members retire.

Related Occupations: Elementary and secondary school teachers, trainers and writers.

Conservators

Job Description: Conservators deal with the various processes in the preservation and conser-

vation of materials and objects in public and private collections like art galleries, historic houses, libraries and museums. They also work on archaeological and historical sites.

The work they do can include some or all of the following:

- systematically inspecting and recording collections and writing reports;
- assessing the conditions of objects to confirm their identification and authenticity;
- advising on the storage of objects in their care;
- researching into the nature of collections and devising methods for their preservation and conservation;
- conducting intensive research into deterioration problems, developing techniques to arrest and correct the damage, and keeping records of the methods used.

Conservators can specialise in the conservation of any particular type of material or object like buildings and historic sites, paper, paintings, sculpture, textiles, etc.

Education: Graduate education is required.

Personal Attributes: Possesses an aptitude for science and a high degree of professional ethics; is computer literate and attentive to detail; has manual dexterity, normal colour vision and patience to do fine work.

Job Outlook: It is a very small profession with limited opportunities available.

Related Occupations: Archaeologists, archivists, artists and museum curators.

Counsellors

Job Description: Counsellors assist people with personal, family, social, educational and career-related problems and concerns. Their duties depend on the individuals they serve and the settings in which they work.

College career planning and placement counsellors: They help students and alumni with career development and job hunting. They may assist in writing resumes and improving job interviewing techniques.

Employment counsellors: They help individuals make wise career decisions. Their work could include some or all of the following:

- helping clients explore and evaluate their education, training, work history, interests, skills, personal traits and physical capacities;
- arranging for aptitude and achievement tests;
- assisting clients in locating and applying for jobs.

Mental health counsellors: They emphasise prevention and work with individuals and groups to promote optimum mental health. They usually help individuals deal with the following:

- addictions and substance abuse, family parenting, marital problems, suicide, stress management and problems with self-esteem;
- issues associated with ageing, job and career concerns, educational decisions, and issues of mental and emotional health.

Rehabilitation counsellors: They help persons deal with the personal, social and vocational impact of their disabilities.

During the course of counselling they may do some or all of the following:

- evaluate the strengths and limitations of individuals;
- provide personal and vocational counselling, and arrange for medical care, vocational training and job placement if required;
- confer with the client to develop and implement a rehabilitation programme, which may include training, to help the person become more independent and employable.

School and college counsellors: They help students understand their abilities, interests, talents and personality characteristics so that the students can develop realistic academic and career options. Their scope of work may include some or all of the following:

- using counselling sessions, interviews, tests or other tools to assist them in evaluating and advising students;
- operating information centres and career education programmes;
- helping students understand and deal with their social, behavioural and personal problems;

- working with students individually, in small groups or with an entire class;
- consulting and working with parents, school administrators, school psychologists and teachers.

Education: You need a degree in a behavioural science, with a major in your particular area of interest like nursing, psychology, social work, teaching, etc. This could be followed by a certificate or diploma in counselling, rehabilitation and other related fields.

Personal Attributes: Possesses a strong interest to help others and the ability to cope with most problems; able to inspire respect, trust and confidence; is strong and mature.

Job Outlook: Employment for school counsellors is expected to grow because of increasing enrolments, particularly in secondary schools. Rehabilitation and mental health counsellors should also be in demand. Employment opportunities for counsellors working in private job training services should grow readily as counsellors provide skill training and other services to a growing number of laid-off workers.

Related Occupations: College and student personnel workers, nurses, occupational therapists, psychiatrists, psychologists, social workers, training and employee development specialists, and youth workers.

Curators

Job Description: Museum curators acquire, arrange, catalogue, exhibit and maintain items of lasting value so that they can be used by researchers, or for exhibitions and other educational programmes. Curators usually handle three dimensional objects such as paintings, sculptures and textiles.

Curators may do some or all of the following:

- co-ordinate educational and public outreach programmes such as classes, lectures, tours and workshops;
- plan and prepare exhibits;
- give lectures, answer public queries and work with boards of institutions to administer plans and policies;
- conduct research on topics or items relevant to

their collections to determine the condition and authenticity, for example, and write reports;

- oversee collections in aquariums, botanical gardens, historic sites, museums, nature centres and zoos;
- acquire items through purchase, gifts, field exploration, inter-museum loans or, in the case of some plants and animals, hybridisation and breeding.

Most curators specialise in art, botany, history or palaeontology.

Education: Graduate education is required.

Personal Attributes: Possesses a methodological approach to work; is patient and attentive to detail.

Job Outlook: Employment for curators is expected to increase about as fast as other occupations. Although the rate of turnover among curators is relatively low, the need to replace workers who leave the occupation or stop working will create additional job openings. Despite the anticipated growth, competition for jobs is expected to be keen. Job opportunities for curators should be best in art and history museums, since these are the largest employers in the museum industry.

Related Occupations: Anthropologists, archaeologists, historians, librarians, paintings restorers and record managers.

Guidance Officers

Job Description: Guidance officers are also known as school counsellors or school psychologists. They study teaching methods and learning processes, and subsequently help students improve their social, personal, educational and career-planning skills in a school set-up.

Their work usually involves some or all of the following:

- counselling students and parents on truancy, misbehaviour, and career and educational options;
- developing and implementing programmes designed to help students overcome such problems, with the aid of parents and teachers;

- interacting with a variety of educationists to develop and evaluate training and other programmes, and planning course content;
- using psychological tests to diagnose learning disabilities in children, and selecting children for various courses using specially designed aptitude tests;
- developing appropriate programmes for students with special needs,
- conducting research in relevant topics;
- giving information on and providing references for education and training opportunities.

Education: A bachelor's degree in a relevant discipline is required.

Personal Attributes: Possesses good negotiation and communication skills; able to interact comfortably and tactfully with young people.

Job Outlook: Jobs are generally available in colleges, schools and other educational and training institutions.

Related Occupations: Psychologists and teachers.

Librarians

Job Description: Librarians oversee the collection and cataloguing of library materials, manage staff and develop and direct information programmes for the public. They make information easily available to people. They help users find printed information, maps, journals, manuscripts, journals, CD-ROMS and computerised on-line materials.

Library work is divided into three basic functions and depending on an employer, librarians may perform a combination of these services.

Administrative services: Librarians in administrative services oversee management of the library and ensure that it functions properly. Their work includes some or all of the following:

- using marketing strategies for promotional purposes, to increase the collection and resources of the library;
- interacting with the general public and answering queries over the telephone, in person or by mail;
- supervising and training staff.

Technical services: Librarians in technical services can work in areas such as acquisitions librarians and cataloguers. They acquire and prepare materials for use and may not deal directly with the public. Their work will involve some or all of the following:

- creating and maintaining databases and increasing and managing collections;
- gathering information from other computer data banks;
- preparing bibliographies and organising library and information resources by selecting, cataloguing and indexing them;
- planning and selecting the appropriate computer systems to be used for the library.

User services: Librarians in user services work with users to help them find information they need. Their work involves some or all of the following:

- developing methods and services to improve user needs;
- advising and assisting users, for example allowing inter-library loans and helping users retrieve information from external computer systems;
- helping to identify or interpret user information;
- designing and implementing reader education courses.

In small libraries, librarians generally handle all aspects of the work. They may work at some or all of the following tasks:

- reading book reviews, publishers' announcements and catalogues to keep up with current literature and other available sources;
- supervising assistants who prepare cards, computer records or other access tools, that indicate title, author, subject, publisher and date of publication;
- compiling lists of books, periodicals, articles and audio-visual materials on particular subjects and recommending the materials to be acquired;
- collecting and organising books, pamphlets, manuscripts and other materials in a specific field such as rare books, genealogy or music.

Librarians may specialise in areas like acquisitions, cataloguing, children's literature, on-line services

or reference. They could also work in libraries specialising in particular topics.

Librarians are assisted by library technicians and library assistants. Information managers or library research officers try and find new ways to bridge the gap between sources of information and the user.

Education: A bachelor's or master's degree in library science is required. ITM offers a Diploma in Library Science locally. The only distance learning programmes available are post-experience master's degrees from University College of Wales.

Personal Attributes: Possesses analytical, organisational and communication skills; has excellent general knowledge; is well versed in the use of information technology especially databases; able to handle customers confidently.

Job Outlook: Budgetary constraints are likely to contribute to slow growth in employment for librarians in schools, public libraries, and college and university libraries. The increasing use of computerised information may also dampen the growth for librarians. Opportunities will be best for librarians outside traditional settings such as consulting firms and private corporations.

Related Occupations: Archivists, information scientists, museum curators and research analysts.

Sources of Additional Information:

New Zealand

General Secretary
NZ Library Association
Box 12-212, Wellington

UK

The Education Department
The Library Association
7 Ridgmount Street
London WC1E 7AE

Department of Information and Library Studies
Liverpool Business School
Liverpool John Moores University
98 Mount Pleasant
Liverpool L3 5VZ

Loughborough University
Department of Information and Library Science
Loughborough
Leics LE11 3TU

University College of Wales
Aberystwyth
Dyfed SY23 3AS

Museum Officers

Job Description: Museums are generally large organisations covering a number of fields or they may concentrate in only one area. Most large museums employ people in a multitude of different capacities.

Museum officers are classified according to the duties they perform.

Administrative staff perform all types of clerical and accounting work.

Design staff plan and organise all aspects of exhibitions from exhibits to publicity material.

Education officers develop and implement special informative and educational programmes for schools and the general public.

Skilled tradesmen usually carry out routine maintenance and building work like structures for various exhibits, in museums. They could be carpenters, electricians and other tradespeople.

Specialised staff include editors, librarians, photographers and public relations officers, among others. Their work could involve some or all of the following:

- researching, editing and publishing journals;
- preparing films and photographs for display;
- maintaining libraries.

General staff include cleaners, museum attendants and security personnel. They maintain cleanliness and hygiene, assist visitors and protect the museum from theft and vandalism, respectively.

Education: Design staff normally require a diploma in art or design. Education officers need appropriate teaching qualifications and experience. Specialised staff need appropriate qualifications depending on the field of specialisation.

Most other jobs require no formal qualifications for entry.

Personal Attributes: Possesses an interest in museums; able to absorb large amounts of information and easily handle groups of people; is outgoing and friendly.

Job Outlook: Job opportunities are available in museums and art galleries. The number of available opportunities depends on amount of funding, size of the museums and the type and number of special exhibitions being held.

Related Occupations: Conservators and museum curators.

Rehabilitation Counsellors

Job Description: Rehabilitation counsellors help people who are disabled to accept and overcome their disabilities. They help them set and achieve personal goals which may even include getting back to work.

Their scope of work is wide and they may do some or all of the following:

- do an in-depth assessment of the client's needs and then develop an appropriate rehabilitation programme;
- plan, devise and implement individual rehabilitation programmes, and follow their progress to ensure that all client requirements are met;
- provide information, assistance and consultancy services to other health professionals and organisations in the same line of work;
- refer clients for medical examinations and psychological and psychiatric tests;
- help place people into suitable jobs, provide training services, both formal as well as on-the-job, and monitor their progress to make further recommendations;
- interact with insurance companies, doctors and other related professionals to inform and update them on the client's progress;
- carry out administrative, clerical and communication work related to the various cases, in other words, caseload management.

Rehabilitation counsellors are usually part of a team comprising medical, therapy and other related rehabilitation personnel.

Education: A degree in a relevant discipline is required.

Personal Attributes: Possesses excellent negotiation and liaison skills; is sympathetic and tactful when dealing with other people's problems.

Job Outlook: Rehabilitation counsellors find work with government agencies, private companies or they even go into private practice. They can provide consultancy services to other organisations.

Related Occupations: Psychologists, registered nurses, social workers and speech pathologists.

School Teachers – Kindergarten

Job Description: Kindergarten or pre-school teachers teach very young children. They introduce their students to the basic principles of alphabets, numbers, music and art, and help them develop physically, emotionally, intellectually and socially.

Their scope of work will include some or all of the following:

- using a variety of specially designed materials and equipment to organise different activities aimed at developing co-ordination, creativity and social skills, and an eagerness to learn;
- fostering confidence and development of language through story telling discussions and music;
- organising educational trips, encouraging them to explore and investigate, observing and evaluating the children's progress to assist detection of disorders, comforting and assisting children with their needs, and providing first-aid if required;
- interacting with other professionals like health and guidance officers, and psychologists, when working with children with special needs;
- helping to integrate special children with the others, promoting concepts of health and safety among their students, and teaching the children tolerance and sensitivity to all races and cultures;
- interacting with and updating parents, participating in activities within the community, and supervising and training other staff.

Education: A bachelor's degree in education is preferred.

Personal Attributes: Possesses excellent organisational, literacy and numeric skills, and the ability to improvise while teaching; has a lot of patience, enthusiasm and a sense of humour; likes working with young children.

Job Outlook: Opportunities exist in child-care centres and schools. Employment is also possible as nannies or home tutors.

Related Occupations: Child care workers and primary school teachers.

Sources of Additional Information:

Kementerian Pendidikan Malaysia
Bhg. Pendidikan Guru
Paras 4 dan 5
Blok A, Pusat Bandar Damansara
50604 Kuala Lumpur

School Teachers – Primary

Job Description: Primary school teachers play a vital role in the development of children. They introduce children to languages, numbers, science and social studies, and consolidate these skills. They may use artwork, computers, films, games, music, slides and other instructional technology to teach basic skills.

The work they do includes some or all of the following:

- planning an appropriate syllabus with help from other teachers and administrators, keeping in mind the age group and abilities of their pupils;
- teaching reading, writing, mathematics, science, social studies, physical education, etc., using different specially designed activities;
- developing and encouraging the children's interest, abilities and personal development, using creative activities;
- interacting with parents and administrators to evaluate their pupils' progress, organise parent or teacher functions and interviews;
- devising and implementing programmes for children with special needs, gifted children or children participating in distance learning programmes;

- helping out in school functions like concerts, sports days, etc.

Primary school teachers are usually trained to teach the general content of all subjects. They can, however, specialise in art, music, physical education or languages other than English.

Special education teachers instruct students with a variety of disabilities, such as hearing and visual impairments, learning disabilities, and physical disabilities. Special education teachers design and modify instructions to meet the students' special needs.

Education: A bachelor's degree in education is required.

Personal Attributes: Possesses excellent organisational skills, creativity, and the ability and desire to teach; has plenty of enthusiasm and patience; likes working with children.

Job Outlook: Growth in employment opportunities is expected to be good. Opportunities exist in child-care centres and schools. Employment is also possible as nannies or home tutors. Employment for special education teachers is expected to grow due to legislation emphasising training and employment for individuals with disabilities.

Related Occupations: Child care workers, kindergarten teachers and secondary school teachers.

Sources of Additional Information:

Kementerian Pendidikan Malaysia
Bhg. Pendidikan Guru
Paras 4 dan 5
Blok A, Pusat Bandar Damansara
50604 Kuala Lumpur

School Teachers – Secondary

Job Description: Teachers provide the tools and environment for their students to develop skills. Secondary school teachers specialise in a specific subject such as biology, English, history or mathematics, among others. They may also teach a variety of related courses, such as geography and history. Their students are usually aged 11 years or more.

They may do some or all of the following during the course of their work:

- help students delve more deeply into subjects introduced in elementary school and learn more about the world and about themselves;
- utilise films, slides as well as the latest technology such as computers, telecommunications systems and video discs in teaching, and use telecommunication technology to bring the real world into the classroom;
- work with students individually and supervise them outside the classroom environment;
- assign lessons, give tests, hear oral presentations and maintain classroom discipline;
- observe and evaluate a student's performance and potential and meet with parents and school staff to discuss a student's academic progress or personal problems;
- maintain attendance and class records, and do some amount of clerical and administrative work as well;
- prepare tests, grade papers, prepare report cards, oversee study halls and homerooms, participate in school programmes and other extracurricular activities, and help develop the curriculum to suit the changing needs;
- participate in distance education and continue updating their skills to use the latest technology.

Education: A bachelor's degree in the subject that the teacher wishes to teach is required.

Personal Attributes: Possesses excellent organisational skills, creativity, and the ability and desire to teach; has plenty of enthusiasm and patience; likes working with young people.

Job Outlook: Employment for secondary school teachers is expected to increase faster than the average for all occupations. However, projected growth varies among individual teaching occupations.

Related Occupations: College and university lecturers, counsellors, education administrators, pre-school workers and trainers.

Sources of Additional Information:

Kementerian Pendidikan Malaysia
Bhg. Pendidikan Guru
Paras 4 dan 5
Blok A, Pusat Bandar Damansara
50604 Kuala Lumpur

Teachers — Art

Job Description: Art teachers teach students drawing, painting, photography, print-making and sculpture.

The work involves some or all of the following:

- planning and coordinating art programmes;
- lecturing on the theory and showing or demonstrating the particular uses of various techniques;
- teaching students to develop or improve their skills in both theoretical and practical aspects;
- inspiring students and encouraging them to expand their creativity through different art forms and media;
- arranging and maintaining support facilities such as darkrooms and studios;
- organising exhibitions for students to display finished work;
- organising trips to museums and art galleries.

Private art teachers may instruct students in a commercial school or in their own homes or studios.

Education: An integrated degree in art and education is required;

Personal Attributes: Has good communication skills; is creative, organised, patient, tactful and interested in art and teaching.

Job Outlook: There is an increase of art schools in the city, hence, the high demand for art teachers.

Related Occupations: Artists and craftspersons.

Teachers — English as a Second Language

Job Description: These teachers teach children and adults from non-English speaking backgrounds.

The work involves some or all of the following:

- teaching primary and secondary school children to improve their understanding and usage of the language, enabling these pupils to move to regular school classes with the others; hence, teachers work closely with the mainstream educators in programme development and implementation;

- teaching adults spoken and written English skills to help them cope with daily affairs, entry into post-secondary institutions and for employment purposes;
- developing and implementing teaching programmes to suit the needs of students;
- evaluating the students' progress.

Education: A degree in education or arts majoring in English as a second language (ESL) or a diploma in ESL from a recognised institution is required.

Personal Attributes: Possesses a strong grasp of the English language; has strong communication and good organisational skills; is sensitive to the needs of students; is understanding and able to accept various cultures.

Job Outlook: With the emphasis on English being a second language in Malaysia, employment opportunities are good.

Related Occupation: Translators.

Teachers — Music

Job Description: Music teachers teach theory, history and practical music skills to students with the aim of increasing their interest and appreciation in music.

The work involves some or all of the following:

- teaching theory, history, harmony through demonstration, discussions, practical and written assignments;
- providing aural training;
- assisting and preparing students for performances or concerts;
- preparing and registering students for practical and theory examinations.

Private teachers usually specialise in one musical instrument only (the piano, organ and violin are the popular ones).

Public school music teachers often conduct school choirs, orchestras and bands. They need to know the playing fundamentals of the whole range of musical instruments – brass, strings, percussions and woodwind.

Education: A recognised certificate or diploma

from a specific music board, e.g. ABRSM, London, or a degree in music is required.

Personal Attributes: Possesses good communication and instructional skills; is enthusiastic, organised and patient with students.

Job Outlook: Prospects look good as more parents are sending their children to learn music.

Related Occupations: Actors and musicians.

Teachers — Physical Education

Job Description: The teachers instruct students in sports and recreational activities, with the aim of developing physical fitness and a healthy lifestyle.

The work involves some or all of the following:

- teaching basic techniques on the particular team or individual sport;
- developing and preparing students in physical fitness and skills for competition;
- coordinating special fitness or recreational programmes, e.g. sports day, cross-country meet, etc.;
- educating students on health issues.

Physical education teachers often also teach another subject in school.

Education: A degree in physical education is required.

Personal Attributes: Possesses good organisational ability, and an interest in teaching and physical activity; is physically fit, enthusiastic and patient.

Job Outlook: All schools have physical education in their curriculum, hence, sustaining the demand for these teachers.

Related Occupations: Coaches, fitness counsellors or instructors, sports medicine practitioners and sports persons.

Teachers — Special Education

Job Description: Special education teachers teach children in kindergarten, primary and secondary schools who have learning disabilities due to certain emotional, mental or physical reasons, or

language problem. They may also instruct gifted children with above average intellectual qualities.

The work involves some or all of the following:

- teaching curriculum subjects and other practical skills to help the rehabilitation process;
- monitoring the students' development by observation, appraising and reporting the progress, and recommending the appropriate methodology or programme to further enhance the development;
- caring for the needs of the students and assisting in their daily routine when necessary, e.g. feeding;
- maintaining close communication with parents, educators, professionals and the community for the planning and the implementation of new or enhanced programmes.

The teachers may instruct in special schools, regular schools or on an individual basis.

Education: A diploma or degree in education with a postgraduate course in special education is required.

Personal Attributes: Possesses good communication skills; able to counsel and understand individuals with special needs; has patience, dedication, tact and flexibility; is a good motivator and enjoys working with children.

Job Outlook: Special education teachers are often employed by the government, special needs centres and public schools. However, they are also able to work in private, providing tuition to children with learning disabilities.

Related Occupations: Development educators, psychologists and training officers.

President
Malaysian Librarian Association
PO Box 12545
50782 Kuala Lumpur

VISUAL ARTS OCCUPATIONS

Animators

Job Description: Animators work with a variety of media and models to create animated images for film and television. They usually report to a

director of animation who specifies characters and situations.

They usually do some or all of the following:

- hand draw characters or use computerised methods to make a series of pictures that create an illusion of movement;
- redraw the visuals if required, assist in colouring the drawings and paint backgrounds;
- make clay models or build or cut out models;
- give the characters a personality and physical features;
- record the visual images onto film, video or hard disk, directing and adjusting them for best results;
- depict different positions to coincide with the required direction;
- ensure that lip movements are synchronised with words, and actions match the music and sound effects;
- do freelance work and concentrate on their own productions.

Education: Training through art courses is advantageous.

Personal Attributes: Possesses excellent drawing skills, a flair for art and a basic amount of exposure to computers.

Job Outlook: This field is highly competitive. Work is available in film studios or on a freelance basis.

Related Occupations: Artists and graphic designers.

Designers

Job Description: Designers transform ordinary items, products and materials, using their designs and creativity, into functional and aesthetically pleasing objects. Most designers specialise in a particular area like designing automobiles, fashion, furniture, clothing, home appliances, industrial equipment or interiors, while others may work in more than one field.

Designers usually do some or all of the following:

- establish the requirements of clients and potential users;
- study the product, its colour, shape, size,

- weight, material and its functions as well as factors like cost, maintenance, safety and utility;
- do a market comparison of similar or competitive products if required, focusing on current styles and fashion trends;
- design for a wide range of clients including art or design directors, a product development team or producers of a play, film or television production;
- sketch manually or use computers to produce a model, a prototype, or detailed plans, drawn to scale, using computer-aided design (CAD) tools if necessary;
- supervise craft workers who implement their designs;
- spend time developing new business contacts and undertake administrative tasks like reviewing catalogues and ordering samples, if self-employed.

Designers can specialise in various areas of design depending on the work they do.

- Fashion designers* work with clothing and accessories following current fashion trends or designing original garments, often as self-employed designers designing for individual clients.
- Floral designers* cut and arrange fresh, dried, or artificial flowers and foliage into designs made specially according to customer requirements.
- Furniture designers* create furniture for manufacture, keeping in mind design trends, competitors' products, production costs, capability of production facilities and characteristics of a company's market.
- Industrial designers* develop and design manufactured products like cars, children's toys, computer equipment, home appliances and medical, office or recreational equipment.
- Interior designers* plan the space and furnish the interiors of commercial establishments, private homes and public buildings, and also plan additions and renovations.
- Set designers* work on the design of movie, television and theatre sets after studying scripts and discussions with the directors.

- Textile designers* use their knowledge of textile materials and fashion trends to design fabrics for garments, rugs, upholstery and other products.

Education: Some design occupations, especially industrial design, require a bachelor's degree.

Personal Attributes: Possesses an eye for detail, sensitivity to beauty, a strong sense of colour and a sense of balance and proportion; is creative.

Job Outlook: Employment growth will be fast. There will be a demand for industrial designers because of the continued emphasis on product quality and safety as well as a requirement for designs of new products in medicine, transportation and other fields. Growth in population and income should encourage an increase in demand for fashion designers, set designers and textile designers.

Related Occupations: Architects, landscape architects, merchandise display artists, photographers and visual artists.

Fashion Designers

Job Description: Fashion designers work with clothes and accessories, turning out new designs every season. They sometimes create original designs, but usually the designs are variations of various international fashions to meet the requirement of local clients.

Fashion designers usually do some or all of the following:

- visualise and create garments and garment ranges;
- make storyboards and drawings to describe their ideas, and use computers to alter and devise patterns;
- work with pattern makers or on their own, to draft the final pattern from the preliminary sketches;
- choose appropriate fabric and trim, make samples and meet with persons from sales, management and manufacturing to finalise the selection;
- draw out and approve the final design with all specifications before passing it to production;

- monitor quality control, oversee mass production of garments, and control merchandising and retailing of garments;
- undertake research and development of accessories, fabrics and techniques for producing garments;
- continuously update information on current fashions by travelling overseas if needed;
- supervise and train staff.

Fashion designers can specialise as:

- *accessories designers*, who work with accessories to complement the garment;
- *assistant designers*, who conceptualise and produce the designs with other professionals;
- *buyers*, who analyse the fashion market and handle purchases of garments and accessories within a budget;
- *fashion consultants*, who handle various aspects of fashion and organise shows, photo sessions and publicity;
- *merchandisers*, who develop products and coordinate the various aspects of designing;
- *pattern makers*, who draft out patterns from basic sketches and test them;
- *stylists*, who coordinate trends from various sources;
- *textile designers*, who work to improve and develop new fabrics each season.

Education: This is a very competitive field and experience is desirable. Some formal career preparation such as training through vocational courses is required.

Personal Attributes: Possesses good colour sense and is creatively inclined.

Job Outlook: Freelance work is available for experienced and talented designers. Opportunities also exist in manufacturing houses, small businesses and direct retail businesses.

Related Occupations: Dressmakers, fashion coordinators, industrial designers, interior decorators, milliners and tailors.

Sources of Additional Information:

UK

The Charters Society of Design
29 Bedford Square
London WC1B 3EG

Film and Television Camera Operators

Job Description: Film and television camera operators operate and set up equipment to portray people, places, and events. Some camera operators work for local, network and cable television stations. They cover news events as part of a reporting team.

Camera operators usually do some or all of the following:

- use 35 or 16 millimetre cameras or camcorders to film commercial motion pictures, documentaries or industrial films;
- operate cine electronic television cameras for television news, record programmes, cover live programmes or send direct telecasts;
- film private ceremonies and special events;
- select appropriate film, videos and lenses and adjust the required focus, camera angles and distance settings after consulting the director;
- set up the equipment and accessories, check lighting, make any final adjustments after checking the scenes through the view finder, and film the scenes;
- follow the action, regularly check equipment and adjust controls as required during the filming;
- supervise assistants and work closely with other related personnel like light and sound technicians to get the best results.

Education: Camera operators generally acquire their skills through on-the-job training.

Personal Attributes: Able to accept direction and is creative.

Job Outlook: Job prospects for camera operators will be good because of greater demand by organisations for filming meetings, sales campaigns, public relations exercises and training videos.

Related Occupations: Designers, directors of

photography, film, stage and television directors, film and television editors, and illustrators.

Graphic Designers

Job Description: Graphic designers work with visual communication media and electronic media. They create art and copy layouts to be used in books, brochures, posters, packaging, magazines, newspapers, exhibitions, advertising, CD Rom and multimedia.

They usually do some or all of the following work:

- meet with clients to understand their requirements and prepare preliminary sketches;
- draw detailed layouts using photographic techniques and computerised imagery to make presentations to clients;
- complete the design after client's approval and assemble the final artwork with help from finishing or layout artists;
- organise exhibitions for promos, advertising or educational reasons;
- manage overall production, and organise and supervise printing;
- work on a freelance basis, as consultants or as part of a design team.

Education: Formal training through design courses is required.

Personal Attributes: Possesses an understanding of colour and form; able to perform under pressure; is creative and imaginative;

Job Outlook: Graphic artists can expect better job prospects due to growing emphasis on visual appeal in advertising, marketing, product design and television. However, the advent of computers may affect availability of jobs, with some firms hiring people without formal artistic or design training to operate computer-aided design systems. Freelance work is readily available.

Related Occupations: Animators, artists, finished artists and industrial designers.

Sources of Additional Information:

UK

Art and Designs Admissions Registry

Penn House
9 Broad Street
Hereford HR4 9AP, UK

Young Designers Centre
The Design Council
28 Haymarket
London SW1Y 4SU

Regent Academy of Fine Arts
153 Regent Street
London W1R 7FD

USA

National Association of Schools of Art and Design
11250 Roger Bacon Dr
Suite 21
Reston VA 22090

The Graphics Art Guild
30 East 20th, St., Room 405
New York, N.Y. 10003

Interior Designers

Job Description: Interior designers work on interiors of buildings and draw up plans and designs after considering aesthetics, functionality, health and safety regulations, and other relevant aspects.

They usually do some or all of the following:

- evolve a design for the interior of the building after discussions with clients, studying architectural drawings, analysing budget constraints and understanding clients' needs;
- suggest and implement alterations to buildings, and select appropriate building and furnishing materials;
- prepare and submit job costs to clients;
- work alone as consultants or with design groups;
- manage supplies of material, and monitor suppliers and tradespeople to maintain quality and time schedules;
- maintain records, portfolios and samples of previous work done and display it to potential clients;
- prepare designs for renovation or restoration of old buildings and monitor the work of the various craftsmen and tradespeople involved;
- organise and design exhibitions, commercial stalls and film, TV or theatre sets.

Education: A degree in applied science or a related discipline is required.

Personal Attributes: Possesses a flair for colour and design, and good communication and presentation skills; has the ability to set up specifications and schedules, draft and illustrate work, and find solutions to problems quickly and confidently; is creative and up-to-date on current trends.

Job Outlook: Work is available in the construction industry with architects and interior design firms. Jobs are also available in departmental stores and shopfitting, furniture and fitting organisations. Self-employment is also possible if capital is available.

Related Occupations: Graphic designers and industrial engineers.

Painters and Decorators

Job Description: Painters and decorators use a variety of materials to protect, maintain and decorate interiors and exteriors of commercial and industrial buildings, and residences.

They usually do some or all of the following:

- assess the work site and provide estimates of job costs and materials required;
- organise the work area by erecting scaffolding, cradles, ladders, etc. and cover the portions which do not need painting;
- prepare and clean surfaces to be worked on, prepare the materials and mix paints to get the required colours;
- use different techniques and operate a variety of specialised equipment for painting surfaces;
- measure out the room to fit the pattern when wallpapering, cut the paper to size, fix the paper to the wall and smoothen the surface to prevent bubbles or wrinkles;
- put in decorative finishes if required and clean up the work site and equipment.

Painters and decorators can specialise as:

- *architectural painters*, who work on the interiors and exteriors of homes;
- *industrial painters*, who paint industrial buildings and equipment.

Education: On-the-job training is required.

Personal Attributes: Possesses a good head for heights; has normal colour vision; is physically fit.

Job Outlook: Work is available with painting and decorating firms, government departments and in the construction industry. Self-employment is another available option.

Related Occupations: Plasterers, screen printers or stencil preparers, sign writers and visual merchandisers.

Photographers

Job Description: Photographers photograph people, places, and events using technical expertise and creativity. They sometimes play with lighting to enhance the subject's appearance and blur the background to draw attention to a particular feature. Expert photographers capture the special feeling or mood that sells products, highlights news stories and brings back memories.

Photographers usually do some or all of the following:

- provide technical solutions, give advice on colour combinations and handle problems occurring during photography sessions;
- suggest appropriate locations, props and models;
- develop and print their photographs, especially if special effects are used, or get their film processed in laboratories;
- use a wide variety of cameras, lights and light-measuring devices that can be fitted with special lenses for close-up, medium range, or distance photography;
- specialise in commercial, journalistic photography or portrait, or for weddings or school photographs;
- sell their photographs as artwork;
- if self-employed, register with stock photo agencies that grant magazines and other customers the rights to an individual's photographs on a commission basis.

Photographers can specialise depending on their field of interest.

- *Commercial, editorial and industrial photographers* usually take pictures of manufactured articles, buildings, livestock and groups of

people, to be used mainly in advertisements, catalogues and reports.

- *Industrial photographers* shoot photographs or video records for analysing engineering projects.
- *Photojournalists* record important events, places, people and things, to be published in journals, magazines and newspapers.
- *Scientific photographers* provide illustrations and documentation for research reports, scientific publications and textbooks, and may specialise in a particular topic like biology, chemistry, engineering or medicine.

Education: Many entry level jobs require little formal preparation although training through photography courses is an advantage.

Personal Attributes: Possesses drive and initiative; is artistic and creative.

Job Outlook: Employment growth for photographers will be average. This is essentially due to the field being highly competitive, especially commercial and photojournalism, and the limited number of available jobs. Skilled photographers, however, can expect to get salaried positions or attract enough work to support themselves. Portrait photographers will be in demand as the population grows. The rising demand for visual images in communication, education, entertainment, marketing, research and development and other areas will improve prospects for photographers.

Related Occupations: Directors of photography, film and television camera operators, and film and television lighting operators.

Sources of Additional Information:

Malaysian Institute of Art
225 Jalan Bukit Bintang
55100 Kuala Lumpur

Set Designers

Job Description: Set designers design the set, costumes and props required in stage, theatre, film and television productions.

The work involves some or all of the following:

- producing illustrations or sketches, and working plans or drawings after consultation with the director and other creative members of the team;
- directing set assistants on design interpretations;
- supervising contractors and builders on the construction of the set;
- providing advice on the technical aspects i.e. lighting and sound.

Education: A certificate, diploma or degree in fine arts, specialising in technical production, theatre design or the equivalent is an advantage.

Personal Attributes: Able to work long hours; is artistic yet practical.

Job Outlook: Set designers are usually employed by film, television and production organisations. Many work on a project basis or free-lance. The industry in the country is small and exclusive, hence, only experienced set designers gain recognition and are entrusted with projects. Those who want to pursue a career in this field will need much patience and persistence to obtain the recognition to progress in the industry.

Related Occupation: Interior designers.

Visual Artists

Job Description: Visual artists communicate ideas, thoughts, and feelings, using a variety of media including acrylics, clay, oils, pastels, pen and ink, pencils, plaster, silk-screen and water-colours. They may also use computers as a medium for creating realistic and abstract portrayals of events, nature, objects, people or topography.

Visual artists are broadly divided in two groups; *fine artists* and *graphic artists*. This depends largely on the reason for the artist's creating a work of art.

Fine artists usually work for their satisfaction and as a means of self-expression. They display their work in art galleries, corporate collections, museums and private homes, and sometimes their work is specially commissioned by clients. *Fine artists* work alone, specialising in an art form or art forms they particularly like. The specialisations can include the following:

- *animators*, who work for the motion picture and television industries, creating hand drawings or using computers to create the large series of pictures that are transferred to film or tape to form the animated cartoons;
- *art directors*, who are also called *visual journalists*, and who oversee production of a variety of printed material; they analyse the material to be printed, think up an eye-catching yet organised visual presentation and decide which photographs or artwork to use;
- *cartoonists*, who draw advertising, political, social and sports cartoons;
- *fashion artists*, who draw illustrations of accessories, children's, men's and women's clothing for magazines, newspapers and other media.

Graphic artists work mainly for commercial clients like advertising, design or publishing firms, major corporations and retail stores. They undertake a variety of tasks based on their area of expertise.

Graphic designers design packaging and promotional displays for new products, visual designs of annual reports and other corporate literature, distinctive logos for a particular product or business, layout and design for a variety of publications and graphics for television.

Illustrators paint or draw pictures for books, magazines and other publications, and paper products including calendars, greeting cards and wrapping paper. Many do a variety of illustrations while some specialise in a particular style.

Medical illustrators depict human anatomy and surgical procedures, and sometimes work for doctors and lawyers, producing exhibits for court cases.

Painters generally work with two-dimensional art forms, using a variety of techniques and settings, to produce depictions of realistic scenes or expressions of different moods and emotions. Painters with appropriate qualifications can work as teachers of art in elementary or secondary schools, and in colleges or universities.

Painting restorers preserve and restore damaged and faded paintings

Printmakers create printed images from designs cut into wood, stone or metal, or computerised data, and may engrave the designs on wood-blocks, etch them on metal plates or produce inkjet or laser prints from computers.

Scientific illustrators draw illustrations of animals and plants to be used in medical and scientific publications and audio-visual presentations for teaching purposes.

Sculptors design three-dimensional art works from various materials like clay, glass, wire, plastic or metal as well as creating sculptures from blocks of plaster, wood or stone.

Storyboard illustrators present TV commercials in a series of scenes, similar to a comic strip, to help advertising agencies and the clients to visualise and assess commercials, and also streamline production by guiding the placement of actors, cameras and other details.

Education: In the fine arts field, formal training is not required but having basic training, for example, through a degree in fine arts, is advantageous.

Personal Attributes: Is artistically inclined, creative and self-disciplined.

Job Outlook: Employment growth for this career will be average due to immense competition for salaried jobs as well as freelance work, especially in fine arts. Freelance workers earn very little until they acquire experience and establish a good reputation.

Job opportunities for fine artists may increase with population growth, rising incomes and a growing appreciation of fine arts but the number of available opportunities are outnumbered by new entrants.

Related Occupations: Architects, art and design teachers, display workers, floral designers, graphic designers, industrial designers, interior designers, landscape architects and photographers.

ADMINISTRATIVE SUPPORT OCCUPATIONS

Billing Clerks

Job Description: Billing clerks review purchase

orders, bills of lading, sales tickets, hospital records or charge slips to calculate the total amount due from a customer. They usually work in accounting, law, consulting and similar firms, and hospitals.

Billing clerks usually do some or all of the following work:

- calculate clients' fees based on the actual time required to perform the task;
- keep track of the accumulated hours and dollar amounts to charge to each job, the type of job performed for a customer and the percentage of work completed;
- in hospitals, calculate the charges for an individual's hospital stay;
- compute trucking rates for machine parts after consulting a rate book;
- review all necessary information and then compute the charges using calculators, adding machines or computers;
- prepare the itemised statements, bills or invoices to be used for billing and record-keeping purposes;
- produce a detailed invoice that includes the codes for all goods and services provided, listing the items sold, credit terms, date of shipment or dates services were provided, a salesperson's or doctor's identification if necessary and the sales total.

Education: Secondary education plus basic office skills are adequate.

Personal Attributes: Possesses mathematical and computing skills; is methodical and accurate.

Job Outlook: Job opportunities for billing clerks will be good. A majority of the available jobs will arise from replacement needs. Turnover in this occupation is relatively high, reflecting the fact that it is an entry level occupation requiring only a high school diploma.

A growing economy and a greater demand for billing services will result in more business transactions but technological advances and usage of complex billing machines and equipment will increase productivity and will keep employment from rising.

Less routine and more complex billing applications will increasingly require workers with greater technical expertise. In smaller firms, accounting clerks are taking over the responsibili-

ties of billing clerks due to productivity gains from billing software.

Related Occupation: Cashiers.

Bookkeeping, Accounting and Auditing Clerks

Job Description: Bookkeeping, accounting and auditing clerks are an organisation's financial record keepers and keep track of all money spent or received by an organisation. They compute, classify, record and verify numerical data in order to develop and maintain financial records.

Bookkeeping clerks in smaller set-ups handle all aspects of financial transactions. They usually do some or all of the following work:

- record debits and credits, compare current and past balance sheets, summarise details of separate ledgers and prepare reports for supervisors and managers;
- prepare bank deposits by compiling data from cashiers, verifying and balancing receipts and sending the cash, checks or other forms of payment to the bank.

Accounting clerks are more specialised in larger offices and accounting departments. Their designations depend on the scope of accounting they do, like *accounts payable clerk* or *accounts receivable clerk*.

They may do the following:

- at the entry level, post details of transactions, total accounts and compute interest charges;
- monitor loans and accounts payable and receivable to ensure that payments are up to date;
- total, balance and reconcile billing vouchers, and ensure completeness and accuracy of data on accounts;
- code documents according to company procedures;
- post transactions in journals and on computer files and update these files when needed;
- review computer printouts against manually maintained journals and make necessary corrections;
- senior workers review invoices and statements to ensure all information is accurate and complete and may reconcile computer reports with operating reports.

Auditing clerks verify records of transactions posted by other workers. They usually do some or all of the following:

- check figures, postings and documents for correct entry, mathematical accuracy and proper codes;
- correct or note errors for accountants or other workers to adjust.

Education: Skills are acquired through accounting and bookkeeping courses.

Personal Attributes: Possesses an aptitude for accounting and mathematics; is computer literate; has a methodical approach to work; able to meet deadlines and work as a team.

Job Outlook: Almost all job openings for bookkeeping, accounting and auditing clerks will be due to replacement needs and very little change is expected in employment growth. Turnover is higher in this occupation as compared to other record clerk occupations and the large size of the occupation ensures a large number of openings and plentiful job opportunities for jobseekers. A lot of temporary and part-time work will also be available.

A growing economy will result in more financial transactions and other activities and spur the demand for accounting services. Most new jobs will be created in small, rapidly growing organisations. Larger organisations will opt for the consolidation of departments to eliminate duplication of function, thus reducing the demand for these clerks.

Related Occupations: Accountants and auditors.

Clerical Supervisors

Job Description: Clerical supervisors provide timely and effective clerical and administrative support to organisations for smooth operation. They can be found in nearly every sector of the economy, working in positions as varied as office managers, customer services supervisors, or chief telephone operators.

They usually do some or all of the following work:

- perform administrative tasks aimed at efficient operation of their staff;
- request new equipment or supplies for their department when necessary;

- plan and supervise staff, allocate work assignments and issue deadlines;
- establish regular meetings with staff members to discuss progress and conduct performance evaluations;
- interview and evaluate prospective clerical employees, make presentations at high schools and business colleges for active recruitment, and organise orientation programmes and training for new and old employees;
- liaise between the clerical staff and the managerial, professional, and technical staff, implement new company policies or restructure the workflow in their departments;
- keep their superiors informed of their progress, update them on any potential problems, and resolve interpersonal conflicts among the staff;
- know and implement the provisions of labour-management agreements and meet with union representatives to discuss work problems or grievances.

Education: Tertiary education is advantageous although not essential as most clerical supervisors are promoted through the ranks.

Personal Attributes: Possesses strong teamwork skills, determination, loyalty, poise and confidence; able to organize and coordinate work efficiently, set priorities and motivate others; is attentive to detail.

Job Outlook: Employment opportunities are good because the occupation is so large and replacement needs will create a large number of job openings.

Related Occupations: Accounting clerks, bank tellers and cashiers.

Computer and Peripheral Equipment Operators

Job Description: Computer and peripheral equipment operators oversee the operation of computer hardware systems, ensuring that these expensive machines are used as efficiently as possible. The duties of computer and peripheral equipment operators vary with the size of the installation, the type of equipment used and the policies of the employer.

They usually do some or all of the following work:

- anticipate problems before they occur and take preventive action as well as liaise with maintenance programmers to solve problems that do occur;
- follow operating instructions prepared by programmers or operations managers, and set controls on the computer and on peripheral devices required to run a particular job;
- check that all the necessary equipment is available and load the equipment with tapes, disks, and paper as needed (peripheral equipment operators);
- monitor the computer console constantly and respond to operating and computer messages while the computer is running;
- locate and solve the problem or terminate the program if an error message occurs;
- prepare printouts and other output for distribution to computer users;
- maintain log books listing events such as machine malfunctions that occur during their shift;
- supervise and train peripheral equipment operators and computer operator trainees;
- assist programmers and systems analysts test and debug new programs;
- with technological advances, they may monitor an automated system, take charge of system security, troubleshooting, desk help, network problems and maintain large databases.

Education: A bachelor's degree in a computer-related field or other formal training is required. Hands-on experience is also important.

Personal Attributes: Possesses keyboard skills, problem-solving skills, and a detailed and logical approach to work; able to perform repetitive tasks even under pressure; has initiative and decision-making skills; is quick, methodical and accurate in work.

Job Outlook: Job opportunities for computer and peripheral equipment operators will decline sharply. Advances in technology have reduced both the size and the cost of computer equipment while simultaneously increasing productivity. While these improvements have fuelled an expansion in computer usage in a wide variety of areas, computer and peripheral equipment operators do not benefit.

Related Occupations: Computer programmers, computer scientists, data entry operators, systems

analysts, typesetters, typists and word processing clerks.

Court Registrars

Job Description: Court registrars take charge of the smooth running of court administration and sessions. They will exert the decisions of the courts by ruling the execution of court orders and managing legal orders and documents like summonses and subpoenas, as well as the seizure or reclamation of properties.

The work involves some or all of the following:

- supervising the day-to-day operations of a court, including the staff;
- issuing legal documents agreed by the court;
- interpreting relevant sections of regulatory Acts of Parliament relating to court practices and procedures, and issuing advice to interested parties;
- assessing costs and amounts payable resulting from court proceedings and collecting payment for the court;
- receiving appeals and applications under any Act within the jurisdiction of the court and scheduling the necessary processes on the daily Cause list;
- preparing Cause lists in accordance with the Law Calendar and the arrangement of court sittings;
- providing clerical services for courts presided over by Justices of Peace and magistrates;
- liaising with the judiciary, police, legal officers and other relevant agencies;
- advising the public on legal procedures and practices, making sure that these matters are handled tactfully and with assurance.

The duties of registrars differ according to states and religious courts. The registrars must have a thorough knowledge of the essential Acts to carry out their duties.

Education: Clerical experience in court services department with hands-on registrar training supplemented by a certificate or diploma in justice studies or administration.

Personal Attributes: Possesses an aptitude for clerical duties in a legal environment; able to relate and communicate with people of all levels; is mature, responsible and of good character.

Job Outlook: There are limited vacancies for this job which are generally filled by employees from within the public service department.

Related Occupations: Article clerks, court officers, law clerks, office administrators and state public servicemen.

Credit Clerks

Job Description: Credit clerks review an applicant's credit history and investigate details of the background to determine their creditworthiness. They contact applicants, credit bureaus and other sources for information and verify loan documents to ensure that the information is complete.

Credit authorisers check credit records and reports to decide whether to approve a customer's credit card purchase. They usually do some or all of the following:

- approve charges against customers' existing accounts; most charges are approved automatically by a computer;
- check accounts referred by salespeople when accounts are past due, overextended, invalid or show a change of address;
- evaluate the customers' computerised credit records and payment histories and take quick decisions on whether or not to approve new charges;
- enter address changes and credit extensions into computer credit files.

Credit investigators or reporters are clerks who work in credit bureaus and secure, update and verify information for credit reports.

Clerks in banks and other financial institutions process loan and credit applications. Some clerks verify employment and financial information of credit card applicants.

Closing clerks obtain and prepare documents needed for real estate settlements. They usually do some or all of the following:

- ensure that all documents are complete;
- check that all legal documents like deeds of trust, hazard insurance papers and title commitments are accurate and correctly signed;

- verify that all loan conditions required for settlement have been met.

Loan processing clerks prepare loan applications for underwriters. They usually do some or all of the following work:

- review loan applications, and write to credit bureaus and reporting agencies for applicant's records;
- contact employers, banks and references to verify personal and financial information;
- order appraisals from appraisal companies and secure tax forms, bank statements and any required government forms from applicants;
- calculate debt-to-income ratios to ensure that applicants qualify for a loan;
- check for any inaccurate or incomplete information in the loan package and contact the concerned authority or personnel for further information.

Education: A secondary education plus some computer and typing skills are adequate as new employees are generally trained on the job.

Personal Attributes: Possesses good organisational skills; has the ability to pay attention to detail.

Job Outlook: There will be a significant increase in the number of available jobs as the number of transactions requiring credit increases.

Related Occupations: Collection clerks and procurement clerks.

Dispatchers

Job Description: Dispatchers receive requests for service and initiate action to provide that service.

They may do the following work:

- take responsibility for a variety of communications and record-keeping operations in business and government;
- coordinate, expedite and keep track of orders for personnel, equipment and materials.

Duties vary, depending on the needs of the employer.

- Gas, electric and telephone company dispatch-

ers handle calls related to utility and telephone service.

- *Police, fire and ambulance dispatchers*, also called public safety dispatchers, handle calls from people reporting crimes, fires and medical emergencies.
- *Procurement clerks* draw up purchase orders to obtain merchandise and material.
- *Production, planning and expediting clerks* coordinate and expedite the flow of work and material according to production schedules.
- *Receiving clerks* unpack, verify and record incoming merchandise.
- *Shipping clerks* assemble, address, stamp and ship merchandise or materials.
- *Stock clerks* receive, unpack, store, issue and maintain an inventory, which could include equipment, supplies or materials in wholesale, retail and other establishments.
- *Taxi-cab dispatchers* relay requests for cabs to individual drivers.
- *Tow truck dispatchers* take calls for emergency road services.
- *Traffic clerks* keep a record of destination, weight and charges of all incoming and outgoing shipments.
- *Traffic, shipping and receiving clerks* keep track of all incoming and outgoing shipments of goods transferred between businesses, suppliers and customers. In smaller organisations one clerk may carry out all of these tasks.
- *Truck, bus and train dispatchers* schedule and coordinate the movement of these vehicles.
- *Utilities meter readers* read electric, gas, water or steam meters and record the volume used by their customers.
- *Weighers, measurers, checkers and samplers* weigh, measure and check materials.

Education: Secondary education plus some basic clerical skills are adequate as on-the-job training is usually provided.

Personal Attributes: Possesses computer skills and above average communication skills.

Job Outlook: Growth in employment for material recording, scheduling, dispatching and distributing workers will be slow. A lot of jobs will be created due to replacement needs because of the large size of this occupation. There will however be variations among the different occupations.

Job opportunities for stock clerks will be slow, while employment of traffic, shipping and receiving clerks will be faster. Automation and other innovations to increase productivity may decrease the number of available jobs. Factors influencing job growth include population increases and the subsequent need to protect property and to coordinate the transportation and shipment of a large amount of goods.

Related Occupations: Customer service representatives, radio and television transmitter operators, and telephone operators.

General Office Clerks

Job Description: General office clerks in any organisation have very varied and diverse duties in the field of administrative support. Their tasks depend on the needs of the employer.

They usually do some or all of the following work:

- manage filing of papers and documents for easy accessibility;
- receive and file orders via fax;
- handle correspondence, type or write letters, office memorandums, presentations, reports and operate electronic typewriters and word processors;
- enter data at a computer terminal and operate a wide range of office equipment like facsimile machines, photocopiers, etc.;
- undertake other administrative functions like sorting cheques, maintain payroll records and take inventories;
- answer telephone queries and deliver messages.

Clerical duties also vary by levels of experience. Inexperienced employees may transcribe data, operate calculators or record enquiries.

More experienced workers handle greater responsibilities. They may do the following:

- maintain financial or other records and verify statistical reports for accuracy and completeness;
- handle customer complaints;
- help prepare budgetary requests;
- take inventory of equipment and supplies;
- answer questions on departmental services and functions.

Senior general office clerks usually supervise and direct the work of lower level clerks.

Education: A secondary school education plus some typing, word processing and other general office skills are adequate.

Personal Attributes: Possesses good communication skills and the ability to operate computers and related equipment; is accurate, neat and methodical; able to operate as a team.

Job Outlook: Employment opportunities for general office clerks will be good due to the high turnover and size of this occupation. This occupation is not dependent on technological advances or the economy and is fairly stable. A lot of part-time or temporary work is available, especially during peak business periods. Owing to the versatility of the job, work is available in almost all types of organisations.

Related Occupations: Cashiers, law clerks and receptionists.

Hotel and Motel Desk Clerks

Job Description: Hotel and motel desk clerks look after the needs of guests in hotels, motels and other lodging establishments.

They usually do some or all of the following work:

- handle reservations on the telephone, in person or through facsimile machines;
- interact with airlines, bus companies or other tour and transport organisations for travel arrangements or baggage handling;
- register guests and assign rooms, using personal computers;
- answer queries on services, checkout times, tourist information, the local community and other topics in their public relations capacity;
- assign rooms, keeping in mind guest require-

ments, as well as trying to maximise the establishment's revenues;

- maintain records of room assignments and update housekeepers, telephone operators and maintenance workers on occupied rooms;
- function as a bookkeeper, advance reservation agent, cashier and/or telephone switchboard operator;
- maintain and implement good public relations in dealing with guests to improve establishment's reputation.

Hotel and motel desk clerks in most smaller hotels and motels handle all the work. Large establishments usually have specialised employees to perform each of these various services.

Education: On-the-job training is usually provided.

Personal Attributes: Possesses good public relations and communication skills; able to operate a facsimile machine, switchboard, etc.; is friendly, outgoing and patient.

Job Outlook: Growth in employment for hotel and motel desk clerks will be faster than other occupations due to the increase in the number of hotels, motels and other similar establishments and rising occupancy rates. Job prospects for hotel and motel desk clerks will be good due to the high turnover in this field. Plenty of part-time work will also be available since the front desk must be staffed 24 hours a day.

Employment of hotel and motel desk clerks is dependent on the economy. Thus there are fewer jobs available during recessions as vacation and business travel declines.

Related Occupation: Receptionists.

Information Clerks

Job Description: Information clerks gather and provide information to the public. They are called hotel and motel desk clerks, receptionists and travel clerks, depending on their scope of work and the employer.

Though their daily tasks may vary, most information clerks do some or all of the following work:

- greet customers, guests or other visitors;
- assess customer needs and either assist them or

refer them to someone who can help;

- operate automated office equipment, such as multi-line telephones, fax machines and personal computers.

Education: A secondary school education is adequate as training is usually given on the job.

Personal Attributes: Possesses good interpersonal skills and problem-solving ability; is fluent in the English language; has a pleasant personality.

Job Outlook: Growth in employment for information clerks will be fast due to expanding businesses and organisations. A lot of opening will occur due to replacement needs as this occupation has a high turnover.

There is a lot of opportunity for part-time work and flexible work timings. Economic growth and general business expansion will spur demand for these workers.

Related Occupations: Guides and telephone operators.

Library Assistants and Bookmobile Drivers

Job Description: Library assistants and bookmobile drivers manage and maintain library resources and make them readily available to a variety of users. They work under the supervision of librarians. Library assistants are also called library media assistants, library technicians, library aides or circulation assistants.

They usually do some or all of the following:

- register patrons so they can borrow materials from the library;
- record the borrower's name and address from an application and then issue a library card;
- enter and update patron's records using computers;
- work at the circulation desk and lend and collect books, periodicals, video tapes and other materials;
- stamp the due date on the borrowed material and record the patron's identification from his or her library card;
- inspect returned materials for damage, check the due dates and compute any fines that may be owed;
- review records to compile a list of overdue materials and send out overdue notices;

- answer patrons' questions in person and on the telephone and refer those they cannot answer to a librarian;
- assist in producing publicity material and multimedia kits;
- sort returned books, publications and other items and return them to their designated shelves, files or storage areas within the library;
- locate materials to be loaned, either to a patron or to another library;
- operate computerised systems in their library, like card catalogues that are computerised;
- repair any damaged materials, if possible;
- review the borrower's list of desired reading material, and select the materials or closely related substitutes from the library collection of large type or Braille volumes, tape cassettes and open-reel talking books;
- complete the necessary paperwork and give or mail the books or material to the borrower.

Many libraries operate bookmobiles to extend library services to as many people as possible. Bookmobile drivers drive vans stocked with books or light trucks that pull a book trailer to designated sites on a regular schedule.

Bookmobile drivers may do the following work:

- serve community organisations such as apartment complexes, nursing homes, schools and shopping centres;
- answer patrons' questions, receive and check out books, collect fines, maintain the book collection and shelve materials;
- participate and may assist in planning programmes sponsored by the library such as reader advisory programmes, used book sales or outreach programmes;
- keep track of their mileage, the materials lent out and the amount of fines collected;
- be responsible for the maintenance of the vehicle and any photocopiers or other equipment in it;
- record statistics on circulation and the number of people visiting the bookmobile;
- record requests for special items from the main library and arrange for the materials to be mailed or delivered to a patron during the next scheduled visit;
- operate personal computers and CD-ROM systems linked to the main library system and locate or reserve books immediately;
- provide a link between some of the people and help the public;

- assist handicapped or elderly patrons to the bookmobile;
- enter hospitals or nursing homes to deliver books directly to patrons who are bedridden;
- be familiar with audio-visual equipment for showing slides or films.

The schedules of bookmobile drivers depend on the size of the area being served. Some workers go out on their routes every working day, while others do so only certain days of the week. On their off days, they perform library assistant duties at the library. Some now work evenings and weekends to give patrons as much access to the library as possible.

Education: Secondary education plus on-the-job training are required.

Personal Attributes: Possesses organisational and communication skills and an aptitude for computers; has a practical and logical way of working; able to perform under pressure.

Job Outlook: Opportunities should be good for persons interested in jobs as library assistants or bookmobile drivers. Turnover in this occupation is quite high and there will be plenty of replacement opportunities. This work is attractive to retirees and others who want a part-time schedule and there is a lot of movement into and out of the occupation.

Library assistants can be promoted to supervisory positions in public service or technical service areas. Job prospects are better in larger libraries and are more limited in smaller libraries. Library assistants and bookmobile drivers are not directly affected by the ups and downs of the business cycle.

Related Occupations: Audio-visual technicians, binders and finishers, librarians and record clerks.

Mail Clerks and Messengers

Job Description: Mail clerks and messengers help businesses and governments run efficiently by moving and distributing information, documents and small packages. They sort and deliver letters, parcels and other items. They also keep accurate records of their work.

Mail clerks usually work in large organisations and handle the internal mail, which essentially goes back and forth among people, offices or departments within a firm or institution. It

ranges from memos to key personnel to bulletins on job issues to all employees.

Mail clerks may do the following work:

- sort internal mail and deliver it to their fellow employees, often using carts to carry the mail between offices;
- handle external mail, serving as the link between the Postal Service and individual offices and workers;
- sort incoming mail and deliver mail within large office buildings;
- prepare outgoing mail – which may range from advertising flyers, to customers' orders, to legal documents – for delivery to the post office;
- prepare materials for mailing by folding and inserting them into envelopes and affixing the proper postage, when a large number of identical items are to be mailed;
- contact delivery services to send important letters or parcels;
- sort large mailings by zip code before delivery to the post office;
- operate machines which collate, fold and insert material to be mailed into envelopes, in larger organisations or organisations with a large volume of outgoing mail;
- operate machines which affix postage.

Messengers pick up and deliver letters, important business documents or small packages which need to be sent or received in a hurry from one side of town to another.

They may do the following work:

- ensure that the item given to them reaches its destination the same day or even within the hour;
- deliver important legal or financial documents which the sender is unwilling to entrust to other means of delivery;
- pick up and deliver important small packages such as medical samples to be tested;
- maintain records of deliveries and often obtain signatures from the persons receiving the items;
- carry items only for their employer, which typically might be a law firm, bank or financial institution;
- as part of an organisation's internal mail system carry items between an organisation's buildings or entirely within one building;

- work for messenger or courier services, where they pick up items from anyone and deliver them to specified destinations within a local area for a fee;
- provide and maintain their own transportation, specially in courier companies.

Education: On-the-job training is required.

Personal Attributes: Able to do routine work and work well with the hands; is careful and dependable.

Job Outlook: Growth in employment for mail clerks and messengers will be slow despite the increase in material being handled. Technological advances, for example, increasing automation of mail-handling, new electronic information-handling technology and electronic facsimiles, may hamper growth to some extent.

The transmission of information through telephone lines between computers will also reduce the demand for messengers. However, messengers will still be needed to transport materials which cannot be sent electronically such as legal documents, blueprints and other over-sized materials, large multipage documents and securities. Jobs will still be available for messengers in medical and dental laboratories to pick up and deliver medical samples, specimens and other materials.

Related Occupation: Postmen.

Order Clerks

Job Description: Order clerks receive and process incoming orders for items like articles of clothing, consumer appliances, film rentals, gas and electric power connections and spare parts for machines. They are also called order-entry clerks, customer service representatives, order processors or order takers.

Order clerks may do some or all of the following:

- process orders for materials, merchandise or services that come from within an organisation or from outside it, for example, inside order clerks receive orders from other employees or from salespersons in the field;
- receive orders from other companies or from individuals;
- work in wholesale businesses and receive

orders for merchandise from retail establishments which in turn sell to the public;

- work in catalogue sales, receiving orders from individual customers either by phone or by mail;
- deal mainly with the public (outside order clerks);
- operate and record orders on video display terminals (VDT's), that are part of a larger computer system;
- sit at these terminals and receive orders directly by telephone, entering the required information as the customer places the order and getting approval for the credit card purchase if needed;
- give price estimates for entire jobs, not just single parts, in industrial setting, take special orders or give expected arrival dates;
- receive and process orders by mail and by fax machine, contacting customers if needed in case of any missing details or to provide them any extra information on prices, shipping dates or anticipated delays;
- adjust inventory records after a sale has been made and notify other departments when inventories are low or when orders would deplete supplies;
- compile data from completed orders to produce reports that managers use to assess the organisation's sales and plan its future activities;
- assess requests and establish priorities in filling orders, for example in a blood bank.

Education: Secondary education and on-the-job training are required.

Personal Attributes: Possesses computer, organisational and communication skills; is methodical and accurate in work.

Job Outlook: There will be a greater demand for outside order clerks who deal mainly with the public. However, productivity gains from the increasing use of automation will absorb some of the growth in the volume of orders.

Demand for inside order clerks will be much weaker due to various technological advances like electronic data interchange (EDI), sophisticated inventory control and automatic billing systems, to name just a few.

Payroll and Timekeeping Clerks

Job Description: Payroll and timekeeping clerks

undertake the important task of ensuring that employees' pay cheques are correct and paid on time. They assist employees who call on them to adjust monetary errors. They also research these records and perform other clerical tasks during the course of their day.

Payroll clerks or payroll technicians work in the payroll department and screen the timecards for calculating, coding or other errors. They usually do some or all of the following work:

- compute pay by subtracting allotments or savings from gross earnings, either manually or increasingly with the help of computers;
- be alert for any problems or errors in the data;
- maintain paper backup files for research and reference, record changes in employees' addresses, and close files when employees retire, resign or transfer;
- advise employees on income tax withholding and other mandatory deductions;
- issue and record adjustments to pay;
- follow changes in tax and deduction laws to be aware of the most current revisions;
- prepare and mail earnings and tax withholding statements in time for employees' to prepare their income tax returns.

Timekeeping clerks distribute and collect time cards each pay period. They may do the following work:

- review employees' work charts, timesheets and timecards to ensure that information, like number of hours worked and sick and vacation days, is properly recorded and that the records are signed by the proper authorities;
- recalculate total hours on a timesheet that has many complex entries;
- in companies that bill for the time spent by staff like law or accounting firms, ensure that the hours recorded are charged to the correct job so the client is properly billed;
- review computer reports listing timecards that cannot be processed because of errors and contact the employee or the employee's supervisor to resolve the problem;
- keep up-to-date on new payroll policies and inform managers and other employees of any changes.

In small offices, payroll and time-keeping duties are more likely to be included in the duties of a

general office clerk or secretary. In some small offices, payroll is processed by clerks or other employees in the accounting department.

Education: Secondary education and on-the-job training are required.

Personal Attributes: Possesses an aptitude for mathematics; is methodical, accurate and honest.

Job Outlook: A lot of jobs will be available for applicants as payroll and timekeeping clerks. A majority of jobs will be created due to replacement needs. However, technological advances and automation of the payroll is increasing productivity and reducing job growth.

Related Occupation: Cashiers.

Personnel Clerks

Job Description: Personnel clerks greet and induct new employees into an organisation.

They usually do some or all of the following work:

- explain the company's various employee benefits and pay rates, review rules and regulations, administer an oath of office and ensure that the new employees report to their duty station;
- maintain the personnel records of all employees, including information like name, address, job title, earnings, benefits and tax withholding;
- record details of absence and performance reports on a daily basis;
- update relevant forms when an employee receives a promotion or switches health insurance plans;
- prepare reports for managers in other departments for various purposes, like compiling a list of employees eligible for an award;
- handle the reception, perform clerical duties, answer queries over the telephone or via letters, send out announcements of job openings or job examinations and issue application forms;
- provide authorised information from the employee's personnel records to credit bureaus and finance companies requesting confirmation of a person's employment;
- screen job applicants to obtain details of education and work experience, administer apti-

tude, personality and interest tests, explain the organisation's employment policies, refer qualified applicants to the employing official and request references from present or past employers;

- inform job applicants, by telephone or letter, of their acceptance or rejection for employment.

Personnel clerks can be classified according to the work they do.

Assignment clerks inform a firm's existing employees of internal vacancies and identify and assign qualified applicants to available positions. They may do the following work:

- keep track of vacancies throughout the organisation and complete and distribute vacancy advertisement forms;
- review applications in response to the advertisement and verify the information using personnel records;
- notify all the applicants of their acceptance or rejection after the selection is made.

Identification clerks handle security-related matters at defence installations. They may do the following:

- compile and record personal data about vendors, contractors and civilian and military personnel and their dependants;
- interview applicants, correspond with law enforcement authorities and prepare badges, identification cards and passes.

Referral clerks work in temporary help agencies and handle calls from businesses or other organisations requesting temporary workers. They may do the following:

- record information regarding the job requirements;
- locate registered workers who meet the requirements and are available for the scheduled work shift and inform them of the available job;
- specialise in referring specific types of workers, like nurses.

Education: Secondary education and on-the-job training are required.

Personal Attributes: Possesses organisational

and interpersonal skills; is discreet about confidential information.

Job Outlook: Factors spurring the demand for personnel clerks include the increased workload due to the expanding work force and changing personnel practices, caused by changes in tax and immigration laws, the growing popularity of flexible benefit plans and the growth of legislatively mandated benefits.

However, technological advances like extensive computerisation, electronic data interchange (EDT) and automation of personnel departments will increase the productivity of personnel clerks and moderate their employment growth.

Related Occupation: Secretaries.

Receptionists

Job Description: Receptionists are usually the first to meet people visiting any organisation and are responsible for the kind of impression that is conveyed. They handle enquiries in person or over the telephone.

Receptionists usually do some or all of the following work:

- handle security and monitor the kind of people visiting the organisation usually in large cities;
- monitor the attendance of employees and report this to management;
- answer telephone calls and route the calls to the proper individual or department;
- greet customers and other visitors, determine their needs and refer callers to the person who can help them;
- answer questions from the public;
- keep records of callers, the times at which they called and the persons to whom they were referred to;
- inform employees of their visitors' arrivals or an expected visitor's cancellation;
- perform secretarial duties – opening and sorting mail, collecting and distributing parcels, making fax transmittals and deliveries, updating appointment calendars or preparing travel vouchers;
- handle basic bookkeeping, filing, typing and word-processing.

Receptionists' scope of work varies depending on their employer or the organisation.

- *Receptionists at beauty or hair salons* arrange appointments and direct customers to the hair-stylists;
- *Receptionists in factories, government offices and large business firms* provide identification cards and arrange for escorts to take callers to the proper office;
- *Receptionists in doctors' offices and hospitals* may obtain personal and financial information and then direct patients to the proper waiting rooms;
- *Receptionists working for bus and train companies* handle enquiries about departures, arrivals, stops and related matters.

Education: A secondary school education is adequate.

Personal Attributes: Possesses well-developed organisational skills and able to pass on accurate and precise information; is computer literate; has good communication skills and a good rapport with people; is independent and pleasant.

Job Outlook: Employment growth for receptionists will be fast due to the increasingly large number of available jobs in the services industry – including consulting firms, law firms, physician's offices and temporary help agencies – a sector of the economy that is expected to continue to show strong growth. Plenty of jobs for receptionists will arise due to replacement needs because of the high turnover in this occupation. Receptionists are usually not subject to layoffs during recessions since their services are needed even during economic downturns.

Related Occupations: Clerks and telephonists.

Record Clerks

Job Description: Record clerks handle the wide variety of record-keeping duties which may vary depending on the size of the organisation.

They may do the following:

- interact with the public and with co-workers, for example payroll clerks, and answer employees' questions concerning benefits;
- operate video display terminals (VDT's) as part

of their daily routine;

- work as *billing clerks* who prepare bills and invoices;
- work as *bookkeeping, accounting and auditing clerks* who maintain financial data in computer and paper files;
- work as *brokerage clerks* who prepare and maintain the records generated when stocks, bonds and other types of investments are traded, working overtime if needed;
- work as *file clerks* who store and retrieve various kinds of office information for use by members of the staff;
- work as *library assistants* and check books in and out, in the evenings and at weekends, and in school libraries only during the school year;
- work as *statement clerks* who prepare monthly statements for bank customers;
- work as *order clerks* to process incoming orders for goods and services;
- work as *payroll and timekeeping clerks* to compute wages for payroll records;
- work as *personnel clerks* to keep employee records current.

Education: Secondary school education is adequate as on-the-job training is provided.

Personal Attributes: Possesses good organisational, communication and public relations skills.

Job Outlook: Job growth will be slow despite continued growth in the volume of business transactions due to rising productivity. The high turnover in this occupation is responsible for providing the most job openings.

Related Occupations: Medical record clerks, receiving clerks and statistical clerks.

Secretaries

Job Description: Secretaries are employed by most organisations to perform and coordinate office activities and to ensure that information gets disseminated efficiently to staff and clients. Managers, professionals and other support staff are dependent on them to keep a variety of administrative and clerical operations under control.

Their scope of work depends on the organisation and their level of responsibility. They usually do some or all of the following:

- schedule appointments, give information to callers organise and maintain files, fill out forms and take dictation;
- type letters, make travel arrangements or contact clients;
- operate office equipment like facsimile machines, photocopiers and telephones with voice mail capabilities;
- run spreadsheet, word processing, data base management, desktop publishing and graphics programs using personal computers;
- specialise as executive secretaries or administrative assistants and receive visitors, arrange conference calls and answer letters;
- handle more complex responsibilities like conducting research, preparing statistical reports, training employees and supervising other clerical staff.

Secretaries may also specialise in work involving a knowledge of technical terminology and procedures.

Legal secretaries specialise in various types of law. They may prepare correspondence and legal papers such as complaints, motions, subpoenas and summonses under the supervision of an attorney, review legal journals and assist in other ways with legal research.

Medical secretaries transcribe dictation, prepare correspondence and assist physicians or medical scientists with conference proceedings, reports and speeches. They may do the following work:

- record simple medical histories;
- arrange for patients to be hospitalised or order supplies;
- be aware of insurance rules, billing practices;
- be familiar with hospital or laboratory procedures.

Technical secretaries assist engineers or scientists. They may prepare correspondence, maintain the technical library and gather and edit materials for scientific papers.

Education: Secretarial qualifications are essential.

Personal Attributes: Possesses good oral and written skills, and organisational and interpersonal skills; able to perform under pressure and work independently; is discreet, tactful and well-groomed.

Job Outlook: Employment growth for secretaries will be slow. Most jobs will arise out of replacement needs. There will, however, be plenty of job opportunities for well-qualified and experienced secretaries, who are in short supply.

Demand for secretaries will be spurred by the growing economy and increased responsibilities like those traditionally reserved for managers and professionals. Increased productivity resulting from new office technologies may adversely affect job growth. Widespread use of automated equipment is already changing the workflow in many offices, with duties being reassigned and departments being restructured to reduce staff. Professionals and managers are taking over their own word processing and there is a growing trend to "share" secretaries.

However, many secretarial job duties are of a personal, interactive nature and not easily automated. For example, planning conferences, receiving clients and transmitting staff instructions require tact and communication skills and secretaries will continue to play a key role in the office activities of most organisations.

Related Occupations: Office managers, personnel clerks, receptionists, stenographers and typists.

Sources of Additional Information:

UK

London Chamber of Commerce and Industry
Examinations Board
Marlowe House
Station Road, Sidcup
Kent DA15 7BJ
Pitman Examinations Institute
Catteshall Manor
Godalming
Surrey GU7 1UU

Stenographers and Court Reporters

Job Description: Stenographers and court reporters take verbatim reports of speeches, conversations, legal proceedings, meetings or other events.

Stenographers and stenotype operators may do the following work:

- take dictation using either shorthand or a

stenotype machine and then transcribe their notes on a typewriter or word processor;

- do other office tasks such as answering telephones, filing, operating office machines and typing;
- sit in on staff meetings and provide word-for-word records or summary reports of the proceedings to the participants;
- supervise other stenographers, typists and clerical workers;
- take dictation in foreign languages and work as public stenographers serving travelling business people and others.

Technical stenographers must know the medical, legal and engineering or scientific terminology used in a particular profession. For example, medical transcriptionists must be medical language specialists and familiar with patient assessment, therapeutic procedures, diagnoses and prognoses.

They may do the following:

- listen to doctors' audio recordings and use typewriters or word processors to transcribe what they hear into the proper printed format;
- edit these reports for grammar or expand abbreviated words;
- transcribe letters and reports, and perform other clerical duties.

Court reporters record all statements made in an official proceeding, keeping in mind that accuracy is of vital importance. They usually do some or all of the following work:

- take down all statements at speeds of approximately 200 words per minute and present their record as the official transcript;
- do freelance work recording out-of-court depositions for attorneys, proceedings of meetings and conventions, and other private activities;
- dictate notes on magnetic tapes that a typist can transcribe later, transcribe their own notes or give them to note readers;
- use stenotype machines for "Computer-Aided Transcription";
- operate stenotype machines linked directly to the computer for real-time captioning, used for closed captioning for the deaf or hearing-impaired on television, in courts or in meetings;
- specialise as stenocaptioners, in captioning television news stories.

Education: Training is through business or secretarial courses.

Personal Attributes: Possesses well-developed keyboard skills and good concentration; has good language command; able to perform under pressure.

Job Outlook: Employment of stenographers and court reporters is expected to decline. However, job openings will arise each year due to replacement needs. The widespread use of dictation machines has greatly reduced the need for office stenographers. Audio recording equipment and the use of personal computers by managers and other professionals will also adversely affect the demand for these workers.

Meanwhile, skilled court reporters jobs should remain nearly unchanged as video recordings are increasingly recognised as legal records of proceedings. Demand for court reporters willing to take depositions for court reporting service bureaus or as independent freelancers will increase.

Another factor spurring demand is the growing number of conventions, conferences, seminars and similar meetings whose proceedings are recorded. Despite being videotaped, a written transcript must still be created for legal purposes or if the proceedings are to be published. The trend to provide instantaneous written captions for the deaf and hearing impaired also should strengthen demand for stenocaptioners.

Related Occupations: Journalists, secretaries, word processing operators and writers.

Stock Clerks

Job Description: Stock clerks receive, unpack, check, store and keep track of incoming and outgoing merchandise or materials.

They usually do some or all of the following work:

- unload goods, keep records of items entering or leaving the stock room and report damaged or spoiled goods;
- complete orders and check them against lists, and package and send out the completed orders;
- operate a variety of equipment and machinery including forklifts, visual display units and computers;

- organise and if required, mark items with identifying codes or prices for efficient location of inventories;
- use hand-held scanners connected to computers to keep inventories updated;
- bring merchandise to the sales floor and stock shelves and racks, from store rooms;
- store materials in bins, on the floor or on shelves in stockrooms and warehouses;
- maintain neat and clean surroundings.

In large establishments, where stock clerks are responsible for only one specific task, they may be known as inventory clerk, merchandise distributor order filler, property custodian, stock control clerk or storekeeper. In small firms they may also be responsible for tasks usually handled by shipping and receiving clerks.

Education: Secondary school education plus basic office skills are adequate.

Personal Attributes: Possesses good organisational skills and an understanding of safety rules and regulations; has good memory, eyesight and physical fitness.

Job Outlook: Job prospects for stock clerks will be good despite the slow growth in employment. The large size of this occupation is responsible for creating job openings which occur each year due to replacement needs.

Related Occupations: Cargo checkers and distributing clerks.

Survey Assistants

Job Description: Survey assistants operate in the field and in offices doing survey work usually under the supervision of surveying professionals. They are employed in a variety of surveying areas including engineering, hydrographic (surveys of waterways), land (cadastral) and mining.

They usually do some or all of the following work:

- help surveyors in measuring and studying various aspects of the earth's natural features like hills, rivers, valleys, etc. and marking out land boundaries for building sites, drainage systems, housing units and roads;
- use measuring tools like tape and steel band

and operate other complex equipment including radios, etc.;

- record measurements either manually or in an electronic field data recorder;
- clear the area to be surveyed so that measurements can be taken;
- handle, set up and dismantle surveying equipment like pegging out boundaries and construction work;
- carry out collection and labelling of samples.

Education: On-the-job training is required.

Personal Attributes: Possesses well-developed observational skills and team spirit; is accurate and neat in work.

Job Outlook: Jobs for survey assistants are usually available in cartographic companies, government departments, land developers or mining companies.

Related Occupations: Architectural drafters, cartographer drafters, civil engineering technicians, geoscience technicians and surveying technologists.

Telephone Operators

Job Description: Telephone operators assist callers in dialling telephone numbers, with person-to-person or collect calls, with special billing requests like charging a call to a third number or giving customers credit or a refund for a wrong number or a bad connection.

Operators usually do some or all of the following:

- handle emergency calls and assist children or people with physical limitations;
- work as central office operators and operate electronic switching systems and other new systems that automatically record details of the length and cost of calls into a computer that processes the billing statements;
- work as directory assistance operators and answer inquiries by accessing computerised alphabetical and geographical directories;
- work in organisations like hotels and medical centres and run private branch exchange (PBX) switchboards;
- connect inter-office or house calls, answer and relay outside calls, connect outgoing calls, supply information to callers and record charges;
- act as receptionists or information clerks, relaying messages or announcing visitors.

Operators can also specialise as follows:

- *communication-centre operators*, who handle airport authority communication systems like the public address system used to page passengers or visitors and monitor the electronic equipment alarms;
- *private branch-exchange service advisors*, who sometimes are called customer instructors or telephone usage counsellors, and who train switchboard operators;
- *service advisors*, who monitor conversations between operators and customers to observe the operator's behaviour, technical accuracy and adherence to company policies;
- *telephone answering-service operators*, who manage switchboards to provide answering service for clients.

Education: Skills are acquired through vocational courses or on-the-job training.

Personal Attributes: Possesses good oral communication and keyboard skills; has good telephone manners.

Job Outlook: Job opportunities for operators in telephone companies will decline sharply due to increased productivity caused by automation. Many telephone companies do not plan to replace operators who leave and a lot are laying off operators. The number of switchboard or PBX operators will also decline, but not as fast.

Fewer operators will be needed to monitor switchboards as older switchboards are replaced by ones that route calls automatically. The advent of more affordable equipment and technologies like voice message systems will take over the work currently performed by PBX operators to some extent. Voice recognition technology and equipment may replace some directory assistance operators and central office operators.

Related Occupations: Customer service representatives, information clerks and receptionists.

Tellers

Job Description: Tellers generally handle a wide range of banking transactions such as cashing

cheques, accepting deposits and loan payments, and processing withdrawals.

They usually do some or all of the following work:

- sell savings bonds, accept payment for customers' utility bills, receive deposits for special accounts, keep records and perform the necessary paperwork for customer loans;
- process the vast variety of certificates of deposit and money market accounts, and sell travellers' cheques;
- specialise in handling foreign currencies or commercial or business accounts;
- verify all details on the cheque, ensure that the document is legal tender, check that written and numerical amounts agree, and that the account has sufficient funds to cover the cheque before cashing it;
- carefully count out the cash to avoid errors, check the accuracy of the deposit slip and process the transaction, when accepting a deposit;
- operate a variety of machines to calculate, record transactions and prepare documents, such as receipts and drafts;
- operate computer terminals and very sophisticated computer systems;
- receive and count an amount of working cash for their drawer at the start of the day, and get it verified by a supervisor or the head teller;
- take responsibility for its safe and accurate handling, count cash on hand, balance the day's accounts and sort cheques and deposit slips, at the end of the day;
- be updated on the bank's products, services and changes in procedures;
- process numerous mail transactions, replenish cash drawers and corroborate deposits and payments to automatic teller machines (ATM's);
- work as head tellers in a supervisory capacity and ensure that ATM's function properly;
- interact with customers as customer service representatives and explain bank schemes and policies.

Education: Training through bookkeeping or accounting courses is preferred.

Personal Attributes: Possesses the ability to combine a knowledge of bank procedures with speed and accuracy in processing money, cheques and other financial items for customers.

Job Outlook: Employment of bank tellers will decline but job prospects will still be good. Decline in employment is due to over expansion and competition from large non-bank corporations offering similar services and the advent of new technologies.

Related Occupations: Accounts clerks, cashiers and toll collectors.

Traffic, Shipping and Receiving Clerks

Job Description: Traffic, shipping and receiving clerks maintain records of all goods shipped and received. Their scope of work depends on the size of the establishment. In a small company, one clerk may be responsible for accepting deliveries, preparing shipments and maintaining records. The responsibilities are usually divided among several clerks who specialise in a particular task, in larger companies.

Receiving clerks handle arriving or incoming shipments and perform tasks similar to those done by shipping clerks. They may do the following:

- determine whether their employer's orders have been correctly filled by verifying incoming shipments against the original order and the accompanying bill of lading or invoice;
- record the shipment and the condition of its contents.

Shipping clerks are record keepers responsible for all outgoing shipments. They may do the following:

- prepare shipping documents and mailing labels and make sure orders have been filled correctly;
- record items taken from inventory and note when orders were filled;
- occasionally fill the order themselves;
- obtain merchandise from the stockroom and wrap it or pack it in shipping containers;
- address and label packages, look up and compute freight or postal rates and record the weight and cost of each shipment;
- prepare invoices and furnish information about shipments to other departments like the accounting department;
- move the goods from the plant – sometimes by forklift truck – to the shipping dock and direct its loading once a shipment is checked and ready to go.

Traffic clerks usually do some or all of the following:

- maintain records on the destination, weight and charges on all incoming and outgoing freight and enter this information into a computer for the accounting and other departments within the firm;
- ensure that the rate charges are accurate by comparing the classification of materials with rate charts;
- process and pack goods for shipment;
- maintain a file of claims for overcharges and for damage to goods in transit.

Traffic, shipping and receiving clerks can specialise as:

- *aircraft load controllers*, who calculate and plan appropriate combinations of fuel, passengers and luggage in the aircraft and accordingly instruct loading staff;
- *bond clerks*, who calculate duties excise and other payments required for clearing of goods;
- *customs clerks*, who work in export-import firms or for customs agents and who do the customs documentation ensuring that all required rules and regulations are met;
- *import-export clerks*, who handle all the paperwork involved in importing cargo, organise storage and clearance formalities, and maintain records of all relevant details;
- *shipping officer clerks*, who do the paperwork, organise clearance and delivery of goods, and liaise with shipping companies.

Education: Secondary education is adequate as on-the-job training is provided.

Personal Attributes: Possesses good communication and organisational skills; is neat and accurate in work.

Job Outlook: Job opportunities will be adversely affected by automation, but despite automation, jobs will become available due to increasing economic activity and because certain functions cannot be automated.

Related Occupations: Distributing clerks, inven-

tory and supply officers, material clerks, stock clerks and store persons.

Travel Clerks

Job Description: Travel clerks assist people who are planning to travel, in a number of ways.

They usually do some or all of the following:

- help individuals plan trips, answer queries and offer advice on travel arrangements like routes, time schedules, rates and types of accommodation;
- make and confirm transportation and hotel reservations, calculate expenses, and write and sell tickets;
- check passengers' baggage before they embark on a trip, direct them to departure points and help them to board.

There is a variety of specialisation available in this field.

Gate agents work in airports and terminals assisting passengers when boarding. They usually do some or all of the following:

- direct passengers to the correct boarding area;
- check tickets, make boarding announcements and assist young, elderly or disabled passengers when they board or depart.

Passenger rate clerks work for bus companies. They may do the following work:

- sell tickets for regular bus routes;
- arrange non-scheduled or chartered trips by planning travel routes and computing rates;
- keep customers informed of appropriate details;
- arrange travel accommodations.

Reservation agents usually work in large central offices and may handle the following tasks:

- answer customer telephone inquiries and attend to booking reservations;
- operate computer terminals and quickly obtain information needed to make, change or cancel reservations at the customer's request.

Ticket agents, also called passenger agents, passenger-booking clerks, reservation clerks, ticket

clerks or ticket sellers may do the following:

- sell tickets;
- answer enquiries, check baggage, and examine passports and visas;
- manage passenger seating arrangements;
- check in animals.

Ticketing clerks make records of all relevant details after reservation and sale of tickets have occurred. They may do the following:

- compile and record information such as dates of travel and method of payment;
- send the tickets to the travellers or arrange to have them picked up.

Education: A secondary education is adequate as on-the-job training is provided.

Personal Attributes: Able to answer any queries that customers may have.

Job Outlook: Employment opportunities for reservation and transportation ticket agents and travel clerks will increase. Growth in the number of jobs will be spurred by the continued expansion of the travel trade. Job openings will also occur due to replacement needs, but they will be fewer than other similar fields due to lower turnover.

Employment of travel clerks is sensitive to changes in the economy and fewer jobs are available during recessions, with some employees even being laid-off.

Related Occupation: Sales assistants and ticket sellers.

Typists, Word Processing Operators and Data Entry Operators or Keyers

Job Description: Typists, word processing operators and data entry operators or keyers are responsible for ensuring that the large amounts of information processed daily by companies is handled smoothly and efficiently. Typists and word processing operators usually set up and enter reports, letters, mailing labels and other text material.

Data entry operators or keyers use keyboards and visual display units to transfer information into computers for storage, processing and transmission.

Typists make neat, typed copies of materials written by other clerical, professional or managerial workers. They usually do some or all of the following work:

- begin as entry level workers by typing headings on form letters, addressing envelopes or preparing standard forms on electric or electronic typewriters;
- gain experience and do routine typing or type from hand-written drafts;
- perform other office tasks like answering telephones, filing, and operating copiers, calculators and other office machines;
- handle work requiring a higher degree of accuracy and independent judgement, like working from rough drafts that are difficult to read or which contain technical material;
- plan and type complicated statistical tables, combine and rearrange materials from different sources or prepare master copies to be reproduced on photocopiers.

Typists' scope of work depends on their duties and work setting.

Clerk typists combine typing with filing, sorting mail, answering telephones and other general office work.

Note-readers transcribe stenotype notes of court proceedings into standard formats.

Word processing operators are employed by word processing centres that handle the transcription and typing for several departments in many organisations. Most typing is now done more efficiently on automated word processing equipment.

Word processing operators usually do some or all of the following work:

- operate word processing or automated equipment, usually a personal computer or part of a larger computer system that normally includes a keyboard, a video display terminal and a printer and which may have "add-on" capabilities such as optical character recognition readers;
- use word processing equipment to record, edit, store and revise forms, letters, memos, reports, statistical tables and other printed materials;

- plan and format the style of various documents;
- undertake some amount of clerical work.

Data entry operators or keyers usually fill forms that appear on a computer screen or enter lists of items or numbers. They usually do some or all of the following work:

- manipulate existing data, edit current information or proof read new entries to a database;
- enter customers' personal information orders for supplies or update membership lists;
- enter data on a variety of typewriter-like equipment;
- prepare materials for printing or publication using data entry composing machines;
- operate on-line terminals or personal computers, as well as non-keyboard forms of data entry like scanners and electronically transmitted files;
- operate computer peripheral equipment such as printers and tape readers, act as tape librarians and perform other clerical duties.

Education: Secondary school education and good typing skills are required.

Personal Attributes: Possesses good language and grammar skills, and organisational skills; has excellent concentration; able to work quickly and accurately.

Job Outlook: Job opportunities for typists, word processing operators and data entry operators or keyers will decline despite rapid growth in the production of information and volume of business transactions. This is mainly due to the increased productivity caused by increasing office automation. A majority of the available jobs will be due to replacement needs.

Technological advances, like the advent of personal computers, scanners and automatic teller machines and restructuring of work processes will mean that fewer employees will be able to handle more work. Most professionals and managers now use desktop personal computers or work stations to enter data and do their own word processing.

Most of the job growth that will occur will be in part-time and temporary work.

Related Occupations: Clerks, computer opera-

tors, court reporters, secretaries and stenographers.

MARKETING AND SALES OCCUPATIONS

Auctioneers

Job Description: Auctioneers conduct the sale of articles, goods or properties to the highest bidder. They need to be familiar with the items so as to recommend a realistic reserve price to the sellers or vendors.

The work involves some or all of the following:

- inspecting items for auction, listing items to be catalogued, placing advertisements in newspapers or magazines and arranging for the display of items for inspection before the auction;
- consulting and discussing with vendors to determine the lowest price (the reserve price) which the vendors or sellers are willing to sell;
- making sure that all terms and conditions of sale at auctions are read out and clearly understood;
- conducting the entire auction session;
- supervising the work of others as sales are finalised at the auction.

Education: Education requirements vary. People are often introduced to the trade by starting at entry level and advancing to trainee auctioneer. Trainees are trained in all aspects of the business and after obtaining sufficient knowledge and an auctioneer's licence, they become junior auctioneers.

Personal Attributes: Possesses a clear strong voice; able to address large groups, and make quick and sound decisions; is confident.

Job Outlook: The job prospects lie in both large and small firms of auctioneers, valuers or real estate agents and produce firms. Auctioneers can be self-employed or in partnership with others. Opportunities will depend largely on economic conditions such as recession, interest rates and property prices for real estate auctioneers.

Related Occupations: Land economists and real estate agents.

Cashiers

Job Description: Cashiers are employed in

department stores, gasoline service stations, movie theatres, restaurants, supermarkets and many other businesses, to facilitate the sale of merchandise. They usually total bills, receive money, make change, fill out charge forms and give receipts.

Cashiers usually do some or all of the following:

- take over the assigned register and a drawer containing money at the beginning of their shift;
- count their cash at hand to ensure that they have the correct amount of money and that there is an adequate supply of change;
- count the money and compare the total to the sales amount, separate charge forms, and return slips, coupons and any other non-cash items at the end of their shift;
- operate manual as well as more sophisticated equipment, such as computers and scanners;
- enter all items, subtract the value of any coupons or special discounts, total the bill and take payment;
- accept payment by cash or charge cards, and know the relevant store policies;
- issue a receipt to the customer and return the appropriate change;
- wrap or bag the purchase;
- handle returns and exchanges, ensuring that the merchandise is in good condition and verifying details of the purchase.

Education: On-the-job training is required.

Personal Attributes: Able to work quickly and accurately; is confident in handling money.

Job Outlook: Employment of cashiers is expected to increase due to expanding demand for goods and services. Opportunities for part-time work will be excellent with a trend towards hiring non-traditional groups such as disabled or retired persons.

Related Occupations: Bank tellers, clerical officers, food counter clerks and sales assistants.

Counter and Rental Clerks

Job Description: Counter and rental clerks efficiently handle transactions like taking orders, calculating fees, receiving payments and accepting returns. They are responsible for answering ques-

tions involving product availability, cost and rental provisions, and provide advice if needed.

They usually do some or all of the following work:

- be aware of the company's services, policies, and procedures;
- in the car rental industry, inform customers about the various types of automobiles available, their daily and weekly rental costs, ensure that customers meet age or other requirements, and indicate when and in what condition the car must be returned;
- in dry-cleaning establishments, inform customers about delivery;
- use their knowledge base to give advice on a wide variety of products and services ranging from hydraulic tools to shoe repair;
- operate a variety of equipment when taking orders, and write out tickets and order forms;
- operate computers and bar code scanners, and ensure that the data on the screen matches the actual product.

Education: Little formal training is required.

Personal Attributes: Has the ability to deal tactfully with difficult customers; possesses good oral skills; enjoys working with people.

Job Outlook: Growth in employment for counter and rental clerks will be good due to anticipated employment growth in the related industries. Part-time employment opportunities will increase.

Related Occupations: Cashiers and retail sales workers.

Exporters and Importers

Job Description: Exporters and importers sell and purchase products or services such as food items, manufactured goods and raw materials produced in Malaysia for overseas markets (for export), or produced overseas for Malaysian market (for import).

The work involves some or all of the following:

- coordinating the marketing activities of overseas agents and helping in the administrative functions;
- examining overseas demand for made-in-Malaysia items, or local demand for overseas products;

- ordering and arranging for the production of goods with suppliers and agents;
- coordinating the shipment of the products, and ensuring that customs clearance procedures and other documentation are done;
- arranging for payments which meet financial regulations in Malaysia and overseas;
- employing freight forwarders and customs brokers to assist in freight and space bookings with airlines or shipping companies and the transportation of cargo from airports and ports.

Education: A degree in commerce or equivalent is required.

Personal Attributes: Possesses negotiation skills and an aptitude for administration and mathematics; is willing to travel extensively locally and overseas.

Job Outlook: Opportunities in this area is abundant due to the high economic activity in trading in both local and overseas markets. With the government's emphasis on manufacturing goods for export purposes and our vision to become an industrialised nation in 2020, local manufacturers can look to tremendous support from the local authorities.

Related Occupations: Customs brokers, marketing officers, retail buyers and sales representatives.

Insurance Agents

Job Description: Insurance agents or brokers sell insurance policies to individuals and businesses, providing protection against loss. They help individuals, families and businesses select the right policy that best provides insurance protection for their lives and health as well as for their automobiles, businesses, furniture, household items, jewellery, personal valuables, and other properties.

They usually do some or all of the following work:

- prepare reports, collect premiums, maintain a client list and records of payment, and in the event of a loss, help policyholders settle insurance claims;
- meet with potential clients to assess the requirements, help clients decide on a policy, explain its benefits and recommend appropriate cover;

- specialise in group policies to help an employer provide employees the opportunity to buy insurance through payroll deductions;
- work for one insurance company or as "independent agents" selling for several companies;
- offer comprehensive financial planning services to their clients such as retirement planning counselling, and are licensed to sell mutual funds, annuities, and other securities;
- sell one or more of several types of insurance including disability, health, life, long-term care and property or casualty.

The specialists in this field include the following:

- *insurance brokers*, who place insurance policies for their clients with the company that offers the best rate and coverage;
- *life insurance agents or life underwriters*, who specialise in selling policies that pay survivors when a policyholder dies, and depending on the policyholder's circumstances, a whole-life policy can also be designed to provide retirement income, funds for the education of children or other benefits;
- *property or casualty insurance agents and brokers*, who sell policies that protect individuals and businesses from financial loss as a result of automobile accidents, fire or theft, or other property losses, and can also cover workers' compensation, product liability, or medical malpractice.

Education: Insurance agents must pass a written examination to obtain the licence to sell insurance.

Personal Attributes: Possesses an aptitude for mathematics, a flair for selling and good communication skills; has perseverance and motivation.

Job Outlook: Employment opportunities for insurance agents and brokers will be much like the average for all occupations. Ambitious people who enjoy sales work and have expertise in a wide range of insurance and financial services have a bright future. Demand for agents and brokers depends on the volume of sales of insurance and other financial products.

Insurance sales will increase with the growing number of working women, a concern for financial security, growing demand for long-term

health care and pension benefits for retirees and cover for expensive advanced technology products such as home computers. As new businesses emerge and existing firms expand coverage, sales of commercial insurance should increase.

Related Occupations: Actuaries, financial advisers, real estate agents and brokers, sales representatives and securities dealers.

Manufacturers' and Wholesale Sales Representatives

Job Description: Manufacturers' and wholesale sales representatives are an integral part of the selling process. They market their company's products to manufacturers, wholesale and retail establishments, government agencies and other institutions.

They usually do some or all of the following work:

- interest wholesale and retail buyers and purchasing agents in their merchandise and ensure that any questions or concerns of current clients are addressed;
- provide advice to clients on how to increase sales;
- do plenty of entertaining, travelling and make sales calls to prospective buyers and current clients;
- discuss the customers' need, suggest how their merchandise or services can meet those needs, and show samples or catalogues giving details of availability, company stocks, prices, etc.;
- attempt to emphasise the unique qualities of the products and services offered by their company;
- team up with technical experts to cover any lack of technical expertise and spend more time maintaining and soliciting accounts;
- take orders and resolve any problems or complaints with the merchandise;
- make frequent follow-up visits to ensure that the equipment is functioning properly and even help train customers' employees to operate and maintain new equipment;
- operate a portable computer to ensure instant access to technical, sales and other information while meeting a customer;
- suggest possible displays for the merchandise while selling consumer goods, work with retailers, and help arrange promotional programmes and advertising;

- obtain new accounts, follow possible leads from various sources;
- analyse sales statistics, prepare reports, and handle administrative duties, such as filing the expense account reports, scheduling appointments, and make travel plans;
- study literature about new and existing products and monitor the sales, prices, and products of their competitors;
- manage their businesses, organise and keep up-to-date with accounting, administration procedures and marketing.

Designations depend on where they work and include the following:

- *chemical sales representatives*, who sell chemicals and chemical products to the agricultural sector and the manufacturing industry.
- *industrial sales workers* or *sales engineers*, who sell technical products for both manufacturers and wholesalers,
- *manufacturers' agents*, who are self-employed sales workers who contract their services to all types of companies.
- *manufacturers' representatives*, who represent manufacturers.
- *medical representatives*, who work for pharmaceutical companies and sell, promote and take orders for over the counter drugs, prescription drugs and a wide variety of medical and diagnostic equipment.
- *sales engineers*, who among the most highly trained sales workers, typically sell products whose installation and optimal use require a great deal of technical expertise and support-products such as computer systems, material handling equipment and numerical-control machinery.
- *sales representatives*, who are employed by wholesalers.

Education: Some marketing training is advantageous although not essential as many companies have in-house training programmes.

Personal Attributes: Possesses excellent commu-

nication skills; able to work independently; is friendly, confident and well-groomed.

Job Outlook: Technological advances, increasing computerisation and changing business practices make ordering and reordering goods from suppliers quicker and easier than ever before. They will substantially reduce the need for sales representatives when paired with other advances such as point of sale inventory systems.

Larger companies will offer fewer jobs as the trend turns to using their market power to negotiate directly with suppliers, bypassing sales representatives entirely. Job prospects in small organisations will be brighter.

Direct selling opportunities in manufacturing will be best for products with strong demand such as computers and consumer products.

Related Occupations: Insurance officers, marketing officers, real estate agents, retail buyers, retail managers, sales assistants and securities sales workers.

Marketing Officers

Job Description: Marketing officers are involved in increasing the product sales or services, developing and marketing new and existing products, and finding new markets of their company's products and services.

They may do some or all of the following work:

- pinpoint and study the company's strengths and weaknesses, and the competition or other factors which may affect company sales;
- fix targets and plan to meet them, and formulate marketing and promotional strategies for their products and services;
- finalise the packaging and presentation of products in the market, and calculate various factors and data to price items;
- handle the various distribution channels like retailers and wholesalers, and the physical distribution of goods;
- monitor sales performance using marketing audits;
- interact with other specialists like advertising agents, production managers and technical personnel;
- devise and implement techniques for advertising, personal selling, public relations, sales management and sales promotions.

Marketing officers can also specialise as:

- *marketing managers*, who control all the processes responsible for delivery of products or services to clients and integrate a variety of marketing strategies to produce a corporate strategy;
- *marketing service officers*, who are also called customer support managers, and who handle queries in the field and over the phone, provide after sales support and advice to customers, help prepare promotional literature, and organise exhibitions and market surveys;
- *product managers*, who essentially market major products and product lines, and manage related factors like pricing and decisions to phase out obsolete products.

Education: A diploma or degree is required.

Personal Attributes: Possesses excellent communication and organisational skills; able to analyse and interpret information.

Job Outlook: Work is available mainly in private companies involved in manufacturing or distributing a variety of industrial and consumer goods. Employment opportunities also exist in advertising agencies and service oriented organisations like banks, hospitals, insurance companies, etc.

Related Occupations: Advertising account executives, economists, market researchers, public relations officers, sales representatives and sociologists.

Real Estate Agents, Brokers and Appraisers

Job Description: Real estate agents and brokers arrange sales and lease of residences, offices, and commercial and industrial buildings. They have a thorough knowledge of the housing market in their community and know which neighbourhoods will best fit their clients' needs and budgets.

Real estate agents and brokers are familiar with local zoning and tax laws, and know where to obtain financing. They usually act as a medium for price negotiations between buyers and sellers.

Brokers are independent business people who charge a fee to sell real estate owned by others,

and rent and manage properties. They usually do some or all of the following:

- provide buyers with information on loans to finance their purchase, when closing sales;
- arrange for title searches and for meetings between buyers and sellers when details of the transactions are agreed upon and the new owners take possession;
- use their skills to arrange the best deal for the prospective buyer, to successfully close a sale;
- manage their own offices, advertise properties and handle other business matters;
- combine other types of work such as the sale of insurance or the practice of law, with their real estate business.

Real estate agents are usually independent sales workers who provide their services to a licensed broker on a contract basis. They may do the following work:

- ensure that all the terms of the contract are met before the closing date, once the contract has been signed by both parties;
- handle environmental problems or make sure the property they are selling meets environmental regulations;
- spend a lot of time obtaining "listings" (owner agreements to place properties for sale with the firm), and exploring leads gathered from various sources, including personal contacts;
- make comparisons with similar properties that have been sold recently to determine a fair market value;
- usually sell residential property.

A few large firms or specialised small firms sell agricultural, commercial, industrial, or other types of real estate. Selling these types of property requires an in-depth knowledge of the particular property and prospective clients.

Real estate appraisers are objective experts who do not have a vested interest in the property, and they advise on real estate transactions since a lot of money is usually involved. An appraisal is an unbiased estimate of the quality, value, and best use of a specific property.

Real estate appraisers may do the following work:

- make appraisals for prospective sellers to set a competitive price, lending institutions to estimate the market value of a property as a con-

dition for a mortgage loan, or for local governments to determine the assessed value of a property for tax purposes;

- work independently as fee appraisers for real estate appraisal firms, or as employees of banks, savings and loan associations, mortgage companies and multiservice real estate companies;
- evaluate the quality of the construction, the overall condition of the property, and its functional design during an inspection;
- gather information on properties by taking measurements, interviewing persons familiar with the properties' history, and searching public records of sales, leases, assessments and other transactions;
- estimate the present cost of reproducing any structures on the properties and depreciation value;
- consider factors like the location of the properties, current market conditions, and real estate trends or impending changes that could influence the future value of the properties, and then make an estimate of the value;
- estimate the market value of the property, its insurable value, investment value, or other kinds of value, depending on the reason for the appraisal.

Real estate appraisers may specialise in a particular type of property, for example, apartments, homes, office buildings, shopping centres, or a variety of other kinds of agricultural, commercial or industrial properties.

Education: All practising real estate agents need to be registered with the Board of Valuers, Appraisers and Real Estate Agents. You need to first start work with an estate agency and then sign up for the three-day basic induction course. The next step is to take the official estate agents course conducted by the Board of Valuers, Appraisers and Real Estate Agents. Successful completion of Part 1 of this course qualifies you as a real estate agent. In case you want to open your own agency, Part 2 — an oral examination, must be completed.

Personal Attributes: Possesses good communication and organisational skills, ethics and commitment to personal accomplishment; has courtesy, tact and initiative.

Job Outlook: Growth in job opportunities for real

estate agents, brokers and appraisers will be good due to the growing volume of sales of residential and commercial properties. Employment growth in this field will stem primarily from increased demand for home purchases and rental units and rising incomes.

Job opportunities for real estate agents, brokers and appraisers are sensitive to swings in the economy. During economic declines jobs may be harder to find and many work fewer hours or leave the occupation altogether.

Related Occupations: Insurance agents, land economists and valuers.

Sources of Additional Information:

Board of Valuers, Appraisers and Estate Agents
Suite 5.3E 5th Floor
Wisma Sime Darby
Jalan Raja Laut
50350 Kuala Lumpur
Tel:(03) 2937839

Malaysian Institution of Surveyors
Bangunan Jurukur
No.64 Jalan 52/4
43200 Petaling Jaya

UK

The College of Estate Management
Whiteknights
Reading, Berkshire
England RG6 2AW

Sales Workers

Job Description: Sales workers are employed by many types of retailers to assist customers in the selection and purchase of a wide variety of merchandise. Whether selling automobiles, computer equipment or shoes, a sales worker's primary job is to interest customers in the merchandise.

They may do the following work:

- describe the product's features, demonstrate its use or show various models and colours;
- make out sales checks, and receive cash, cheque, and charge payments;
- bag or package purchases, and give change and receipts;
- operate the cash register depending on their

working hours, and count the money in the cash register, separate charge slips, coupons, and exchange vouchers, and make deposits at the cash office;

- be responsible for the contents of their register, since repeated shortages might cost them their job;
- handle returns and exchanges of merchandise, perform gift wrapping services and maintain their work areas;
- assist in stocking shelves or racks, arrange for mailing or delivery of purchases, mark price tags, take inventory and prepare displays;
- be aware of the store's promotions as well as those sponsored by their competitors;
- identify and handle possible security risks.

Sales workers or assistants can specialise as:

- *car salespeople*, who sell new or used cars in showrooms or car yards, do related paperwork, arrange finance and demonstrate the features of vehicles;
- *computer salespeople*, who analyse customer requirements, both current and for the future, suggest suitable equipment and systems, and organise demonstrations, delivery and installation;
- *cosmetic consultants*, who provide advice, give demonstrations and teach application techniques of a variety of make-up and skin care products;
- *delicatessen assistants*, who handle food sales, and display products in delicatessens in supermarkets and in small shops;
- *pharmacy sales assistants*, who work with pharmacists in chemist shops and help customers decide on medicines and other products like cough mixtures, tablets for cold and headache, cosmetics and toiletries.

Education: There are usually no formal education requirements for this type of work.

Personal Attributes: Possesses excellent communication skills, drive and ambition; is helpful, courteous and well-groomed.

Job Outlook: Job prospects are dependent on the economy. There will be many opportunities for

part-time workers and demand for temporary workers during peak selling periods like festivals and sales.

Related Occupations: Counter and rental clerks, insurance sales workers, manufacturers' and wholesale trade sales workers, real estate sales agents, sales representatives, service sales representatives, and wholesale and retail buyers

Securities Sales Representatives

Job Description: Securities sales representatives help investors buy or sell stocks, bonds, shares in mutual funds, insurance annuities, certificates of deposit or other financial products. They are also called registered representatives, account executives, or brokers.

They usually do some or all of the following:

- they relay investors' orders through their firms' offices to the floor of a securities exchange where securities sales representatives or brokers' floor representatives buy and sell securities;
- if a security is not traded on an exchange, they send the order to the firm's trading department, where a security trader trades it directly with a dealer in the over-the-counter market;
- notify the customer of the final price after the transaction has been completed;
- provide many related services for their customers like explaining the meaning of stock market terms and trading practices, offer advice on the purchase or sale of particular securities and offer financial counselling;
- devise an individual financial portfolio for the client including securities, life insurance, corporate and municipal bonds, mutual funds, certificates of deposit, annuities and other investments;
- furnish information about the advantages and disadvantages of an investment based on each person's objectives;
- supply the latest price quotations and other details on any security in which the investor is interested;
- serve individual investors, specialise in institutional investors or handle the sale of new issues such as corporate securities issued to finance plant expansion;
- spend time finding clients and building a customer base, teach adult education investment

courses or give lectures at libraries or social clubs.

Securities sales representatives can specialise in a variety of fields with appropriate experience.

Corporate financial advisers work in the area of financial analyses and give advice on feasibility studies, equity raising, and project and corporate finance. They may do the following work:

- undertake research in the finance market and prepare proposals;
- carry out corporate and industry studies on acquisition candidates, purchase shares and do underwriting;
- organise funding for companies and assist them in meeting stock exchange listing requirements;
- provide advice on corporate planning and structures.

Equity dealers trade in listed shares and options.

Financial planners develop and implement financial plans for individuals and businesses using their knowledge of insurance, pension plans, real estate, securities and tax and investment strategies. They may do the following:

- interview clients to determine their assets, cash flow, financial objectives, insurance coverage, liabilities and tax status;
- analyse all this information and develop a financial plan tailored to the clients' needs;
- provide regular monitoring services.

Financial services sales representatives contact potential customers to explain their services and to ascertain the customer's banking and other financial needs. They may do the following work:

- discuss services such as cash management, deposit accounts, investment services, lines of credit, or sales or inventory financing;
- solicit businesses to participate in consumer credit card programmes;
- take the responsibility for marketing the bank's increasingly complex financial services like financial planning and securities brokerage.

Portfolio managers choose and monitor a set of investments for individuals and companies, and ensure maximum possible returns.

Stockbrokers provide investment advice, and buy and sell securities through the stock exchange, charging a brokerage fee for their services.

Education: Though there are no formal qualifications some employers prefer a tertiary degree in accountancy, commerce, economics or law.

Personal Attributes: Possesses an aptitude for research, financial writing and mathematics; has good communication and computing skills; able to make quick and accurate calculations; is independent and able to perform under pressure.

Job Outlook: Employment growth for securities and financial sales representatives will be fast. This is mainly due to economic growth, rising personal incomes and greater inherited wealth increasing the funds available for investment. Competition for available jobs is keen in this field.

Employment prospects for institutional investors will be strong. More representatives will also be needed to sell securities issued by new and expanding corporations and by state and local governments financing public improvements.

Financial planners will also face good future prospects as more investors seek assistance in selecting the proper options among a wide variety of financial alternatives. Jobs will also open up in banks and credit institutions.

Related Occupations: Accountants, bank officers, credit officers, economists, merchant bankers and stockbroker's clerks.

Services Sales Representatives

Job Description: Services sales representatives sell a wide variety of services.

Services sales representatives usually do some or all of the following:

- act as industry experts, consultants and problem solvers when selling their firm's services, and create a demand for their firm's services;
- call on clients and prospects at their homes or offices with or without an appointment (outside sales representatives);
- work on their employer's premises, assisting individuals interested in the company's services (inside sales representatives);
- sell exclusively over the telephone, make large

numbers of calls to prospective clients, attempt direct sales or arrange an appointment (tele-marketing sales representatives);

- deal exclusively with one or a few major clients;
- fully understand and be able to discuss the services their company offers;
- develop lists of prospective clients through business directories and telephone, business associates and customers, through incoming queries and calling on new businesses as they cover their assigned territory;
- describe the services being offered and their relevance to the client, organise demonstrations, answer queries on the nature and cost of the service, and try to make a sale;
- make follow-up visits if they fail to make a sale on the first visit;
- provide satisfactory after-sales services and ensure the purchase meets the customer's needs, and assess chances of further sales;
- operate as part of a team of sales representatives and experts from other departments who provide technical guidance.

Their work depends on the following areas of specialisation:

- *sales representatives in data processing services firms*, who sell complex services such as financial reporting systems, inventory control, payroll processing and sales analysis;
- *fund-raisers*, who plan programmes to raise money for charities or other non-profit causes;
- *hotel sales representatives*, who contact business, government, and social groups to solicit convention and conference business for the hotel;
- *telephone services sales representatives*, who visit commercial customers to review their telephone systems, analyse their communications needs and recommend services such as installation of additional equipment;
- *sales representatives for temporary help services firms*, who locate and acquire clients who will hire the firm's employees;
- *other representatives*, who sell automotive leasing, management consulting services, etc.

Education: College education is preferred.

Personal Attributes: Possesses sales ability and good communication skills; has a pleasant and outgoing personality, and good rapport with people; is confident, motivated, reliable, well-organised and efficient.

Job Outlook: Growth in employment opportunities for services sales representatives will be fast. However, job growth will differ over the wide range of industries and in some cases technological advances like cellular phones, laptops and voice mail, may be responsible for increased productivity and thus fewer jobs. Persons with a college background or a proven sales record will have better job opportunities.

Related Occupations: Insurance agents, manufacturers' and wholesale sales representatives; real estate agents, securities and financial services sales representatives, and travel agents.

Travel Agents

Job Description: Travel agents or travel consultants help clients by making the best possible travel arrangements, give advice and provide information.

They usually do some or all of the following work:

- assess the clients' needs and give advice on destinations;
- make arrangements for car rentals, hotel accommodations, recreation, tours, and transportation;
- plan the right vacation package, or business or pleasure trip combination, and prepare itineraries;
- advise on restaurants, tourist attractions and weather conditions;
- provide information on customs regulations, required papers (certificates of vaccination, passports, and visas), and currency exchange rates, for international travel;
- plan conventions and other meetings (meeting planners);
- consult a variety of published and computer-based sources for information on departure and arrival times, fares, and hotel ratings and accommodations;
- base recommendations on their own travel experiences or those of colleagues or clients;
- visit hotels, resorts and restaurants to judge,

firsthand, their comfort, cleanliness and quality of food and service;

- promote their services, handle routine administrative jobs, organise slides or movies to social and special interest groups, arrange advertising displays and suggest company-sponsored trips to business managers.

There are various specialists within this field.

Operations and administrative staff includes accounts personnel and administrative staff.

Ticketing and reservations staff help plan affordable and suitable routes. They may do the following:

- handle ticket sales and prepare itineraries;
- confirm reservations on all types of tickets;
- handle hotel bookings.

Tour coordinators design tour packages and ensure they are attractively designed and priced, and allow for profits as well.

Tour managers or guides accompany tourists on trips, handle itineraries and arrangements, and ensure a good trip. They may do the following:

- arrange hotel, transport and tour reservations;
- help with visas and foreign exchange;
- accompany tours and provide information and commentaries.

Education: Training through travel courses is preferred.

Personal Attributes: Possesses good communication skills and is familiar with tourist destinations and travel geography; is patient, tactful and well-groomed.

Job Outlook: There is currently a great demand for experienced tour guides in Malaysia. Many jobs will be available due to new agencies opening and existing agencies expanding. Growth in employment will increase with expanding business activity boosting business-related travel, the growing number of managerial, professional speciality, and sales representative occupations who travel often, and rising incomes.

Related Occupations: Airline reservation agents, rental car agents, tour guides and tourism managers.

TECHNICIANS AND RELATED SUPPORT OCCUPATIONS

HEALTH TECHNOLOGISTS AND TECHNICIANS:

Cardiovascular Technologists and Technicians

Job Description: Cardiovascular technologists and technicians assist physicians in diagnosing and treating cardiac (heart) and peripheral vascular (blood vessel) ailments. They can also specialise in non-invasive peripheral vascular tests. They use ultrasound equipment that transmits sound waves, then collect the echoes to form an image on a screen.

Cardiovascular technicians are known as electrocardiograph (ECG or EKG) technicians. They perform ECG (electrocardiogram) tests, which trace electrical impulses transmitted by the heart, and stress tests. They are also called non-invasive technicians.

They usually do some or all of the following:

- take a "basic" ECG by attaching electrodes to the patient's chest, arms, and legs, and adjusting switches on an electrocardiograph machine to get a reading; the test is a prerequisite for most kinds of surgery and is part of a routine physical examination for persons who have passed a certain age;
- perform Holter monitor and stress testing, which requires high level skill.

Cardiovascular technologists specialising in cardiac catheterization procedures, also known as invasive technology, are called cardiology technologists.

They usually do some or all of the following:

- assist physicians in various diagnostic procedures, for example, to thread a small tube, or catheter, through a patient's blood vessel from a spot on the patient's leg into the heart to determine if a blockage exists;
- assist in balloon angioplasty, a procedure used to treat blockages of blood vessels whereby a balloon catheter is inserted to determine the position of the obstruction;
- prepare patients for procedures by positioning them on an examining table, then cleaning them and administering anaesthesia to the required area;

- handle the ECG equipment during the procedure, to monitor patients' blood gases and heart rate, and inform the physician if a problem is detected;
- prepare and monitor patients during open heart surgery and the implantation of pacemakers;
- specialise in the study of blood flows and circulation problems (vascular technologists).

Education: Formal or on-the-job training is required.

Personal Attributes: Possesses an analytical, detailed and careful attitude to work; able to work as part of a team; is good with patients.

Job Outlook: Job opportunities for ECG technicians will decline, since most hospitals will prefer to train their registered nurses and other personnel to perform the growing number of basic ECG procedures. Persons trained in Holter monitoring and stress testing will be at an advantage compared to those who can only perform a basic EKG. Job prospects are much better for cardiology technologists due to an ageing population with heart problems.

Related Occupations: Audiometrists, medical imaging technologists, radiation therapists and respiratory therapists.

Clinical Laboratory Technologists and Technicians

Job Description: Clinical (or medical) laboratory technologists and technicians perform tests to examine and analyse body fluids, tissues and cells. They play a crucial role in the detection, diagnosis, and treatment of diseases.

Clinical or medical laboratory technologists usually do some or all of the following work:

- study bacteria, parasites and other micro-organisms, analyse the chemical content of fluids, match blood for transfusions and test for drug levels in the blood to indicate a patient's response to treatment;
- prepare specimens for examination, count cells, and look for abnormal cells;
- perform complex bacteriological, biological, chemical, haematological, immunologic and microscopic tests;

- examine samples of blood, tissue, and other body substances microscopically, make cultures of samples to check for the presence of bacteria, fungi, parasites or other micro-organisms, analyse samples for chemical content or reaction and determine blood glucose or cholesterol levels;
- evaluate the effects a patient's condition has on test results;
- develop and modify procedures, and implement and monitor programmes to ensure the accuracy of tests;
- supervise medical laboratory technicians.

Clinical or medical laboratory technologists can specialise in a number of fields.

- *Blood bank technologists* collect, type and prepare blood and its components for transfusions.
- *Clinical chemistry technologists* prepare specimens, and analyse the chemical and hormonal contents of body fluids.
- *Cytotechnologists* are specially trained to prepare slides of body cells and microscopically examine them for abnormalities which may indicate the beginning of a cancerous growth.
- *Immunology technologists* study elements and responses of the human immune system to foreign bodies.
- *Microbiology technologists* examine and identify bacteria and other micro-organisms.

Clinical or medical laboratory technicians perform routine tests and laboratory procedures.

They usually do some or all of the following work:

- operate and maintain highly sophisticated automated equipment and instruments, microscopes, cell counters and other kinds of sophisticated laboratory equipment;
- analyse and pass on the test results to the physicians;
- prepare specimens and operate automatic analysers, or perform manual tests following detailed instructions;
- work in several areas of the clinical laboratory or specialise in just one;

- cut and stain tissue specimens for microscopic examination by pathologists and phlebotomists (histology technicians), and draw and test blood;
- work under the supervision of medical technologists or laboratory managers.

Clinical or medical laboratory technicians can also specialise in anatomical pathology, clinical chemistry, cytology, haematology and medical microbiology.

Education: A bachelor's degree with a major in medical technology or in one of the life sciences is required.

Personal Attributes: Able to work independently and accurately, and maintain concentration levels even while doing repetitive work; is attentive to details.

Job Outlook: Job prospects for clinical laboratory workers will be average. Most openings will occur due to the need to replace workers who leave the field for different reasons. The rapidly growing numbers of older people will also spur demand for workers, with a majority of jobs becoming available in independent medical laboratories, and offices and clinics of physicians. Fewer jobs will be available in hospitals.

Related Occupations: Laboratory workers and science technicians.

Sources of Additional Information:

New Zealand

NZ Institute of Medical Laboratory Science
Executive Officer
Box 3270 Christchurch
New Zealand

UK

The Institute of Medical Laboratory Sciences
12, Queen Anne Street
London W1M 0AU, UK

USA

American Society for Medical Technology
330 Meadowfern Drive
Houston, Texas 77067, USA

Dental Hygienists

Job Description: Dental hygienists usually help dentists, provide preventive dental care and teach individuals and groups how to practise good oral hygiene.

They usually do some or all of the following work:

- examine patients' teeth and gums, and make a record of any diseases or abnormalities found;
- provide a variety of treatment like removing calculus, plaque and stains from teeth, apply caries-preventive agents such as fluorides and pit and fissure sealant, and take and develop dental x-rays;
- place temporary fillings and periodontal dressings, remove sutures, and polish and recontour amalgam restorations;
- suggest some basic facts about post-operative care to patients and ways to develop and maintain good oral health;
- explain the relationship between diet and oral health;
- teach patients how to select toothbrushes and show them how to floss their teeth;
- devise and implement community dental health programmes including lessons in good oral hygiene practices;
- operate hand and rotary instruments to clean teeth and x-ray machines to take dental pictures;
- use syringes with needles to administer local anaesthesia and models of teeth to explain oral hygiene;
- work under the supervision of a dentist and undertake specific clinical procedures to help prevent dental disease.

Education: An associate degree is adequate for practice in a private dental office. A bachelor's or master's degree is usually required for clinical practice, research or teaching.

Personal Attributes: Able to do precise and accurate work.

Job Outlook: Employment growth for dental hygienists will be rapid due to a growing demand for dental care. A lot of jobs will open up due to people leaving the occupation. Population growth, greater retention of natural teeth by middle-aged and elderly people, and rising real incomes will further spur job prospects. Jobs will be more readily

available with dentists to perform preventive dental care, since they face increasing workloads.

Related Occupations: Dental assistants, dental therapists and medical assistants.

Dental Laboratory Technicians

Job Description: Dental laboratory technicians fill prescriptions from dentists and make bridges, crowns, dentures, and other dental prosthetics.

They usually do some or all of the following:

- create a plaster model of the patient's mouth from an impression (mould) of the patient's mouth or teeth;
- study the model and dentist's specifications, and build and shape a wax tooth or teeth;
- use this wax model to cast the metal framework for the prosthetic device;
- apply porcelain in layers to arrive at the precise shape and colour of a tooth;
- bake the porcelain onto the metal framework, and adjust the shape and colour to prepare an exact replica of the lost tooth or teeth;
- make devices like braces, mouth guards and plates for patients.

Dental laboratory technicians can specialise in the following areas:

- *ceramics*, which involves the manufacture of porcelain and acrylic restorations;
- *complete and partial dentures*, which is the largest field, and which involves replacement of teeth;
- *crown and bridge*, which is used to restore natural teeth and are fixed in the mouth;
- *orthodontic appliances*, which manufactures special equipment to correct dental irregularities, usually in children or adolescents.

Education: Training is usually on the job although formal training is preferred.

Personal Attributes: Possesses a high degree of manual dexterity, good vision and an inclination for detailed and precise work.

Job Outlook: Job prospects for dental laboratory

technicians will be favourable. Experienced technicians who have built up a favourable reputation with dentists should have good opportunities for establishing laboratories of their own.

Related Occupations: Dental assistants, dental hygienists, dentists and orthodontics technicians (braces and surgical supports).

Dispensing Opticians

Job Description: Dispensing opticians study prescriptions written by ophthalmologists or optometrists and fit eyeglasses and contact lenses.

They usually do some or all of the following work:

- help customers choose appropriate frames, organise ophthalmic laboratory work and adjust the finished eyeglasses;
- analyse prescriptions to determine lens specifications, recommend lenses, lens coatings, and spectacle frames, taking into account the customer's facial features, habits, and occupation;
- assess various factors to determine size of eyeglasses;
- use a lensometer to record the present eyeglass prescription for customers without prescriptions;
- prepare work orders containing lens prescriptions and information on lens size, material, colour and style for ophthalmic laboratory technicians, for grinding and inserting lenses into a frame;
- occasionally grind and insert lenses themselves and later verify that the lenses have been ground to specifications;
- reshape or bend the frame, manually or with pliers, to ensure a proper and comfortable fit;
- fix, adjust and refit broken frames;
- instruct clients about adapting to, wearing, or caring for eyeglasses, and provide specialist services like fitting artificial eyes, contact lenses, cosmetic shells, etc.;
- measure eye shape and size to fit contact lenses, select the appropriate lens material, and prepare work orders detailing the prescription and lens size;
- observe customers' eyes, corneas, lids and contact lenses with special instruments and microscopes before fitting the contact lenses, and ensure the fit is correct;
- teach customers how to use and maintain their contact lenses;

- maintain customer records like prescriptions, work orders and payments, keep track of inventory and sales, and manage other administrative tasks.

Education: Skills are acquired through formal or on-the-job training.

Personal Attributes: Possesses the ability for technical and manual work; is patient and attentive to detail.

Job Outlook: Employment growth for optical dispensers will be fast due to a growing demand for corrective lenses. A lot of job openings will occur due to growth in the industry and as replacements for those who leave.

Technological breakthroughs of new products such as special lens treatments, photochromic lenses (glasses that become sunglasses in sunlight) available in plastic as well as glass, tinted lenses, and bifocals, extended wear and disposable contact lenses will also spur demand for optical dispensers.

Related Occupations: Ophthalmic laboratory technicians, optical mechanics and optometrists.

Electroencephalograph (EEG) Technologists

Job Description: Electroencephalograph (EEG) technologists measure the electrical impulses of brain waves using an EEG machine. They are also called electro-neurodiagnostic or neurophysiologic technologists. They perform tests which help neurologists measure the effects of infectious diseases on the brain, determine whether individuals with mental or behavioural problems have any organic impairment like Alzheimer's disease, establish "cerebral" death, i.e., the absence of brain activity and assess the probability of a recovery from a coma. They usually do some or all of the following work:

- take patients' medical histories and help them relax before a basic EEG, apply electrodes to designated spots on the patient's head, and choose the best combination of instrument controls and electrodes to produce the required records;
- adjust the instrument for electrical or mechanical events originating from areas other than the brain, like eye movement or interference from electrical sources, perform EEG's in the operating room and in special cases secure elec-

trodes to the chest, arm, leg or spinal column to record activity from both the central and peripheral nervous systems;

- monitor the brain, and sometimes the heart, in ambulatory monitoring while patients carry out normal activities, obtain a readout, review it and select sections for the physician to examine;
- perform "evoked potential" testing to measure sensory and physical responses to specific stimuli;
- perform nerve conduction tests used to diagnose muscle and nerve problems;
- administer sleep studies and perform quantitative EEG's (sometimes called "brain wave mapping"), constantly monitoring respiration and heart activity in addition to brain wave activity;
- decide which sections of the EEG, in the case of quantitative EEG's, should be transformed into colour-coded pictures of brain wave frequency and intensity for interpretation by a physician;
- write technical reports summarising test results, locate any changes in the patient's neurologic, cardiac and respiratory status, which may indicate an emergency, and provide emergency care until help arrives;
- manage administrative responsibilities like handling an EEG laboratory, arrange work schedules, keep records schedule appointments, order supplies, maintaining equipment and provide instruction in EEG techniques.

Education: Skills are acquired through formal on-the-job training.

Personal Attributes: Possesses manual dexterity, good vision and an aptitude for working with electronic equipment; able to work with patients.

Job Outlook: Job prospects for EEG technologists will be good, reflecting the increased number of neurodiagnostic tests performed. There will be more testing as new tests and procedures are developed, and as the older population increases in number. Hospitals offer a large number of jobs but growth will be fastest in offices and clinics of neurologists.

Related Occupations: Cardiovascular (ECG) technologists and radiologic technologists.

Emergency Medical Technicians

Job Description: Emergency medical technicians

(EMT) give immediate medical care and then transport the sick or injured to medical facilities.

They usually do some or all of the following work:

- follow instructions from a dispatcher and drive specially equipped emergency vehicles to the scene of emergencies;
- take assistance from the police, fire or electric company personnel, and bystanders if needed;
- determine the nature and extent of the patient's injuries or illness, and simultaneously check for diabetes, epilepsy or other pre-existing medical conditions;
- give the appropriate emergency care following strict guidelines for the procedures that they perform;
- provide emergency care while others help to free people trapped in cave-ins and automobile accidents;
- use special equipment such as backboards to immobilise patients before placing and securing them on stretchers in the ambulance to transport them to a hospital;
- usually work in teams of two and while one technician drives, the other monitors the patient's vital signs and gives additional care as needed;
- work for hospital trauma centres or jurisdictions which use helicopters to transport critically ill or injured patients;
- transfer patients to the emergency department in hospitals, report their observations and the care they provide, and help provide emergency treatment;
- replace used supplies and check equipment after each incident, decontaminate the interior of the ambulance if required and make out formal reports.

Different levels of emergency medical technicians have different skills.

Emergency medical technicians do some or all of the following:

- open airways, restore breathing, control bleeding, treat for shock and administer oxygen;
- immobilise fractures, bandage wounds and assist in childbirth;
- manage emotionally disturbed patients;
- treat and assist heart attack victims, and give initial care to poison and burn victims;
- treat patients with anti-shock trousers, which

prevent a person's blood pressure from falling too low.

Emergency medical technicians – intermediates, have more advanced training. They usually do some or all of the following:

- perform additional procedures such as administer intravenous fluids;
- use defibrillators to give lifesaving electrical shocks to a stopped heart.

Emergency medical technicians – paramedics, provide the most extensive prehospital care. They usually do some or all of the following work:

- administer drugs orally and intravenously;
- interpret ECG's;
- perform endotracheal intubations;
- operate monitors and other complex equipment;
- maintain radio contact with medical personnel for step-by-step guidance for more complicated problems.

Education: Formal training is required.

Personal Attributes: Possesses good dexterity, physical coordination, agility and emotional stability; has good eyesight and accurate colour vision; able to lift and carry heavy loads.

Job Outlook: Employment growth for emergency medical technicians will be fast due mainly to the expanding population and the increasing number of older people. Most jobs will occur due to this occupation's substantial replacement needs as turnover is quite high, due to the stressful nature of the job, limited growth potential and the low salaries.

Job opportunities for emergency medical technicians will be least lucrative in hospitals and private ambulance services. However, jobs in fire, police and rescue squad departments will be fiercely competitive because of attractive pay and benefits, and good job security.

Related Occupations: Fire-fighters, members of the Armed Forces and police officers.

Licensed Practical Nurses

Job Description: Licensed practical nurses (LPNs) care for the sick, injured, convalescing and handi-

capped, under the direction of physicians and registered nurses.

They usually do some or all of the following work:

- provide basic bedside care which includes monitoring vital signs such as blood pressure, pulse, respiration and temperature;
- treat bedsores, prepare and give injections and enemas, apply dressings, give alcohol rubs and massages, apply ice packs and hot water bottles, and insert catheters;
- observe patients and report any adverse reactions to medications or treatments;
- collect samples from patients for testing and perform routine laboratory tests;
- care for patients by bathing, dressing and looking after their personal hygiene, feed them, record food and liquid intake and output, keep them comfortable and care for their emotional needs;
- help to deliver babies, care for and feed infants;
- supervise nursing assistants and aides;
- work in nursing homes and help evaluate residents' needs, develop care plans as well as provide routine bedside care;
- make appointments, keep records, and perform other clerical duties in doctors' offices and clinics, and in health maintenance organisations;
- work in the field of home health, prepare meals and teach family members to perform simple nursing tasks.

Education: All licensed practical nurses must have formal training through a recognised nursing programme.

Personal Attributes: Able to follow orders and work under close supervision; possesses a caring, sympathetic nature; is emotionally stable.

Job Outlook: Employment growth for licensed practical nurses will be fast due to the long-term care needs of a rapidly growing population of very old people and to the general growth of health care. This growth rate has resulted in the number of graduates in recent years being insufficient to meet the demand.

Nursing homes will offer most of the new jobs for licensed practical nurses. Rapid growth is also expected in residential care facilities like board and care homes, old folks' homes, and

group homes for the mentally retarded as well as in home health care services. However, employment in hospitals is not expected to increase much, while it will grow very rapidly in physicians' offices and clinics, including health maintenance organisations.

Related Occupations: Emergency medical technicians, human service workers and social service aides.

Medical Record Technicians or Administrators

Job Description: Medical records technicians maintain treatment records of patients that include the results of examinations, X-ray reports, laboratory tests and diagnoses, and treatment plans.

They usually do some or all of the following work:

- organise and evaluate these records for completeness and accuracy;
- ensure that the medical chart is complete and the information is fed into the computer when assembling a patient's medical record;
- talk to physicians or others to clarify diagnoses or get additional information;
- assign a code to each diagnosis and procedure, consult classification manuals and use their knowledge of disease processes;
- use a software program to assign the patient to one of several hundred "diagnosis-related groups" or DRGs;
- specialise in coding as medical record coders, or coding specialists;
- tabulate and analyse data to help improve patient care, control costs for use in legal actions or respond to surveys;
- specialise as tumour registrars, compile and maintain records of patients who have cancer, and forward this information to physicians and researchers.

Medical record technicians' duties depend on the size of the facility. In large to medium hospitals, technicians may specialise in one aspect of medical records or supervise medical record clerks and transcribes, while a medical records administrator manages the department.

Medical records administrators usually do some or all of the following work:

- devise and implement a variety of health information systems like filing and retrieval of records, numbering systems, patient identification systems, etc.;
- assess the effectiveness of existing policies and procedures, and develop new ones if required;
- select, supervise and train staff in the policies and procedures related to the management of health information;
- perform managerial duties like budgeting, financial planning, ordering supplies and equipment, and workplace designing;
- help in medical research and health-care projects.

Education: An associate degree is required.

Personal Attributes: Possesses good oral and written skills; able to manage staff.

Job Outlook: Employment growth for medical record technicians will be fast due to rapid increase in the number of medical tests, treatments and procedures. Medical records will also be increasingly scrutinised by third-party payers, courts and consumers. Hospitals will continue to employ the most technicians. Rapid growth is also expected in health maintenance organisations, home health agencies and nursing homes. The need for detailed medical records in physicians' offices and clinics of doctors of medicine will lead to rapid growth in employment opportunities for medical record technicians in these establishments.

Related Occupations: Hospital managers, librarians and medical secretaries.

Nuclear Medicine Technologists

Job Description: Nuclear medicine technologists administer radiopharmaceuticals that are used to diagnose and treat disease.

They usually do some or all of the following work:

- administer the radiopharmaceuticals and monitor the characteristics and functions of tissues or organs;
- use and maintain cameras to detect and map the radioactive drug in the patient's body to create an image on photographic film;
- operate and maintain computerised equipment

to project images on a computer screen, since some nuclear medicine studies like cardiac function studies are processed using computers;

- work as radiologic technologists and operate a different kind of diagnostic imaging equipment which creates an image by projecting an x-ray through the patient;
- position patients, set up equipment and explain the test procedures to patients before performing a test;
- prepare a dosage of the radiopharmaceutical and administer it by mouth, injection, or other means;
- regularly check patients during procedures and ensure their safety and comfort;
- ensure strict safety standards are maintained while preparing radiopharmaceuticals, to keep the radiation dose to workers and patients as low as possible;
- perform various laboratory tests, collect blood samples and conduct radioimmunoassay studies to evaluate the behaviour of a radioactive substance inside the body;
- attend research programmes and devise and develop new techniques;
- supervise students, maintain patients' records, record information on the amount and type of radionuclides received, used and disposed of, and handle purchase of equipment.

Specialisation is possible in the fields of bone mineral densitometry, computer programming, positron emission tomography or ultra-sound.

Education: Nuclear medicine technology courses leading to a certificate, associate degree or bachelor's degree is required.

Personal Attributes: Possesses an aptitude and interest in science; able to do accurate work; has patience and a responsible attitude; able to deal with patients in a sympathetic and understanding way.

Job Outlook: There will be a growing demand for nuclear medicine technologists. The factors responsible for this growth include the increasing number of middle-aged and older persons, technological innovations, like the use of radiopharmaceuticals for early detection of cancer without resorting to surgery and to examine the heart's ability to pump blood, and the wider use of positron emission tomography imaging.

However, the high cost of some promising nuclear medicine procedures may affect the speed by which new applications of nuclear medicine will grow and hospitals wishing to use them will have to consider equipment costs, reimbursement policies, and the number of potential users.

Related Occupations: Cardiology technologists, clinical laboratory technologists, electroencephalographic technologists, radiologic technologists and respiratory therapists.

Ophthalmic Laboratory Technicians

Job Description: Ophthalmic laboratory technicians, also known as manufacturing opticians, optical mechanics or optical goods workers, make prescription eyeglass lenses and lenses for other optical instruments such as binoculars and telescopes.

They normally do some or all of the following work:

- study prescription specifications, then select standard glass or plastic lens blanks and mark them to indicate where the curves specified on the prescription should be ground;
- cut, grind, edge and finish lenses according to specifications provided by dispensing opticians, optometrists or ophthalmologists;
- examine the lens through a lensometer, an instrument similar in shape to a microscope, to ensure that the degree and placement of the curve is correct;
- apply protective coatings, tints or dye as specified;
- assemble the lenses with frames to produce finished glasses;
- repair damaged or broken spectacles.

Ophthalmic laboratory technicians can specialise as optical dispensers with the appropriate training.

Education: On-the-job training is required.

Personal Attributes: Possesses manual dexterity, good eyesight and the ability to do precision work; is patient.

Job Outlook: Employment growth for ophthalmic laboratory technicians will be average due to rising demand for corrective lenses.

Related Occupations: Biomedical equipment technicians, optical dispensers and optometrists.

Radiographers

Job Description: Radiographers produce x-ray films (radiographs) of parts of the human body to help diagnose medical problems.

They usually do some or all of the following work:

- prepare patients for radiologic examinations, explain the procedure, remove articles like jewellery through which x-rays cannot pass, and position patients so that the correct parts of the body can be radiographed;
- surround the exposed areas with radiation protection devices like lead shields or limit the size of the x-ray beam, to prevent unnecessary radiation exposure;
- position radiographic equipment at the correct angle and height over the appropriate area of a patient's body;
- measure the thickness of the section to be radiographed and adjust controls on the machine to produce radiographs of the appropriate density, detail and contrast;
- place the x-ray film under the part of the patient's body to be examined and make the exposure;
- remove and develop the film;
- perform more complex imaging tests like fluoroscopies to see soft tissues in the body;
- strictly follow physicians' instructions and safety regulations to ensure everyone is protected from over-exposure;
- manage various aspects of the radiology department and maintain patient records, adjust and maintain equipment, prepare work schedules and evaluate equipment purchase.

Radiographers can further specialise as:

- *computerised tomography (CT) technologists*, who operate computed tomography scanners to produce cross-sectional views of patients;
- *magnetic resonance imaging (MRI) technologists*, who operate machines which use giant magnets and radio waves instead of radiation to create an image;
- *sonographers or ultrasound technologists*, who may specialise in areas including echocardiog-

raphy (the heart), neurosonography (the brain), obstetrics or gynaecology and ophthalmology. They usually do some or all of the following:

- project non-ionising, high frequency sound waves into areas of the patient's body;
- operate the equipment that collects the photographed image on a printout strip;
- send it to physicians for interpretation and diagnosis;
- explain the procedure before a test is performed;
- record additional medical history and then position the patient for testing;
- view the screen while scanning to look for subtle differences between healthy and pathological areas and select images that are satisfactory for diagnostic purposes.

Education: Training is through radiography courses with specialisations in diagnoses or therapy.

Personal Attributes: Able to carry out instructions precisely and is safety-conscious; is physically fit.

Job Outlook: Employment growth for radiographers will be rapid with the current expansion of the health industry. The vast number of applications for latest imaging equipment and the non-invasive and comparatively safer nature of ultrasound will spur demand for radiographers. Hospitals will offer the majority of employment opportunities and there is a growing number of jobs available in offices and clinics of physicians, and in diagnostic imaging centres.

Related Occupations: Cardiovascular technologists and technicians, clinical laboratory technologists, nuclear medicine technologists and respiratory therapists.

Sources of Additional Information:

School of Radiography
c/o General Hospital
Jalan Pahang
53000 Kuala Lumpur

School of Radiography
Universiti Hospital
Universiti Malaya

Lembah Pantai
59100 Kuala Lumpur

UK

The College of Radiographers
14 Upper Wimpole Street
London WIM 8BN, UK

USA

American Society of Radiologic Technologists
55E Jackson Boulevard
Chicago 111 60604

Surgical Technologists

Job Description: Surgical technologists or operating room technicians, assist in operations under the supervision of surgeons or registered nurses.

They usually do some or all of the following work:

- assist in setting up the operating room before an operation with surgical instruments, equipment, sterile linens and fluids;
- assemble, adjust and check non-sterile equipment to ensure that it is in working order;
- prepare patients for surgery by washing, shaving and disinfecting incision sites;
- move patients to the operating room, help position them on the operating table, and cover them with sterile surgical drapes;
- monitor patients' vital signs, check charts, and help the surgical team scrub and put on gloves, gowns and masks;
- pass instruments and other sterile supplies to surgeons and surgeon assistants during surgery;
- hold retractors, cut sutures, help apply dressings and count sponges, needles, supplies and instruments;
- help prepare, care for and dispose of specimens taken for laboratory analysis;
- operate sterilisers, lights, or suction machines, and other diagnostic equipment, and maintain specified supplies of fluids such as plasma and blood;
- assist in transferring patients to the recovery room and clean and restock the operating room after an operation.

Education: Formal training is required.

Personal Attributes: Possesses manual dexterity; able to respond quickly; is conscientious, orderly and emotionally stable.

Job Outlook: Employment growth for surgical technologists will be much faster than for other occupations as the volume of surgery increases and staff needs change. The number of surgical procedures is expected to rise due to the ageing population, new surgical procedures, and technological advances. Employers might opt for surgical technologists to reduce costs.

However, there will not be widespread displacement of operating room nurses. Hospitals will be the primary employer of surgical technologists but there is a trend towards outpatient or ambulatory surgery that may create more jobs in offices and clinics of physicians, and surgicentres.

Related Occupations: Licensed practical nurses and respiratory therapy technicians.

TECHNOLOGISTS, EXCEPT HEALTH:

Aircraft Pilots

Job Description: Pilots are highly trained professionals who fly aircraft and helicopters to perform a variety of jobs like transporting passengers and cargo, dusting crops, spreading seeds for reforestation, testing aircraft, directing fire-fighting efforts, tracking criminals, monitoring traffic, and rescuing and evacuating injured persons.

The vast majority of pilots fly airplanes and the cockpit crew usually comprises two pilots. The captain, who is more experienced, is in command and supervises all other crew members. The captain is usually assisted by a co-pilot who communicates with air traffic controllers, monitors instruments and helps fly the aircraft. Some large aircraft have a flight engineer who monitors and operates instruments and systems, undertakes minor in-flight repairs and watches for other aircraft.

Airplane pilots usually do some or all of the following:

- study weather conditions, carefully prepare flight plans, check all instruments and engines

for proper functioning and ensure that baggage and cargo are properly loaded;

- closely coordinate with the co-pilot during take-off and landing;
- use navigational aids like the autopilot, special navigation radios and the flight management computer to follow the planned route or land in poor visibility;
- continuously scan the instrument panel to check their fuel supply, the condition of their engines, the air-conditioning, hydraulic, and other systems;
- request changes in altitude or route in adverse weather conditions, to save fuel and increase speed;
- monitor altimeter readings and warning devices designed to help detect sudden shifts in wind conditions that may cause crashes;
- remain alert when flying aircraft like helicopters at low altitudes;
- manage non-flying responsibilities like keeping records, scheduling flights, arranging for major maintenance, and performing minor maintenance and repair work on their aircraft;
- instruct students in the principles of flight in ground-school classes and demonstrate how to fly aircraft in dual-controlled planes and helicopters;
- work as "examiners" or "check pilots" who periodically fly with other pilots or applicants to make sure that they are proficient.

Education: You need an appropriate licence issued by the Civil Aviation Safety Authority like the Commercial Pilot Licence, Airline Transport Pilot Licence and Student Licence.

To join the Royal Malaysian Air Force you must be between 18 and 23 years old, at least 157.5 cm tall and weigh at least 48 kg. Commercial pilots require a commercial pilot's licence and an instrument rating and a radio telephone license.

You can get a commercial pilot's licence in several ways:

- complete a residential programme at a recognised Air Training School;
- get a private pilot's licence and log the required number of hours and pass the necessary test, within a set time frame;
- get a sponsorship on the Malaysian Airlines' cadet scheme;
- train as a pilot in the armed forces and later take an appropriate conversion course.

Personal Attributes: Possesses an aptitude for mathematics and well-developed technical skills to handle equipment; able to process information, make quick decisions and remain calm during emergencies; has accurate judgement skills; is physically fit enough to pass the required medical examinations.

Job Outlook: This occupation is highly competitive with more pilots than the number of jobs. As expected some jobs will result from pilots leaving the work force. There will be demand for pilots and flight instructors due to the expected increase in airline passenger and cargo traffic. Job growth for business pilots will be slower than in the past due to the number of businesses opting to fly with regional and smaller airlines instead of buying and operating their own aircraft. There will be a growing demand for helicopter pilots.

However, the emergence of new technology which relies heavily on computerised controls will greatly reduce jobs for flight engineers. Employment of pilots is heavily dependent on changes in the economy and during recessions some pilots may be temporarily out of a job.

Related Occupations: Air traffic controllers and aircraft maintenance engineers.

Sources of Additional Information:

Malaysian Airlines System
Bangunan MAS
Jalan Sultan Ismail
50250 Kuala Lumpur

Malaysian Flying Academy
Lot 3224, Mukim Batu Berendam
75350 Malacca
Tel: (06) 354833

The Secretary
The Royal Selangor Flying Club
Jalan Lapangan Terbang Lama
50460 Kuala Lumpur

Pengarah Tenaga Kerja
(u.p. Tenaga Kerja C – Pegawai Kadet)
Bahagian Sumber Tenaga Manusia Pertahanan
Kementerian Pertahanan
Jalan Padang Tembak
50634 Kuala Lumpur.

Air Traffic Controllers

Job Description: Air traffic controllers manage the vast network of people and equipment to ensure the safe operation of commercial and private aircraft. They coordinate the movement of air traffic to make certain that planes stay a safe distance apart and direct planes efficiently to minimise delays. Some air traffic controllers regulate airport traffic, while others regulate flights between airports.

They usually do some or all of the following:

- handle planes during arrival or departure;
- for arrival, direct the pilot to a runway and place the plane in a holding pattern if the airport is busy;
- delay any departures that would interfere with the plane's landing, guide the aircraft to the runway and direct it to its assigned gate;
- direct the plane to the proper runway for departure, inform the pilot about weather conditions like the speed and direction of wind, and visibility, give runway clearance for take off and guide the plane out of the airport's airspace;
- notify enroute controllers who will next take charge;
- work in flight service stations to provide pilots with vital information on the station's particular area, including terrain, pre-flight and in-flight weather information, suggested routes, and other information important to the safety of a flight;
- assist pilots in emergency situations and participate in searches for missing or overdue aircraft.

Air traffic controllers work as a team and as the flight progresses, the team responsible for the aircraft notifies the next team in charge. Through team coordination, the plane arrives safely at its destination.

Air traffic controllers fall under different classifications.

Enroute controllers usually work in teams of up to three members and are responsible for the safe management of air traffic over a section of the centre's airspace.

Radar controllers prepare for planes which are

about to enter the team's airspace. They usually do some or all of the following:

- take responsibility for the plane from the previous controlling unit;
- delegate responsibility to the next controlling unit when the plane leaves the team's airspace;
- observe the planes in the team's airspace on radar and communicate with the pilots when necessary;
- warn pilots about nearby planes, bad weather conditions and other potential hazards;
- check to ensure that no other planes are on the proposed path if a pilot wants to change altitude in search of better flying conditions.

Terminal area controllers monitor all planes travelling through the airport's airspace and organise the flow of aircraft in and out of the airport using radar and visual observation.

Tower controllers work in the control tower and are responsible for all movement on taxiways, runways and the surrounding areas.

Education: Air traffic controllers must pass a written test that measures their ability to learn the controller's duties.

Personal Attributes: Possesses communication skills and team spirit; is familiar with computerised equipment; able to process information and make quick and accurate decisions; must meet age and medical requirements; is confident, responsible, self-motivated and independent.

Job Outlook: Employment growth for air traffic controllers will be slow. The introduction of labour-saving air traffic control equipment has increased productivity and is responsible for the slow growth. Competition for jobs will be keen due to there being more qualified applicants than the number of job openings. Turnover is very low and because of the relatively high pay and liberal retirement benefits, controllers are likely to remain in the profession. Air traffic controllers who continue to meet the proficiency and medical requirements enjoy more job security than most workers.

Related Occupations: Airline-radio operators, airplane dispatchers, airways data system officers and pilots.

Broadcast Technicians

Job Description: Broadcast technicians are involved in the installation, testing, repair, set up and operation of the electronic equipment used to record and transmit radio and television programmes. They usually work in the control room of a radio or television broadcasting studio.

They usually do some or all of the following:

- operate and check equipment like antennas, light and sound effects, microphones, tape recorders, television cameras and transmitters;
- develop movie sound tracks in motion picture production studios;
- handle equipment that regulates the signal strength, frequency, modulation, clarity and range of sounds and colours of recordings or broadcasts;
- operate control panels to select the source of the material, and locate and fix faulty parts of equipment;
- help install or build new equipment and undertake repairs;
- switch from one camera or studio to another, from film to live programming, or from network to local programmes;
- use hand signals and telephone headsets in television to give technical directions to studio personnel.

Broadcast technicians' duties depend on the size of the organisation they work with. In small stations they perform a variety of duties, whereas in larger stations and in networks, they have more specialised tasks.

The specialists in this area include the following:

- *audio control engineers*, who regulate sound pickup, transmission and switching;
- *chief engineers, transmission engineers, and broadcast field supervisors*, who oversee the technicians who operate and maintain broadcasting equipment;
- *field technicians*, who set up and operate portable broadcasting field transmission equipment outside the studio and are often assigned exclusively to news, since television news coverage requires so much electronic equipment;

- *maintenance technicians*, who install, adjust, maintain and repair electronic broadcasting equipment;
- *recording engineers*, who operate and maintain video and sound recording equipment, while technicians operate equipment designed to produce special effects like illusions of a bolt of lightning or a police siren;
- *sound mixers* or *pre-recording mixers*, who work in the movie industry and dub the sound tracks of movies. Each technician is responsible for certain sounds and they follow a script to place sounds correctly and precisely and finally blend them on a master sound track;
- *transmitter operators*, who monitor and log outgoing signals and operate transmitters;
- *video control engineers*, who regulate the quality, brightness and contrast of television pictures.

Education: Skills are acquired through broadcast technology courses or on-the-job training.

Personal Attributes: Possesses an aptitude for mathematics and science, and learning new techniques; has problem-solving skills and an interest in research; possesses normal eyesight and colour vision; is good with the hands, and quick and methodical in work.

Job Outlook: Employment growth for broadcast technicians will be slow due to labour-saving technical advances such as computer controlled programming and remote controlled transmitters. There is also a shift from operations to maintenance work that will be handled by broadcasting equipment manufacturers.

Competition will be keen in metropolitan areas and jobs will be easier to find in small cities and towns. Job opportunities in the motion picture industry will expand but will remain competitive. Most job openings will arise from replacement needs.

Related Occupations: Air traffic controllers, audio-visual technicians, and engineering and science technicians.

Drafters

Job Description: Drafters prepare technical

drawings for use in the production of automobiles, industrial machinery, spacecraft and other manufactured products as well as the construction of structures like bridges, houses, office buildings, and oil and gas pipelines.

They usually do some or all of the following work:

- make drawings that show the technical details of the products and structures from all angles, giving details of exact dimensions, specific materials, procedures and other information necessary to carry out the job;
- prepare and fill in technical details, using drawings, rough sketches, specifications, and calculations made by architects, engineers, scientists and surveyors;
- work from rough sketches and use knowledge of standardised building techniques to draw the details of a structure;
- use their understanding of engineering and manufacturing theory to arrange the parts of a machine and calculate the number and kind of fasteners needed, using calculators, computers, tables and technical handbooks;
- sit at drawing boards and prepare drawings manually using compasses, dividers, protractors, triangles and other drafting devices;
- use computer-aided drafting (CAD) systems and computer work stations to create the drawing on a video screen.

There are various specialists in this field.

- *Aeronautical drafters* prepare engineering drawings used for the manufacture of aircraft and missiles.
- *Architectural drafters* draw architectural and structural features of buildings and other structures, and may specialise in a particular type like schools or office buildings, or specialise in usage of certain material such as reinforced concrete or stone.
- *Civil drafters* prepare drawings and topographical and relief maps used in civil engineering projects such as bridges, flood control projects, highways, pipelines, and water and sewage systems.
- *Electrical drafters* draw wiring and layout diagrams used by workers who erect, install, and repair electrical equipment and wiring in build-

ings, electrical distribution systems, and power plants.

- *Electronic drafters* draw circuit board assembly diagrams, layout drawings, schematics and wiring diagrams used in the manufacture, installation and repair of electronic equipment.
- *Mechanical drafters* draw detailed working diagrams of machinery and mechanical devices, including details of dimensions, fastening methods and other engineering information.

Education: Formal training through drafting courses is required.

Personal Attributes: Able to draw free-hand three-dimensional objects and do detailed work accurately and neatly; has artistic ability.

Job Outlook: Employment growth for drafters will be slow. Drafters are highly concentrated in industries that are sensitive to cyclical swings in the economy such as architectural and engineering services. During recessions, when fewer buildings are designed, drafters may be laid off.

Related Occupations: Architects, cartographers, engineers, engineering technicians, landscape architects, science technicians and surveyors.

Engineering Technicians (Civil, Electrical, Electronics, Industrial, Mechanical and Chemical)

Job Description: Engineering technicians use the principles and theories of engineering, mathematics, and science to solve problems in areas like construction, customer service, manufacturing, research and development, and sales. Their jobs are more practically oriented than those of scientists and engineers.

They usually do some or all of the following work:

- assist engineers and scientists;
- handle production or inspection jobs;
- build or set up equipment, prepare and conduct experiments, calculate or record the results, and assist engineers in other aspects of research and development;
- make prototype versions of newly designed equipment;

- assist in routine design work, often using computer-aided design equipment;
- follow the general directions of engineers in the field of manufacturing;
- prepare specifications for materials, develop and implement tests to ensure product quality, and study ways to improve manufacturing efficiency;
- supervise production workers to ensure that the prescribed procedures are followed.

Engineering technicians may specialise depending on their scope of work.

Chemical engineering technicians are usually employed in industries producing chemicals, petroleum products, pharmaceuticals, etc. They may do the following:

- help design, install and test or maintain process equipment or computer control instrumentation;
- monitor quality control in processing plants, and make the required adjustments.

Civil engineering technicians help civil engineers plan and build bridges, buildings, dams, highways, wastewater treatment systems, and other structures and do related surveys and studies. They usually do some or all of the following work:

- inspect and maintain water and wastewater treatment systems to ensure that pollution control requirements are met;
- estimate construction costs and specify materials to be used;
- monitor material quality and conduct tests on site to ensure that the specified quality of materials is being used;
- prepare documentation and drawings for civil engineering works, and ensure that plans are followed.

Electrical engineering technicians perform technical support functions in areas of construction, design, electrical engineering, maintenance and research and development, among others. They usually do some or all of the following work:

- help electrical engineers, electrical engineering technologists and related personnel in the field and workshops with circuit design, setting up power stations, substations, switchgear and cabling systems;

- make prototypes and final products, maintain and test equipment, and perform complex workshop functions like assembling meters and indicators;
- assemble, install, check and calibrate electrical installations, with appropriate qualifications;
- undertake supervisory duties.

Electronics engineering technicians help develop, manufacture and service electronic equipment such as radios, radar, sonar, television, industrial and medical measuring or control devices, navigational equipment, and computers. They may do the following work:

- study technical manuals and engineers' instructions to assemble circuits in electronic equipment;
- check, install and modify electronic instruments and equipment, and carry out the necessary repairs;
- use measuring and diagnostic devices to test, adjust and repair faulty equipment;
- calibrate electronic equipment and indicating devices according to set standards.

Industrial engineering technicians study the efficient use of personnel, materials and machines in factories, stores, repair shops and offices. They may do the following work:

- assist engineers in designing tools and equipment, and implement their designs;
- prepare layouts of machinery and equipment;
- plan the flow of work, undertake statistical studies, monitor quality and analyse production costs;
- undertake supervisory duties, provide guidance and work towards continuous improvement;
- operate computers and be familiar with CAD/CAM (Computer Aided Drafting or Computer Aided Manufacturing) techniques and robotics.

Mechanical engineering technicians help mechanical engineers design and develop machinery, robotics, and other equipment, and in all stages of planning, production and maintenance. They may do the following:

- record data, make computations, analyse results and write reports;
- prepare layouts and drawings of the assembly

process and parts to be manufactured, using computer aided design or drafting (CAD);

- estimate labour costs, equipment life and plant space;
- test, install and inspect machines and equipment in manufacturing departments or work with engineers to eliminate production problems.

Education: Training through vocational courses is preferred.

Personal Attributes: Able to perform accurate and detailed work, and work as part of a team.

Civil engineering technician: likes outdoor work;

Electrical and electronic engineering technician: possesses manual dexterity, diagnostic ability and normal colour vision;

Industrial engineering technician: possesses a methodical approach to work and problem-solving skills;

Mechanical engineering technician: possesses an aptitude for machinery design and application; has supervisory skills and a responsible attitude.

Job Outlook: Employment growth for qualified engineers will be good due to technological advancements and continued growth in the output of technical products.

Employment of engineering technicians is dependent on the economy and also varies with the area of specialisation and industry. Civil engineering technicians will be affected by economic changes. Technicians whose jobs are defence related may experience fewer opportunities.

Related Occupations: Aircraft maintenance engineers, civil engineers, electrical fitters, electrical mechanics, electronics service persons and industrial engineers.

Library Technicians

Job Description: Library technicians help librarians acquire, prepare and organise material, and assist users in finding materials and information.

They usually do some or all of the following:

- handle a wide range of duties in small libraries and specialise in a particular area in larger libraries;
- assist library users with microfilm or microfiche readers, in the use of public catalogues and direct them to standard references;
- organise and maintain periodicals, handle interlibrary loan requests, and perform routine cataloguing and coding of library materials;
- verify information on order requests, retrieve information from computer data bases and supervise other support staff such as circulation desk workers;
- enter catalogue information into the library's computer, assist with customising data bases, operate and maintain audio-visual equipment such as projectors, tape recorders and videocassette recorders;
- conduct library tours and design posters, bulletin boards or displays;
- teach and encourage students to use the school library or media centre, help teachers get instructional materials and help students with special assignments.

Some library technicians work in special libraries maintained by advertising agencies, corporations, government agencies, law firms, medical centres, museums, and professional societies, where they conduct literature searches, compile bibliographies and prepare abstracts, usually on subjects of particular interest to the organisation.

Education: Formal or on-the-job training is required.

Personal Attributes: Possesses good communication and customer service skills, an eye for detail and an interest in computers; has a methodical approach to work

Job Outlook: Employment growth for library technicians will be average. The increasing use of library automation may spur job growth among library technicians. However, budgetary constraints may dampen employment growth of library technicians in public, school, and college and university libraries. Job prospects will be good among library technicians in special libraries.

Related Occupations: Audio-visual technicians, librarians, library clerks, museum technicians and record clerks.

Science Technicians

Job Description: Science technicians use the principles and theories of science and mathematics to solve problems in research and development and to investigate, invent and help improve products. The increasing use of robotics to perform many routine tasks formerly done by technicians has freed technicians to operate other more sophisticated laboratory equipment.

Science technicians usually do some or all of the following work:

- use computers, computer-interfaced equipment, robotics and high-technology industrial applications such as biological engineering;
- set up, operate and maintain laboratory instruments, monitor experiments, calculate and record results, and often develop conclusions;
- test products for proper proportions of ingredients or for strength and durability;
- collect weather information or assist oceanographers.

Science technicians can specialise in various areas.

Agricultural technicians work with agricultural scientists in food and fibre research, production and processing. They may do the following:

- conduct tests and experiments to improve the yield and quality of crops, increase the resistance of plants and animals to disease, insects or other hazards;
- do animal breeding and nutrition work.

Biological technicians work with biologists, studying living organisms. They may do the following:

- assist scientists in medical research, helping to find a cure for diseases such as cancer or AIDS;
- help conduct pharmaceutical research;
- analyse organic substances such as blood, drugs and food;
- examine evidence in criminal investigations;
- in biotechnology labs, use the knowledge and techniques gained from basic research by scientists, and apply them in product development.

Chemical technicians work with chemists and chemical engineers, developing and using chemicals and related products and equipment. They may do the following:

- conduct research and development, testing or other laboratory work;
- collect and analyse samples of air and water to monitor pollution levels;
- focus on basic research to produce compounds through complex organic synthesis.

Nuclear technicians operate nuclear test and research equipment, monitor radiation, and assist nuclear engineers and physicists in research. They may also operate remote control equipment to manipulate radioactive materials or materials that have been exposed to radioactivity.

Petroleum technicians measure and record physical and geologic conditions in oil or gas wells using instruments lowered into wells or by analysis of the mud from wells. They may do the following:

- in oil and gas exploration, collect and examine geological data or test geological samples to determine petroleum and mineral content;
- collect information about oil and gas well drilling operations, geological and geophysical prospecting, and land or lease contracts.

Education: Some companies provide on-the-job training but most prefer applicants who have a bachelor's degree in science, mathematics, or in physical or life science.

Personal Attributes: Possesses strong computer skills; able to work as part of a team.

Job Outlook: The continued growth of scientific research and development, production of technical products and advances in biotechnology should spur demand for qualified science technicians from good programmes. Job openings will be fewer in the chemical industry. Employers are seeking well-trained individuals with highly developed technical and communication skills to handle increasingly sophisticated equipment.

Related Occupations: Engineering technicians, and health technologists and technicians.

PRODUCTION OCCUPATIONS

Assemblers and Precision Assemblers

Job Description: Assemblers put together parts of manufactured products, for example, in car assembly which involves hundreds of assemblers or in the assembly of a toy doll where only a single assembler finishes the product. Assembly work can be simple, repetitive and easy-to-learn tasks or that requiring great precision and months of experience and training.

Precision assemblers are the highly experienced and trained workers who assemble complicated products, requiring a high degree of accuracy. Their work usually involves some or all of the following:

- interpreting detailed specifications and instructions from text, drawings and computer-aided drafting systems, using a variety of tools and precision measuring instruments, and applying independent judgement;
- working with engineers and technicians to assemble prototypes or test products;
- monitoring quality control, checking and maintaining inventories, and packing and storing materials;
- working on sub assemblies and completing final assembly of finished products or components of products like electronic equipment, machinery or aircraft.

Areas of specialisation depend on the product being assembled and may include the following:

- *plastic assemblers*, who work at making plastic products manually or using tools;
- *precision aircraft assemblers*, who put together and install various parts of aeroplanes and space vehicles or missiles, like landing gear or wings;
- *precision electrical and electronic equipment assemblers*, who make or modify prototypes or final assemblies of electronic items like appliances, computers, machine-tool numerical controls, missile control systems and radio or test equipment;
- *precision electromechanical equipment assemblers*, who prepare and test equipment or

devices such as dynamometers, ejection seat mechanisms, magnetic drums and tape drives;

- *precision machine builders*, who construct assemble or rebuild engines and turbines, and machines for use in agriculture, construction, food wrapping, offices, oil fields, paper, printing, rolling mills, textiles and woodworking;
- *precision structural metal fitters*, who align and fit structural metal parts according to detailed specifications, prior to welding or riveting;
- *wood product assemblers*, who usually fabricate furniture, attach hardware like hinges and catches to furniture, and assemble wooden parts.

Education: On-the-job training is required.

Personal Attributes: Able to read and follow instructions, complete repetitive jobs quickly and methodically and work as a team; possesses manual dexterity, and good eyesight and colour vision.

Job Outlook: Employment prospects for precision assemblers depend on the industries in which the jobs are located. Entry for assemblers in aerospace and electronics industries is very competitive. Employment opportunities for precision assemblers are better in industries producing industrial machinery and instruments.

However, the number of assembly jobs available in electronics will decrease as firms invest in more automated production equipment and processes.

Related Occupations: Factory hands, machine operators, metal press operators and quality assurance inspectors.

Blue-Collar Worker Supervisors

Job Description: Supervisors are blue-collar workers who ensure that workers, equipment and materials are used properly and efficiently to maximise productivity. They oversee the millions of workers who assemble manufactured goods, build office buildings, load trucks, service electronics equipment or perform a host of other activities.

Supervisors do some or all of the following:

- establish efficient work schedules, maintain production and employee records, monitor employees and ensure that work is done correctly and on time;
- follow all provisions of labour management contracts;
- inform workers about company plans and policies, recommend wage increases, awards or promotions, outline expectations and counsel workers;
- interact with managers and other supervisors to resolve problems, outline goals or discuss performance levels;
- take responsibility for very expensive and complex equipment or systems, ensure that machinery is set up correctly, and schedule or perform repairs and maintenance work;
- train new workers and design and implement a safe working environment;
- use computers to streamline their work and perform supervisory jobs like scheduling work flow, monitoring the quality of their workers' output and updating inventory control systems.

Supervisors are also referred to as crew chiefs, first-line supervisors and foremen or forewomen. They are called boatswains on ships, second hands in the textile industry, superintendents in the construction industry and tool pushers or gang pushers in the oil drilling business.

Education: Although secondary education is the minimum education requirement many supervisors rise through the ranks.

Personal Attributes: Possesses job knowledge, organisational skills, leadership qualities and the ability to motivate employees, maintain high morale and command respect; able to deal with different situations and different types of people; has good communication skills.

Job Outlook: Since job prospects vary depending on the industry, opportunities in manufacturing are expected to decrease slightly, while in construction and most other non-manufacturing industries, employment of blue-collar worker supervisors will increase. Because of their skill and seniority, blue-collar worker supervisors often are protected from layoffs during a recession.

Related Occupations: Clerical supervisors and retail store or department managers.

FOOD PROCESSING OCCUPATIONS

Butchers

Job Description: Butchers are meat, poultry, and fish cutters who reduce animal carcasses into small pieces of meat suitable for sale to consumers.

Butchers usually do some or all of the following:

- cut, scale and dress fish in fish processing plants and wholesale and retail fish markets;
- cut up chickens, turkeys and other types of poultry, normally using machines;
- manually de-bone breast meat, since it requires precision;
- prepare ready-to-heat foods for retail, which involves filleting meat or fish, cutting it into bite-sized pieces, preparing and adding vegetables, or applying sauces or seasoning;
- remove inedible portions and cut the fish into steaks or boneless fillets;
- separate the wholesale cuts of meat into retail cuts or individual size servings and prepare boneless cuts and special cuts;
- slaughter cattle, hogs, goats, and sheep and cut the carcasses into large wholesale cuts to facilitate handling, distribution and marketing in meat packing plants;
- wait on customers, advise them on cuts of meat, the nutritional aspects and storage, and clean and cut fish to order in markets;
- weigh, wrap and label the cuts, and arrange them in refrigerated cases for display purposes;
- work in grocery stores, wholesale establishments supplying meat to restaurants and institutional food service facilities.

Education: Training is usually through apprenticeship.

Personal Attributes: Possesses manual dexterity, good depth perception, colour discrimination and good eye-hand coordination; has a pleasant personality and neat appearance; is strong and in good health.

Job Outlook: Employment of semiskilled meat, poultry and fish cutters, working primarily in meat packing, poultry and fish processing plants will increase.

Related Occupations: Bakers, chefs, cooks, food preparation workers, food technologists and primary foods inspectors.

INSPECTORS AND RELATED OCCUPATIONS:

Construction and Building Inspectors

Job Description: Construction and building inspectors enforce, give advice and ensure compliance with regulations and specifications concerning the construction of buildings.

Their scope of work includes:

- examining, altering and repairing buildings, highways and streets, sewers, bridges and other structures;
- carrying out frequent inspections at construction sites to ensure that no codes or regulations are broken;
- inspecting structural quality, building plans, foundation of building sites, general safety of building and other general issues such as environmental issues, escape routes and fire resistance.

Construction and building inspectors can also work as one of the following:

- *electrical inspectors*;
- *elevator inspectors*;
- *mechanical inspectors*, who inspect the installation of mechanical components of boilers, ventilating equipment and other commercial equipment;
- *plumbing inspectors*, who examine plumbing systems;
- *public works inspectors*, who ensure that construction of roads, sewers, drains and others conform to contract specifications.

Construction and building inspectors are employed by local authorities in cities and outlying areas.

Education: Employers prefer inspectors who have studied courses in architecture, building inspection, construction technology or engineering.

Personal Attributes: Possesses good organisational skills and a practical approach to solving problems; able to interpret plans and drawings.

Job Outlook: This career holds many opportunities in the future as it is foreseen that there will be an increase in the level of construction activity and a rising concern for safer buildings. With appropriate training it is possible to advance to careers like assistant building surveyor and building surveyor. People in this line may also expand further into industrial engineering and surveying.

Related Occupations: Building construction supervisors, building contractors and building surveyors.

Health Inspectors and Compliance Officers

Job Description: The duties of inspectors and compliance officers are to enforce the laws, regulations and policies that are of interest to the public such as with regard to food, health, safety standards, international trade, immigration and licensing.

Health inspectors work together with chemists, microbiologists, health workers and lawyers to see that public health and safety regulations governing food, drugs and other consumer products are adhered to.

- **Agricultural Commodity Graders:** Their duty is to implement quality standards on commodities so that consumers know the quality of the products they purchase. They grade the commodities especially food such as dairy products, fruits, meat and poultry according to the standard set by examining the product samples.
- **Agricultural Quarantine Inspectors:** They inspect plants and animals that enter the country to prevent diseases from spreading to local crops and livestock.
- **Consumer Safety Inspectors:** They specialise in cosmetics, drugs, food, medical equipment, pesticides, radiation emitting equipment and weights and measures. Their general role is to conduct periodic checks on firms for accurate labelling, decomposition, and contamination of product that may be harmful to the public.

After checking, they discuss with plant managers or officials on the findings and advise on corrective measures. They also write reports and if necessary, produce evidence of the findings to be used in court.

- **Environmental Health Inspectors:** They work for the government and are responsible for the safety standards set by the government for food, water and air. They conduct checks on the cleanliness and safety of food and beverages produced in factories and plants, and served in eating outlets. Besides this, they also observe the handling and processing of food as well as the disposal system such as sewerage. Environmental health inspectors are also responsible for the air around us and ensure that pollution does not exceed dangerous levels. If it does, they determine the causes and initiate action to rectify the problem.

Compliance officers ensure compliance with the law and regulations for areas such as aviation safety, customs, immigration, motor vehicles and occupational safety and health.

- **Aviation Safety Inspectors:** They maintain the standard set for the safety of all aircraft and personnel by inspecting the aircraft, the maintenance of the aircraft and flight operations procedures. Besides this, they also examine and certify the pilots, pilot instructors, flying schools and flying instruments.
- **Customs Inspectors:** They look into the import and export laws and are stationed at checkpoints, border points, airports and seaports. They examine all cargoes entering and leaving the country to determine the amount of tax to be charged and the admissibility of the product.
- **Immigration Inspectors:** They inspect passports of people to check whether they are allowed to enter the country legally and verify the status of their citizenship. They also process applications for immigration and temporary residence as well as reports and records concerning immigration.
- **Motor Vehicles Inspectors:** They ensure that all vehicles conform to the regulations and they are roadworthy. They also inspect cargoes to ensure that commercial vehicles are not overloaded.

- **Occupational Safety and Health Inspectors:** They visit workplaces to ensure that employees are working in a safe environment. Should there be any violation, they discuss with the employers to rectify the problem.
- **Securities Compliance Examiners:** They implement regulations on activities concerning securities transactions and report on any irregular transactions.

Education: Because the scope of functions is so diverse, qualifications for inspectors and compliance officers differ greatly. Post secondary or college education is usually required.

Personal Attributes: Possesses an aptitude for detailed work; able to deal politely and firmly with members of the public; is neat, personable, mature and physically fit.

Job Outlook: Adverse economic conditions seldom affect the employment of inspectors and compliance inspectors as they provide essential public service under various government departments.

Related Occupations: Construction and building inspectors, police officers and wardens.

Inspectors, Testers and Graders

Job Description: Inspectors, testers and graders ensure that manufactured products meet quality standards. They do some or all of the following jobs:

- examine materials received from a supplier before forwarding them to the production line;
- inspect all kinds of products including automotive components and completed vehicles, clothing, computers, foods, glassware, electronic components, structural steel and textiles electronic components;
- inspect components, sub-assemblies and assemblies or perform a final check on the finished product and certify the products;
- mark, tag or note problems, reject defective items and fix them in the case of minor defects, and notify supervisors of problems and find solutions;
- calibrate precision instruments, record the results of their inspections, compute various statistical parameters, and prepare inspection and test reports;

- check that parts fit and move correctly in machines and are properly lubricated, check the pressure of gases and the level of liquids, test the flow of electricity and do a test run to check for proper operation;
- set up tests and test equipment, and test the insulation, current flow and resistance in electrical devices;
- verify the colour, dimensions, strength, weight, texture or other physical characteristics of objects and look for imperfections;
- visually check, listen to or feel products, and even tasting or smelling them if required;
- use alignment gauges, callipers, micrometers' electronic equipment and other instruments to check and compare the dimensions given specifications.

Education: Most inspectors rise through the ranks although some beginners are taken on after having been given on-the-job training.

Personal Attributes: Possesses mechanical aptitude, good hand-eye coordination and good vision.

Job Outlook: This is a competitive field, and experienced workers will find jobs more easily. Advances in automated equipment and machinery have reduced the work for inspectors and in some cases even eliminated the need for them. However, when appearance, smell, taste, texture or product performance are important, automation is not aggressively pursued as an alternative to manual inspection.

Related Occupation: Compliance officers.

METALWORKING AND PLASTICS-WORKING OCCUPATIONS:

Boilermakers

Job Description: Boilermakers and boiler maker mechanics construct, assemble, and repair boilers, vats and other large vessels that hold liquids and gases.

Their work includes some or all of the following:

- following blueprints to locate and mark reference points for installing boilers and other vessels on their foundations, and using instruments and tools like squares, straightedges, tape measures and transits;
- fitting heavy frame and plate sections and

- other parts into place;
- aligning sections using levels, plumb bobs, turnbuckles and wedges;
- using cutting torches, files, hammers and grinders to fit sections properly, and bolting or welding them together;
- aligning and attaching gauges, stacks, valves, water tubes and other parts, and testing complete vessels for leaks or other defects, replacing defective sections and strengthening joints;
- maintaining and repairing boilers and similar vessels, and supervising cleaning of boilers.

Boilermakers can also specialise as welders and marker-offs.

Education: Training is usually through apprenticeship.

Personal Attributes: Possesses mechanical aptitude and manual dexterity; is strong and physically fit.

Job Outlook: The limited number of apprenticeships and the relatively good wages a boilermaker earns mean stiff competition for the jobs available. Since most industries that purchase boilers are sensitive to economic conditions, construction boilermakers may be laid off when there are downswings. Existing boilers are maintained and repaired even during economic downturns, so boilermaker mechanics generally have more stable employment.

Related Occupations: Assemblers, blacksmiths, fitters, instrument makers, ironworkers, machinists, millwrights, moulders, plumbers, sheetmetal workers, shipwrights, tool and die makers, and welders.

Heat Treaters

Job Description: Heat treaters work with furnaces and quenching equipment to treat metals to make them strong and resilient. Heat treatment processes such as softening, hardening or controlled heating and cooling are used to bring about changes in the physical properties of metals and metallic objects.

Heat treaters do some or all of the following jobs:

- load the objects into the furnace and set the required temperature;
- operate and monitor the equipment and controls during treatment, for example, light burners, regulate air, gas and electricity, and check gauges;
- quench the hardened metal after heating is complete by immersing it into brine, oil, water, etc.;
- temper steel to make it tough and surface harden metal components to increase resistance to wear and abrasion;
- test hardness of treated metals using special instruments.

Education: On-the-job training is required.

Personal Attributes: Has an interest in working with mechanical machines; able to work as part of a team.

Job Outlook: Work is available in foundries and in industries manufacturing iron and steel products, general engineering companies, heat treatment firms and motor vehicle manufacturers.

Related Occupations: Blacksmiths and metal trades assistants.

Jewellers

Job Description: Jewellers make, repair and adjust bracelets, earrings, necklaces, rings and other jewellery using a variety of tools and materials.

They usually do some or all of the following:

- repair or adjust jewellery, for example, enlarge or reduce rings, reset stones and replace broken clasps and mountings;
- design or make their own jewellery from original designs or those given by designers and customers;
- specialise in one or more areas of the jewellery field like appraisal, buying, designing, gem-cutting, repair or sales;
- use a variety of hand tools including drills, jeweller's lathes, jeweller's soldering torches and pliers to engrave, mould and shape metal, and set gemstones;
- assemble the various components and finish the article of jewellery;

- use chemicals and polish compounds for finishing;
- perform managerial duties like hiring and training employees, marketing, ordering and selling merchandise.

Jewellers in the manufacturing field can specialise in gemmology, making the tools or models for producing specific jewellery, sales or in finishing.

Education: A degree in jewellery design is advantageous although jewellers' skills are usually learned on the job.

Personal Attributes: Possesses finger and hand dexterity, and good hand-eye coordination and eyesight; able to make creative designs; has patience; is of good character.

Job Outlook: Job opportunities for jewellers depend largely on sales and jewellery repair services. Opportunities will be best in jewellery stores and repair shops as jewellery sales rise. There will be a demand for repair workers as that is an ongoing process.

Career opportunities in jewellery manufacturing are very competitive. Increased jewellery imports have caused many jewellery manufacturers to shut down. But opportunities exist in exports as manufacturers become more competitive in the foreign market.

Related Occupations: Gemcutters, gemmologists and hand engravers.

Machinists and Tool Programmers

Job Description: Machinists produce precision metal parts using machine tools like drill presses, lathes and milling machines. They normally produce small batches or one-of-a-kind items and can even produce large quantities of a particular part if required.

They usually do some or all of the following:

- set up and operate a wide variety of machine tools and know the working properties of metals like aluminium, brass, cast iron and steel;
- plan and carry out the operations needed to make machined products that meet precise specifications;
- study blueprints or written specifications for a

job, then calculate how much metal to remove, where to cut it, and how fast to feed it into the machine;

- select tools and materials, plan the sequence of cutting and finish operations, and place markings on the metal stock for the cuts;
- perform the necessary machining operations like positioning the metal stock, setting the controls and making the cuts;
- clean and lubricate machine tools;
- ensure that the workplace is being properly cooled to dissipate the heat produced during metal machining.

Tool programmers operate numerically controlled machines, and in particular, computer numerically controlled machines. These machines enable parts to be produced with a consistent and very high level of precision, thus producing uniformly high quality products and guaranteeing customer satisfaction.

They usually do some or all of the following jobs:

- analyse blueprints, compute the size and position of the cuts, determine the sequence of machine operations, select tools and calculate the machine speed and feed rates;
- write programs in the language of the machine's controller and store them;
- work with machinists to assess new programs, and ensure that machinery will function properly and the output will meet specifications;
- use computer simulations to check the efficiency of the program and avoid damage to the costly machinery, and cut tools during trial runs;
- operate sophisticated measuring devices like acoustical, optical and laser measuring devices to ensure that work meets specifications;
- maintain, repair or make new parts for existing machinery and refer to blue prints for machining operations.

Areas of specialisation include the following:

- *metalworking machine operators*, who usually produce large numbers of parts requiring more routine operations;
- *production machinists*, who produce large quantities of one part, especially parts involving highly complex operations and great preci-

sion, or the use of very sophisticated and expensive machinery.

Education: Training is usually through apprenticeship.

Personal Attributes: Possesses mechanical aptitude and a basic knowledge of computers and electronics; able to work independently and do highly accurate work that requires concentration as well as physical effort.

Job Outlook: There will be more openings for machinists than for tool programmers since machinists are getting more involved in tool programming which now has simplified programming languages and procedures. However job prospects may be constrained by improvements in metalworking technology.

Machinists and tool programmers in production may be laid off or be forced to work fewer hours if demand for machined goods falls. However, machinists involved in plant maintenance have more stable jobs because maintenance and repair of costly equipment remain vital concerns even when production levels fall.

Related Occupations: Instrument makers, metal patternmakers, tool and die designers, tool and die makers, tool planners and welders.

Metalworking and Plastics-Working Machine Operators

Job Description: Metal and plastics-working machine operators produce the metal and plastic housing and parts of most of the consumer products that we use daily. They operate manual and numerical-control machines.

The scope of work is usually based on the size of the organisation and the type of machine being operated. Metalworking machine setters and operators usually do some or all of the following:

- set up and tend machines that cut and form all types of metal parts;
- study blueprints, layouts or other instructions to plan and set up the sequence of operations;
- adjust feed, speed and other controls, choose the proper coolants and lubricants, and select the instruments or tools for each operation;
- use precision-measuring instruments to ensure

- that completed work matches the specifications;
- tend to grinding machines or presses, and perform simple, repetitive operations that can be learned quickly;
- place metal stock in a machine which has pre-set operating specifications;
- watch over machines and make minor adjustments according to instructions;
- make any major adjustments required if the machines are not functioning properly.

Plastics-working machine operators set up and tend machines that transform plastic compounds into a wide variety of consumer goods such as auto parts, toys, and tubing. Their work includes some or all of the following:

- checking the materials feed, the pressure and temperature of the machine, and the rate at which the product hardens;
- loading material into the machine, making minor adjustments to the machinery or unloading and inspecting the finished products;
- removing clogged material from moulds or dies and exercising proper care to avoid damaging them.

Metal and plastics-working machine operators are increasingly being called upon to work with numerically-controlled (NC) equipment where machining is done automatically. Numerical-control machine-tool operators or sometimes machinists do some or all of the following jobs:

- set up and use numerically-controlled machines to obtain the maximum benefit from their use;
- tend just one machine or a number of machines and do some programming, frequent loading and unloading, and tool changing;
- load programs that are usually stored on floppy disks into the controller, using given instructions;
- position the work piece securely, attach the necessary tools, and check the coolants and lubricants;
- monitor the machinery to prevent situations that could result in costly damage to the cutting tools or other parts;
- check the finished part using precision inspection equipment to ensure that it meets specifications.

All machine workers can be separated into the following two groups:

- **Operators and tenders**, who primarily monitor the machinery during operation, sometimes loading or unloading the machine or making minor adjustments to the controls;
- **Set-up workers**, who prepare the machines for production and adjust the machinery during operation; this process requires an understanding of the entire production process, so the workers are better trained and highly skilled.

Many workers set up as well as operate the equipment. Machine operators are usually identified by the type of machine with which they work and may be designated as lathe tenders, plastics-moulding machine set-up operators and screw machine operators. Some workers specialise in one or two types of machinery but the majority are trained to set up or operate a variety of machines.

Education: On-the-job training is required.

Personal Attributes: Possesses mechanical aptitude, strong analytical abilities and manual dexterity.

Job Outlook: The overall employment prospects of metal and plastics-working machine operators will decrease. Increasing productivity resulting from computer-controlled equipment is the reason for decline in jobs. This will affect metalworking machine operators more than those working with plastics machines. Workers with a thorough background in machine operations, exposure to a variety of machines and a good working knowledge of the properties of metals and plastics will be best able to adjust to this changing environment.

Related Occupations: Machinists, metal pattern-makers, numerical-control machine-tool operators, tool and die makers, and woodworking machine operators.

Tool and Die Makers

Job Description: Tool and die makers are highly skilled workers who produce tools, dies and special guiding and holding devices that are used in machines that produce a variety of products.

They usually do some or all of the following jobs:

- make and design gauges, jigs and fixtures, metal dies, metal moulds for die-casting and precision tools;
- study blueprints, drawings and models to plan the manufacturing process;
- repair worn or damaged dies, fixtures, gauges, jigs and tools;
- operate and use many types of machine tools and precision measuring instruments;
- assemble the parts and finish the product by filing, grinding and smoothing surfaces;
- check the accuracy of the final product to ensure that it will meet specifications;
- use computer aided design (CAD) to develop products and specifications for tools and dies and help to plan and write programs for numerically-controlled (CNC) machines;
- use computer numerically-controlled (CNC) machines to produce the die and manually check and assemble the tool or die.

Education: Training is usually through apprenticeship.

Personal Attributes: Possesses an aptitude for technical subjects; has good eyesight; is patient and attentive to detail.

Job Outlook: Job opportunities for tool and die makers will decrease. This is due to the increased use of numerically-controlled machine tools which has reduced the amount of manual jobs for workers.

Related Occupations: Fitters, instrument makers, machinists, metal and plastics machine operators, metal patternmakers, mould makers, tool programmers and welders.

Tool and Die Setters

Job Description: Tool and die setters set up and adjust machine tools and production equipment following detailed instructions and specifications.

They usually do some or all of the following:

- study instructions, drawings or job cards and establish machine operation sequences;
- set up the various tools and dies required for machines carrying out precision work;
- measure and mark reference points, fix work pieces, and position and fix cutting tools;
- make required adjustments to the machine and its controls to ensure the finished product

meets specifications;

- test run and readjust machines, and regularly check product sizes during operation and report any problems that occur;
- take responsibility of setting up and operating various machines in the factory.

Education: Training is usually through apprenticeship.

Personal Attributes: Possesses good hand-eye coordination, precision, accuracy and patience.

Job Outlook: Job opportunities for tool and die setters will decrease. This is due to the increased use of numerically-controlled machine tools which has reduced the amount of manual jobs for workers.

Related Occupations: Fitters, instrument makers, machinists, metal and plastics machine operators, metal patternmakers, mould makers, tool and die setters, tool programmers and welders.

Welders, Cutters and Welding Machine Operators

Job Description: Welding is the most common way of permanently joining metal parts, using a variety of manual techniques or machines. Welding is used to construct and repair parts of automobiles, ships and spacecraft, join beams and steel reinforcing rods when constructing bridges and buildings, and also in utilities such as nuclear power plants and refineries.

Welders may do some or all of the following:

- study and plan work from drawings or specifications, or by analyses of damaged metal;
- select and set up welding equipment, and examine welds to ensure they meet standards or specifications;
- perform manual welding or semi-automatic welding using machinery such as a wire feeder;
- clean and smooth welds;
- set up and operate welding machines as specified by blueprints, layouts and work orders;
- constantly monitor the machine and adjust it to ensure that it produces the desired weld.

Welders can specialise according to the work they do.

First class welders are specialists in welding a range of metals and who carry out complex tasks.

Second class welders usually specialise as arc welders, braziers or gas-cutter welders. They operate equipment and do soldering work.

Third class welders do only basic welding, tool assembly, finishing items and cut scrap metal.

The work of *arc, plasma and flame cutters* is closely related to that of welders. They do some or all of the following:

- use the heat from burning gases or an electric arc to cut and trim metal objects to specific dimensions;
- dismantle large objects such as aircraft, automobiles, railroad cars or ships;
- operate and monitor cutting machines similar to those used by welding machine operators.

Education: On-the-job training is required and formal training through vocational courses is an advantage.

Personal Attributes: Possesses manual dexterity, good eyesight and good hand-eye coordination; able to concentrate on detailed work for long periods and work in awkward positions.

Job Outlook: Employment opportunities for welders and cutters will grow more rapidly in industries like construction, repair services and wholesale trade. Manual welders, especially those with a wide variety of skills will still be needed for maintenance, repair and other work in manufacturing that cannot be automated.

Welders, cutters and welding machine operators in construction and manufacturing are vulnerable to periodic layoffs due to economic downturns.

Related Occupations: Blacksmiths, boilermakers, lathe and turning operators, machine-tool operators, metal workers, millwrights, sheetmetal workers, and tool and die makers.

PLANT AND SYSTEM OPERATORS:

Electric Power Generating Plant Operators and Power Distributors and Dispatchers

Job Description: Power plant operators control

the machinery that generates electricity. Power distributors and dispatchers oversee the flow of electricity through substations and over a network of transmission and distribution lines to users. Power plant operators usually do some or all of the following work:

- regulate and monitor boilers, turbines, generators, auxiliary equipment like coal crushers, and switching gear, in plants fuelled by coal, natural gas or oil;
- operate switches to distribute power demands among generators, combine the current from several generators and regulate the flow of electricity into powerlines;
- start or stop generators and connect or disconnect them from circuits, when power requirements change;
- monitor instruments to ensure the proper flow of electricity and that voltage is maintained;
- clean and lubricate parts and equipment, and conduct repairs of faulty equipment;
- maintain records of switching operations, loads on generators, lines and transformers, and make reports of any unusual incidents or equipment malfunction during the shift.

Power distributors and dispatchers, also called load dispatchers or systems operators, control the flow of electricity through transmission lines to users.

They usually do the following jobs:

- operate circuit breakers, current converters and voltage transformers;
- monitor equipment and record readings at a pilot board which is a map of the transmission grid system;
- anticipate power needs due to various reasons and call control room operators' work at bringing production into balance with needs;
- handle emergencies such as transformer or transmission line failures and route current around affected areas;
- operate and monitor equipment in substations including step up or step down voltage and operate switchboard levers to control the flow of electricity in and out of substations.

Education: On-the-job training or training through vocational courses is required.

Personal Attributes: Possesses a logical and

thorough approach to work, and a mechanical aptitude; able to shoulder responsibilities and make appropriate decisions.

Job Outlook: Job opportunities are dependent on the pace of development of new plants and equipment, which is expected to be moderate. The overall employment growth will be slow for electric power generating plant operators, distributors and dispatchers, and there will be stiff competition for available jobs. Workers in electric power companies have relatively secure jobs and are seldom laid off even during downswings in the economy.

Related Occupations: Boiler attendants, chemical operators, electrical mechanics, metal trades assistants, refinery operators, and water and sewage treatment plant operators.

Water and Wastewater Treatment Plant Operators

Job Description: Wastewater treatment plant operators remove harmful pollution from domestic and industrial wastewater. Water treatment plant operators work in water treatment plants, where water that is pumped from rivers, streams and wells is treated to make it potable.

They do some or all of the following jobs:

- control processes and equipment to remove effluents, chemical compounds and micro-organisms from the water or to render them harmless;
- control pumps, valves and other processing equipment to move the water or wastewater through the various treatment processes;
- dispose of the waste materials removed from the water;
- monitor meters and gauges to ensure plant equipment and processes are working properly, adjusting controls if required;
- operate locks and adjust water levels in weirs;
- take samples of the water or wastewater, and perform biological and chemical laboratory analyses;
- test and adjust the amount of chemicals such as chlorine that is being fed into the water;
- make minor repairs to valves, pumps and other equipment;
- use computers to help them monitor equipment, make process control decisions, prepare

reports and use specialised software to store sampling results;

- retrieve data in order to determine the cause of the malfunction when problems occur;
- work under emergency conditions, for example, when heavy rainstorms may cause large amounts of wastewater to flow into sewers and exceed a plant's treatment capacity, or chlorine gas leaks or there are oxygen deficiencies inside a plant;
- train in emergency management response using special safety equipment and procedures to protect public health and the facility;
- supervise staff and their training, conduct inspections, and maintain the surroundings of plants, dams and reservoirs.

Plant operators' scope of work depends on the type and size of plant. In smaller plants, one operator may control all machinery, perform tests, keep records, handle complaints, and undertake repair and maintenance. Some operators even handle both water treatment and wastewater treatment plants.

In larger plants with many employees, operators perform more specialised tasks and only monitor one process. The staff may also include chemists, engineers, helpers, laboratory technicians, mechanics, supervisors and a superintendent.

Education: On-the-job training is required.

Personal Attributes: Possesses mechanical aptitude, competency in basic mathematics and the capacity to perform methodically and accurately; has disciplined approach to work; able to work shifts; is physically fit.

Job Outlook: Employment of water and wastewater treatment plant operators will be good as new plants are constructed. Local governments are the largest employers but as privatisation increases, the focus will shift to these companies. Increased pre-treatment activity by manufacturing firms will also create new job opportunities. Water and wastewater treatment plant operators are not affected by economic ups and downs, since the services they provide are essential.

Related Occupations: Boiler operators, chemical plant operators, gas-compressor operators, petroleum refinery operators, power plant operators,

power reactor operators, stationary engineers and turbine operators.

PRINTING OCCUPATIONS:

Binders and Finishers

Job Description: Binders and finishers bind and finish books and other printed matter manually or using machines. The work needs a high degree of skills and the ability to use several machines when there is a large volume of work.

They usually do some or all of the following work:

- assemble and process sheets of printed material as they come from the printing press;
- trim the papers to size using automated guillotines and fold them using mechanised folders;
- assemble and operate bookbinding and finishing machines that arrange the pages and attach the cover, prepare appropriate pastes and glues, and maintain and load the machine;
- repair damaged bindings;
- manually bind books by applying pastes to hold the book together, sew pages together and build a cover around the book using either cloth or leather.

Binders or finishers can specialise in any one of the above activities.

Education: Skills are acquired through on-the-job training.

Personal Attributes: Possesses finger dexterity, basic mathematical skills, mechanical aptitude, artistic ability and imagination; has good eyesight; is attentive to detail; able to do accurate and neat work.

Job Outlook: Employment is available in specialist printing firms. However the job opportunities for binders and finishers will decline with advances in technology. Self-employment is a reasonable alternative.

Related Occupations: Graphic prepress operators, printing machinists and screen printers or stencil preparers.

Prepress Workers

Job Description: The printing process has three

stages – prepress, press, and binding or finishing. Prepress workers prepare material for printing presses. They perform a variety of tasks such as typesetting, designing page layout, photographing text and pictures, and making printing plates. They share typesetting and page layout tasks with their customers, in other words they get material that looks more and more like the desired finished product, usually on a computer disk.

There are various specialists in this field.

- *Colour separation photographers* produce four-colour separation negatives, an extremely complex process, from a continuous-tone colour print or transparency which is being reproduced.
- *Electronic pagination system operators* use a keyboard for typesetting, storing the material, transmitting the pages for production into film and then into plates, or directly into plates, thus eliminating the role of paste up artists.
- *Halftone operators* separate the photograph into pictures that are made up of tiny dots, which can be reproduced.
- *Job printers* do the typesetting according to copy, reading proof for errors and clarity, and correcting mistakes, in small shops.
- *Line camera operators* start the process of making a lithographic plate by photographing and developing film negatives or positives of the material to be printed, load unexposed film in machines that automatically develop and fix the image.
- *Lithographic dot etchers* retouch film negatives or positives by sharpening or reshaping images. They are usually assigned to only one phase of the work and may correspondingly be called dot etcher, retoucher or letterer.
- *Paste up artists* cut and arrange the columns of text and illustrations onto a special illustration board called a "mechanical". The text is arranged in final form and the board is sent to the camera department where a photographic negative used to create printing plates is produced.
- *Platemakers* use a photographic process to

make printing plates, sometimes using lasers to directly convert electronic data to plates without using film.

- *Scanner operators* use computerised equipment to create film negatives or positives of photographs or art, and for the scanning process, review the work and adjust the scanner to obtain the best results.
- *Strippers* cut the film to required size and arrange and tape the negatives onto "flats" or layout sheets, used by platemakers to make press plates.

Education: Skills are acquired through on-the-job training, apprenticeship or vocational courses.

Personal Attributes: Possesses manual dexterity, good eyesight and the ability to focus quickly; able to pay attention to detail and work independently.

Job Outlook: Within the field, growth will be fastest for electronic pagination operators and slowest for precision compositors and typesetters. Electronic pagination workers have the best job prospects, reflecting the increasing proportion of page layout and design that will be performed electronically. Precision compositors, typesetters and other manual workers, on the other hand, face a bleak future. The same goes for camera operators, job printers, paste-up workers, photoengraver, platemakers and prepress machine operators. Jobs will also be available in advertising agencies, public relations firms and large corporations.

Related Occupations: Engravers, graphic artists, keypunch operators, sign painters and telegraphic-typewriter operators.

Printing Press Operators

Job Description: Printing press operators prepare, operate and maintain the various printing presses in a pressroom. Their work varies depending on the type of press they operate — flexography, gravure, letterpress, offset or screen printing.

They may do some or all of the following work:

- prepare presses for printing, check that paper

and the combination of inks meet specifications, then feed paper;

- monitor the operation and feed controls of the presses, handle problems like paper jamming and make required adjustments and corrections to avoid expensive losses of paper and ink;
- constantly check for any printing imperfections;
- undertake minor repairs and preventive maintenance;
- monitor computerised printing processes on a control panel, making adjustments to the press electronically.

Press operators' jobs vary depending on the type and sizes of presses. Smaller business establishments normally print only one or two colours at a time and are operated by one person. Operators who work with larger presses, newspapers for example, have several assistants and helpers.

Education: Training is through apprenticeship.

Personal Attributes: Possesses mechanical aptitude, adequate mathematical skills and the ability to visualise colour.

Job Outlook: Employment prospects of gravure, flexographic and offset operators will increase, while employment of letterpress operators will decline. Other printing such as books, newspapers, periodicals and print advertising will also provide jobs. Experienced press operators have a better chance of finding jobs.

Related Occupations: Bindery machine operators, metal machinists, papermaking machine operators, screen printers or stencil preparers and sign writers.

Screen Printers or Stencil Preparers

Job Description: Screen printers establish and operate a variety of screen-printing equipment and prepare stencils.

The work normally involves:

- readying the stencils for printing using methods like handcutting, photographic methods or electronic methods;
- selecting, combining and loading inks into the printing machines;

- loading the other material to be printed on carefully into the machine, ensuring that it is in the correct sequence and in register if more than one colour is to be used;
- operating and monitoring both hand operated and power driven machines, and regularly checking printing quality;
- drying the printed items on racks or dryers using hot air or ultraviolet light;
- disposing of waste, cleaning and maintaining machines and related equipment like camera lenses, filters and screens;
- maintaining records of the work done.

Education: Training is through apprenticeship.

Personal Attributes: Possesses mechanical aptitude, competency in basic mathematics and the capacity to perform methodically and accurately; has disciplined approach to work; able to work shifts; has good eyesight, normal vision and is physically fit.

Job Outlook: Work is available in advertising and display, garment manufacturing companies, glass and ceramics industries, sign shops, industrial printers and other private printing organisations.

Related Occupations: Binders and finishers, graphic prepress operators, printing machinists and sign writers.

TEXTILE, APPAREL AND FURNISHINGS OCCUPATIONS:

Apparel Workers

Job Description: Apparel workers transform cloth as well as leather and fur into clothing and other consumer products. They also care for these products and do alterations.

Apparel production begins with a design, created by a designer, that has been made into a sample product. Apparel workers usually do some or all of the following:

- work as markers to determine the best arrangement or layout of the pattern pieces to minimise wastage;
- carefully cut out the various pieces of material following the outline of the pattern, either automatically or manually if the material is delicate;

- work as sewing machine operators, who work on a variety of specialised sewing machines and produce clothing or items like curtains, sheets, and towels;
- usually specialise in a single operation such as bindings, collars or hems;
- sew manually when valuable and delicate materials are involved;
- specialise as hand sewers who require a high degree of skills, and work in a particular operation such as sewing buttonholes or adding lace or other trimming;
- work with the designer to make samples of new products;
- operate computerised equipment in larger firms.

The work of apparel workers varies from that requiring very little skill and training to that which is highly complex, requiring several years of training.

Education: Applicants with vocational training are preferred.

Personal Attributes: Possesses good hand-eye coordination and the ability to perform repetitive tasks for long periods.

Job Outlook: Employment prospects for apparel workers will decline due to increased productivity caused by technological advancements. However, the large size of this occupation ensures that jobs will become available to replace the multitude of persons who transfer to other occupations, retire or leave the occupation for other reasons. Opportunities should be best for those interested in a job as a custom tailor or pressing machine operator.

Related Occupations: Shoe and leather workers, shoe sewing machine operators, textile operatives and upholsterers.

Dressmakers

Job Description: Dressmakers usually make garments like dresses, coats, suits and bridal wear for their clients who might be women, men or children. They undertake all the work involved from taking measurements to finishing the product.

The work involved can include some or all of the following:

- make estimates of the type and quantity of fabric required after detailed discussions with the client;
- give a quotation of how much the finished product will cost;
- take down the client's measurements and record them for future reference;
- draft the pattern and make required adjustments keeping in mind style and size;
- fit the garment on the customer before finishing it and making alterations if any;
- sew the pieces together, iron the seams and add finishing touches like buttons, zips, hooks and eyes, etc.;
- make garments to designs given by the customer or design the outfit for the customer;
- carry out repair and alterations.

Dressmakers can specialise in "haute couture", stitch for boutiques or opt for self-employment.

Education: Skills are acquired through dressmaking courses or apprenticeship.

Personal Attributes: Possesses a flair for style and design, and a knowledge of fabrics; has the ability to produce neat and accurate work.

Job Outlook: Most dressmakers are self-employed, working either from home or operating from small workshops. They can also work in boutiques or in haute couture.

Related Occupations: Fashion designers and milliners.

Shoe and Leather Workers and Repairers

Job Description: Shoe and leather workers design and make stylish and durable leather products. Repairers are responsible for upkeep and maintenance. Other workers dealing with leather work and repair include custom orthopaedic shoemakers, saddlemakers and luggage makers.

Depending on the size of the organisation, shoe and leather workers usually do some or all of the following:

- check the leather for colour, strength and texture;

- draft or design a pattern;
- place a pattern of the item being produced on the leather, trace the pattern onto the leather and cut along the outline;
- join and sew the pieces together;
- beautify the product by attaching buckles, decorations or by embossing designs on it;
- finish the product using stain, dyes, polish or lacquer coats;
- repair damaged goods.

Shoe and leather workers can specialise in various fields depending on the type of goods being produced.

Custom shoe workers usually modify existing footwear for people with foot problems and special needs.

Luggage makers fasten leather to a frame and attach handles and other hardware. They also cut and secure linings inside the frames and sew or stamp designs onto the luggage exterior.

Orthopaedic shoemakers make special shoes for people with disabilities. They normally do some or all of the following:

- attach the insoles to shoe lasts (a wooden form shaped like a foot);
- affix the shoe uppers and apply heels and outsoles;
- shape the heels with a knife and sand them on a buffing wheel for smoothness;
- dye and polish the shots.

Saddlemakers work on saddles and often do some or all of the following:

- apply leather dyes and liquid top coats to produce a gloss finish on a saddle;
- decorate the saddle surface by hand stitching or by stamping the leather with decorative patterns and designs.

Shoe and leather repairers use their knowledge of leatherworking to give worn leather goods extended wearability. They usually do some or all of the following jobs:

- repair or replace soles and heels, and polish them to match the original;
- attach new soles and heels to shoes, either by stitching, sticking or nailing them in place;

- re sew seams or replace handles and linings on other leather goods like handbags or suitcases;
- cut keys and do embossing;
- use handtools like awls, hammers, knives and skivers, or operate automatic equipment including heel nailing machines, hole punching machines, sewing machines and sole stitchers;
- undertake managerial responsibilities and maintain good relations with their customers;
- make business decisions and keep accurate records.

Education: Skills are acquired through on-the-job training or vocational courses.

Personal Attributes: Possesses manual dexterity, mechanical aptitude and fine motor skills; able to work quickly, accurately and independently.

Job Outlook: Job opportunities for shoe and leather workers will decline while repairers will face a moderate demand for their services. In the future, however, most job openings will occur due to the need to replace experienced workers who transfer to other occupations or leave the work force. Prospects for workers in the manufacture and modification of custom-made, moulded or orthopaedic shoes are better than those for most other leather workers.

Textile Machinery Operators

Job Description: Textile machinery operators handle machines that manufacture textile goods used in a variety of consumer and industrial products. Their scope of work depends on the product and the type of machinery being used.

Textile machinery operators do some or all of the following:

- control equipment that cleans, cards, combs and draws the fibre, spins it into yarn, and weaves, knits or tufts the yarn into textile products;
- operate, clean, monitor, ensure proper functioning of the various machines, and make replacements or minor repairs to the machinery;
- constantly monitor machines and check the fibre, yarn or fabric produced, repair breaks and monitor supply of the fibre or yarn as required;
- monitor a larger area or number of computer

- controlled machines and sometimes specialise in a particular type of machine;
- run a shift of workers;
- prepare the machinery prior to a production run, make adjustments according to design specifications and help maintain the equipment.

Textile machinery operators can specialise as:

- knitting mechanics*, who control automatic knitting machines and produce knitted or hosiery material or garments;
- spinning mechanics*, who set up machines, and carry out functions like adjusting and aligning controls and materials to transform raw fibre into threads like cotton and wool;
- tufting mechanics*, who operate machines that produce tufted carpet;
- weaving mechanics*, who operate machines that convert yarn into fabric like blankets, carpets, clothing material or towels.

Education: Skills are acquired through on-the-job training or vocational courses.

Personal Attributes: Possesses mechanical aptitude, manual dexterity, good eyesight and physical stamina.

Job Outlook: Advances in technology will lead to a decline in employment of textile machinery operators.

Related Occupations: Electrical mechanics and textile technicians.

Upholsterers

Job Description: Upholsterers are skilled craft workers who cover new furniture with different fabrics or materials and recondition or repair old furniture. They combine knowledge of fabrics and other materials with artistic flair and manual skill and make new pieces of furniture, restore treasured antiques, or redo an ordinary living-room tastefully.

They usually do some or all of the following:

- repair and replace automobile upholstery and vinyl tops;

- make new furniture;
- recondition old furniture by first removing the old cover and stuffing, examining the springs and replacing broken or bent ones;
- install and tack new webbing of cotton, jute, or nylon in the frame to hold the springs, sew or staple each spring to the webbing or frame and fix them to each other;
- stretch burlap over the springs, cover the furniture with filling material, then cover it with a layer of felt and heavy cloth, and tack the cloth to the frame;
- measure and cut fabric for the various sections ensuring minimum wastage;
- temporarily stitch pieces together to ensure a perfect fit, make adjustments as required, remove the cover and finally sew it;
- tack, staple or glue the cover to the frame and sew, tack or glue on buttons, fringes or other ornaments;
- use common hand tools including tack pliers, staple guns, tack and staple removers, tack hammers, and special tools like upholstery needles and webbing stretchers, and use sewing machines;
- pick up and deliver furniture, order supplies and equipment, and keep business records;
- assist customers in choosing fabric, designs and colour for new furniture coverings, and give estimates of the job cost.

Upholsterers usually specialise as:

- antique and reproduction upholsterers*, who restore antiques and recreate styles from bygone eras;
- custom upholsterers*, who specialise in furniture for airports, hotels and ships;
- production upholsterers*, who work in mass production of furniture;
- renovation and repair upholsterers*, who replace and repair old furniture.

Education: On-the-job training is required.

Personal Attributes: Possesses manual dexterity, good coordination and an eye for detail; able to work neatly and accurately.

Job Outlook: The growth rate in jobs will increase in furniture manufacturing while it will decline in reupholstery shops. Technology will not affect

employment of upholsterers, since upholstery work cannot be automated as each piece of furniture is different.

Related Occupations: Fur cutters, furniture finishers, and pattern and model makers.

WOODWORKING OCCUPATIONS:

Wood Carvers

Job Description: Wood carvers are also known as furniture carvers and they specialise in ornamental designs and patterns in wooden furniture, wood panelling and other decorative articles.

They usually do some or all of the following:

- study drawings and specifications, and make and trace detailed designs on the wood;
- choose the appropriate piece of wood and cut out a rough shape;
- fix the wood firmly and carve out the design manually using chisels, gouges, paring knives or power tools;
- smoothen the wood with sandpaper or leave particular areas rough, depending on the design;
- finish the wood carving by applying stain, dye or special paint;
- restore and copy antique ornaments and furniture;
- maintain tools to ensure they are sharp and rust free.

Education: Training is usually through apprenticeship.

Personal Attributes: Is artistic, good with the hands and patient; able to turn out accurate and neat work.

Job Outlook: Since this is more of a craft, the opportunities are limited. Most wood carvers are self-employed.

Related Occupations: Cabinetmakers and carpenters.

Woodworkers or Wood Machinists

Job Description: Woodworkers control the various processes through which logs of wood are transformed into finished products and assemble,

operate and maintain the woodworking machines.

Woodworkers or wood machinists usually do some or all of the following:

- produce the structural elements of buildings, mill hardwood and softwood lumber, or assemble finished wood products;
- operate machines that cut, shape, assemble and finish raw wood to make wooden articles used in building house including cabinets, doors, flooring, moulding, panelling, plywood, trusses and windows;
- fashion home accessories such as beds, chairs, dressers, sofas and tables;
- make sporting goods like baseball bats, oars and racquets as well as caskets, musical instruments, tool handles, toys and thousands of other wooden items;
- set up, operate and tend woodworking machines such as jointers, lathes, routers, planers, power saws and sanders;
- study blueprints, instructions from supervisors, or shop drawings to devise methods for shaping, and develop a sequence for assembling parts;
- measure and mark the materials to be cut after verifying that dimensions adhere to specifications, and make minor adjustments to ensure a good fit;
- cut logs into boards, planks or timbers in sawmills;
- cut veneer sheets from logs for making plywood in veneer mills;
- program a computerised numerically-controlled machine to perform a sequence of operations automatically, resulting in greater precision and reliability;
- finish the product using various techniques like sanding, staining, sealing and even coating with a sealer such as lacquer or varnish.

There are various specialists in this field.

- *Precision woodworkers* usually work on a customised basis, often building one-of-a-kind items like architectural woodwork, furniture and many other speciality items. Precision or custom woodworkers perform a complete cycle of cutting, shaping, surface preparation and assembling prepared parts of complex wood components into a finished wood product. They can work as cabinetmakers, furniture and

wood finishers, wood machinists, and wood pattern and model makers.

- *Production woodworkers* work in primary industries like sawmills and plywood mills as well as in secondary industries that manufacture furniture, kitchen cabinets, musical instruments and other fabricated wood products.

Education: Skills are acquired through apprenticeship or vocational courses.

Personal Attributes: Possesses manual dexterity and good eyesight; is mathematically inclined; able to work independently and implement quality assurance measures.

Job Outlook: Employment growth will be slow in woodworking occupations. Environmental measures, growing automation and changes in the economy may limit the growth of woodworking occupations. However, the continuing need for repair and renovation of residential and commercial properties will stimulate demand and prospects for woodworkers specialising in items like cabinets, mouldings, stairs and windows will be particularly good.

Related Occupations: Cabinetmakers, carpenters or joiners and wood carvers.

MISCELLANEOUS PRODUCTION OCCUPATIONS:

Painting and Coating Machine Operators

Job Description: Painting and coating machine operators handle the machinery and equipment that applies the many types of paints and coatings to a wide range of manufactured products.

Painting and coating machine operators usually do some or all of the following:

- fill the equipment's tanks with a mixture of paints or chemicals, in the prescribed amounts or proportions;
- adjust spray guns to obtain the proper dispersion and pressure of the spray, and position the guns to direct the spray onto the article;
- check the flow and viscosity of the paint or solution, and visually inspect the quality of the coating;
- regulate the temperature and air circulation in drying ovens;

- implement safety measures by using new types of paints and coatings on their products instead of high-solvent paints;
- operate newer, more automated painting equipment instead of welding a spray gun;
- synchronise the action of the automatic guns with the speed of the conveyor carrying articles through the machine and drying ovens;
- operate and monitor the painting machine, observe gauges on the control panel and randomly check articles for any variation from specification and "touch up" spots manually where necessary using spray gun;
- when painting automobiles, if only the repaired portions of a vehicle need painting, they often have to mix paint to match the original colour;
- use power sanders and sandpaper to remove the original paint or rust, and then fill small dents and scratches;
- remove or mask parts they do not want painted such as chrome trim, headlights, mirrors and windows;
- use a spray gun to apply several coats of paint, and apply lacquer or enamel primers to vehicles with metal bodies and flexible primers to newer vehicles with plastic body parts;
- place the freshly painted vehicle under heat lamps or in a special infrared oven to speed drying between coats;
- sand the surface between coats of primer to remove any irregularities and to improve the adhesion of the next coat;
- manually sand the final coat with a fine grade of sandpaper, apply a sealer and then the final topcoat;
- polish the finished surface after the final coat has dried, when lacquer is used.

Specialists in this field include the following:

- *automotive painters*, who work in automotive body repair and paint shops refinishing old and damaged buses, cars and trucks, essentially using spraypainting techniques;
- *dippers*, who immerse racks or baskets of articles in vats of liquid plastic, paint or other solutions using a power hoist;
- *enrobing machine operators*, who coat, or "enrobe" confectionary and other food products with melted chocolate, cheese, oils, sugar or other substances;

- *paper coating machine operators*, who spray "size" on roll of paper to give it its gloss or finish;
- *silvering applicators*, who spray copper, silver and tin solutions on glass in the manufacture of mirrors;
- *spray-machine operators*, who use spray guns to coat ceramic, fabric, metal, paper, wood and even food products with paint and other coating solutions;
- *tumbling barrel painters*, who deposit articles of porous materials in a barrel of paint, varnish or other coating, which is then rotated to insure thorough coverage.

Education: On-the-job training is required.

Personal Attributes: Possesses keen eyesight and good colour sense.

Job Outlook: Employment of painting and coating machine operators is expected to decline in the manufacturing industry due to increased automation. Employment growth for painting and coating machine operators in the auto repair industry will also be slow but steady.

Related Occupations: Construction and maintenance painters, electrolytic metal platers, and hand painting, coating and decorating occupations.

Photographic Process Workers

Job Description: Photographic process workers either operate machines or work on photographs. They do the more delicate tasks such as retouching photographic negatives and prints, restoring damaged and faded photographs, and may colour or shade drawings to create photographic likenesses using an airbrush.

They may do some or all of the following:

- colour photographs, using oil colours to produce natural, lifelike appearances according to specifications;
- take a conventional negative and use a computer to vary the contrast of images, remove unwanted background, or even com-

bine features from several different photographs;

- work directly on the photo negative rather than on a computer, in portrait studios where high volumes are involved;
- restore damaged and faded photographs using airbrush techniques (airbrush artists);
- retouch or alter photographic negatives and prints to accentuate the subject (retouchers);
- apply oil colours to portrait photographs to create natural lifelike appearances (colourists);
- spot out imperfections on photographic prints (photographic spotters).

Photographic processing machine operators and tenders operate various machines such as film developing machines, motion picture film printing machines, mounting presses and photographic printing machines.

They may do some or all of the following:

- control and maintain equipment which produces colour prints from the negatives;
- read customer instructions to determine processing requirements and prepare appropriate chemicals;
- load the rolls into colour printing equipment;
- examine the negatives to determine equipment control settings, set the controls and produce a specified number of prints;
- inspect the finished prints for defects, remove them and finally insert the processed negatives and prints into an envelope for return to the customer;
- sort processed film and operate enlargers;
- develop strips of exposed photographic paper (automatic print developers);
- operate equipment that cuts and mount slide film into individual transparencies (automatic mounters).

Education: Skills are acquired through on-the-job training or photography courses.

Personal Attributes: Possesses manual dexterity, good hand-eye coordination, good vision and normal colour perception; is comfortable with computers and able to adapt to technological advances.

Job Outlook: Career prospects look good for photographic process workers. A majority of available jobs will result from replacement needs,

which tend to be higher for machine operators than for precision process workers. Technological improvement may adversely affect photographic process machine operators but the same does not apply to precision photographic process workers.

Related Occupations: Chemical laboratory technicians, computer and peripheral equipment operators, photographers and photolithographers.

MECHANICS, INSTALLERS AND REPAIRERS

Business Equipment Technicians

Job Description: Servicing and repairing the many types of machines used in offices is the job of a business equipment technician. This covers things like calculators, cash registers, fax machines, photocopiers and typewriters.

Their work includes some or all of the following:

- servicing and maintenance;
- testing and making adjustments;
- repairing or replacing faulty parts;
- using instruments like resistance meters, oscilloscopes and voltmeters to locate faults;
- advising users on the correct way to use the machine.

Education: Skills are usually acquired through on-the-job training

Personal Attributes: Possesses an interest in electrical and electronic systems; has good eyesight and colour vision; is good with the hands.

Job Outlook: Much reliance is placed on office machines and new models are constantly appearing so there should always be work for competent business machine technicians.

Related Occupations: Computer service technicians and electronics technicians.

Computer Service Technicians

Job Description: Computer technicians install, service and repair computer hardware and its related equipment including CD ROMs and interfacing equipment for network operating systems like the Internet. They may do the following things:

- install equipment and check that it is working;
- upgrade existing equipment;
- locate faults using equipment like logic analysers, logic probes and oscilloscopes;
- run test program;
- reconnect internal computer wiring and make mechanical adjustments to fitted parts;
- carry out regular maintenance;
- answer customer queries about the working or non-functioning of their computer equipment.

Repair and installation jobs in this field can sometimes be long and complicated so shift work and irregular hours may be a feature. It is possible to specialise in one field, for example, microcomputers or point of sale equipment.

Education: Skills are acquired usually through on-the-job training.

Personal Attributes: Possesses manual dexterity, and good eyesight and colour vision.

Job Outlook: Computer equipment is so widely used that the number and range of job opportunities is increasing.

Related Occupations: Business equipment technicians and electronics technicians.

Electronics Technicians

Job Description: Electronics technicians service, repair and install domestic electronic equipment such as stereo systems and video machines, radio communications equipment including TV broadcast and studio equipment, and digital electronic equipment such as is used in computers, security systems and telephone systems.

They do some or all of the following:

- test and check circuitry, resistors, transistors, integrated circuits and capacitors, using electronic test and measurement equipment;
- repair or replace faulty parts;
- install equipment like transceivers in aircraft and ships;
- install, service and repair domestic equipment such as closed-circuit networks and television systems;
- estimate costs of work, and write invoices and receipts.

The scope in this field covers so many different systems that people tend to specialise. Electronics technicians can expect to work mainly in factories, homes or offices or in more unusual conditions such as on high masts or roofs.

Education: Formal training in electronics is required.

Personal Attributes: Possesses good eyesight and normal colour vision; is methodical and good with the hands.

Job Outlook: There is currently a shortage of competent electronics technicians; work should be easy to find.

Related Occupations: Business equipment technicians, computer service technicians and electronic engineers.

Heavy Vehicle Mechanics

Job Description: This job is a specialised branch of motor mechanics in which the worker is usually concerned with diesel as well as petrol driven vehicles. It can include heavy plant like bulldozers and earthmoving equipment.

Mechanics do some or all of the following:

- service, maintain and repair heavy vehicles such as buses, earthmoving equipment and trucks;
- use instruments to detect faults in charging and starting circuitry, ignition, fuel injection systems, compression, braking and wheel balance;
- repair and maintain the hydraulic components of diesel and petrol engines used to power attachments like hoists, booms and buckets;
- use welding and mechanical equipment.

Education: Vocational training or apprenticeship is required.

Personal Attributes: Possesses a "feel" for mechanical things and some mathematical ability; is physically fit and not allergic to oils or greases.

Job Outlook: While the construction industry continues to thrive there should be no shortage of work for heavy vehicle mechanics.

Related Occupation: Motor mechanics.

Motor Mechanics

Job Description: A motor mechanic's job is to service and repair all mechanical parts of motor vehicles — the engine, the suspension systems and the transmission. They work on any kind of motorised vehicle including things like boats, motorcycles and tractors.

The work involves some or all of the following:

- identifying faults, sometimes by using test equipment;
- dismantling and checking assemblies such as engines, transmissions and differentials;
- reassembling them and checking that they are in working order;
- tuning engines with special electronic equipment;
- testing and repairing electrical systems;
- making minor repairs to bodywork and trim;
- fitting accessories;
- using welding equipment.

This work is becoming more specialised as more vehicle systems are computerised.

Education: Skills are acquired through vocational courses or apprenticeship.

Personal Attributes: Possesses a "feel" for machines; able to work with tools and understand written technical information.

Job Outlook: There are jobs for motor mechanics almost everywhere – in repair shops, service stations, with the armed forces, in public transport companies and public utility companies.

Related Occupations: Automotive electricians, and air-conditioning and refrigeration mechanics.

Piano Technicians

Job Description: The piano technician's job is to tune pianos and keep them in good working order. This involves some or all of the following:

- tightening or loosening the strings to correct tonal balance and pitch;
- adjusting moving parts to give the correct touch;
- replacing worn or broken parts;

- testing and adjusting the pedal assembly and keyboard;
- making major repairs where necessary to soundboards and wooden bridges;
- realigning hammers, replacing strings and recovering keyboards.

The work is usually done wherever the piano is, mostly in concert halls or private homes.

Education: Technical training is required.

Personal Attributes: Possesses a particularly good ear for musical pitch and tonal quality, some manual dexterity and the ability to play the piano.

Job Outlook: Employment opportunities are expected to increase slowly. However, because training is difficult to get, opportunities for those who do get training should be excellent.

Refrigeration and Air-conditioning Mechanics

Job Description: Refrigeration and air-conditioning mechanics assemble, install, service and repair cooling systems in industrial and commercial units. They also sell, service and repair equipment for homes, offices, shops, etc.

Their tasks may include some or all of the following:

- interpreting and following installation plans;
- installing compressors, motors, condensers, evaporators, switches and gauges, air filters and copper lines for steam, gas, refrigerant, compressed air, fuel, oil and chilled water;
- attaching piping to refrigeration systems;
- cooperating with electricians and carpenters to install ducting for air-conditioning;
- fill systems with gas or fluid and check for leaks;
- repair faulty refrigerators and air-conditioning units.

When repairing breakdowns in an emergency they may have to work long hours.

Education: Skills are acquired through technical training or apprenticeship.

Personal Attributes: Possesses the ability to

translate working drawings into practical actions and able to work with hand and power tools.

Job Outlook: The job outlook is good both in the industrial and commercial sectors and the domestic repair sector.

Related Occupations: Electrical mechanics and motor mechanics.

Sewing Machine Mechanics

Job Description: Sewing machine mechanics assemble, adjust, repair and lubricate sewing machines which may be located in homes, commercial outlets or in factories.

They usually do some or all of the following work:

- undertake servicing of the machines, lubricating the components and adjusting them if required;
- identify the reason for any malfunction or problem in the sewing machine by dismantling it;
- repair and even make parts for a variety of domestic and industrial sewing machines as well as computerised ones;
- make sure that safety requirements are adhered to;
- regularly update their technical skills to keep in touch with the advancements in machinery and computerised controls of recent models.

Sewing machine mechanics need to travel extensively since theirs is a field job. They also need a working knowledge of clothing, footwear manufacture, sewing machine needles, threads and fabric.

Education: Skills are acquired through on-the-job training or vocational courses.

Personal Attributes: Possesses mechanical aptitude, fine motor skills and the ability to do precise work with the hands; has normal eyesight.

Job Outlook: Work is available with clothing and footwear manufacturing units and related factories. Self-employment is also a viable option.

Related Occupations: Business equipment technicians and electrical engineering technicians.

Telecommunications Technicians

Job Description: The job of a telecommunications technician is to install, maintain and repair telecommunications and broadcasting networks and equipment and to operate them as well.

Telecommunications technicians do some or all of the following:

- position and terminate cables, install jumpers, wires and strappings;
- undertake proof tests such as wire testing, analogue circuit commissioning and power tests;
- assemble, erect, position and label all items of equipment;
- install and maintain telephones and other business communications systems;
- carry out routine maintenance of telecommunications, switching and transmission equipment including telephone exchanges and the public telephone network;
- analyse faults;
- observe correct operational procedures;
- be responsible for assigned tools, plant and test equipment;
- provide estimates to customers and sell telecommunications products.

There are many different working situations for telecommunications technicians. They may be mainly in client's homes, offices or workshops or they could be in underground tunnels or at the top of high towers. Shift work is common and in the case of major installations and repairs they may have to work very long hours at certain times.

Education: On-the-job training is required.

Personal Attributes: Possesses analytical ability and the ability to do routine work, sometimes working in uncomfortable situations; is computer literate; has good colour vision and team spirit.

Job Outlook: With the sustained development taking place in Malaysia at the present time, job prospects in the telecommunications industry are likely to be very good for some time to come. Telecommunications is a highly specialised field and, once competent, telecommunications technicians can usually move into supervisory or management positions.

Related Occupations: Electrical engineering and electrical technicians.

Textile Technicians

Job Description: Textile technicians are responsible for various technical functions in different areas of textile production like design, production and quality control.

They usually do some or all of the following:

- study the various raw materials used to manufacture textiles and make specifications for production;
- choose and combine dyes to get fabric of the desired colour;
- obtain and interpret test data;
- undertake and/or supervise testing and quality control;
- do research, devise and implement better and newer processes or material.

They usually specialise in areas like dyeing, fabric design, finishing or others like knitting, spinning or weaving.

Education: Vocational training is preferred.

Personal Attributes: Possesses mechanical aptitude, an interest in chemistry, manual dexterity, normal vision and good eyesight; able to do work methodically and thoroughly.

Job Outlook: Employment opportunities will grow as fast as in other occupations.

Related Occupation: Laboratory workers.

Vending Machine Technicians

Job Description: These technicians service, maintain and repair coin-operated machines that dispense things like drinks, sweets or tickets.

The job involves some or all of the following:

- understanding and interpreting service manuals and specifications;
- dismantling and examining the machines;
- repairing or replacing faulty parts;
- reassembling and testing;
- regularly oiling moving parts and replacing worn components;

- cleaning the machines regularly;
- liaising with the vending machine company to have machines removed for repair.

The work would involve travelling to where the machines are installed as well as being in a workshop.

Education: Skills are acquired through on-the-job training.

Personal Attributes: Is good with the hands, and at analysing and solving problems.

Job Outlook: There is a move towards more automated dispensing machines, particularly of tickets, in such places as parking lots, train stations and toll booths so job prospects are good.

Related Occupations: Air-conditioning and refrigeration mechanics, business equipment technicians and electrical fitters

SERVICE OCCUPATIONS

Food and Beverage Preparation and Service Occupations:

Bakers

Job Description: Bakers bake and decorate a variety of products like bread rolls, cakes, loaves, pastries and special breads.

They usually do some or all of the following:

- maintain and operate baking equipment ensuring cleanliness, hygiene and adherence to safety regulations;
- inspect raw materials to maintain standards;
- weigh, mix and shape mixture, and put into baking tins or trays;
- control the equipment and temperature for a perfect finished product;
- decorate baked products and operate slicing and wrapping machines;
- order supplies from various wholesalers and dealers;
- attend to customers, and supervise staff training and recruitment.

Education: Skills are acquired through baking courses or on-the-job training.

Personal Attributes: Is neat, well-groomed, in good health and good with the hands.

Job Outlook: Work is available in large and medium-sized bakery plants, specialised cake shops, supermarket bakeries and in hotels. Self-employment is also an available option.

Related Occupations: Chefs, cooks and pastrycooks.

Chefs, Cooks and Other Kitchen Workers

Job Description: Chefs, cooks and other kitchen workers are largely responsible for the reputation a restaurant acquires and this reputation for serving good food is essential to any restaurant. Restaurants may offer a varied menu featuring elaborate meals requiring a highly skilled cook or chef, while others may lay the emphasis on fast service, offering fast food like hamburgers and sandwiches that require only limited cooking skills.

Chefs and cooks are responsible for preparing meals that are tasty and attractively presented. Chefs are the most highly skilled, trained and experienced of kitchen workers and cooks generally have more limited skills.

They usually do some or all of the following work:

- specialise in the skilful and artistic preparation of traditional food, create new dishes and improve familiar ones;
- work as institutional chefs and cooks in the kitchens of schools, industrial cafeterias, hospitals and other institutions and prepare a small selection of entrees, vegetables and desserts, but in large quantities;
- work as restaurant chefs and cooks, and prepare a wider selection of dishes for each meal, cooking most individual servings to order;
- measure, mix and cook ingredients according to recipes;
- use a variety of pots, pans, cutlery and equipment including blenders, broilers, grills, grinders, ovens and slicers;
- supervise other kitchen workers, estimate food requirements order food supplies and help plan meals and develop menus.

Cooks and chefs can also specialise in different areas.

Bread and pastry bakers or pastry chefs produce baked goods for institutions, restaurants and retail bakery shops. They may do the following:

- bake smaller quantities of breads, cakes, pastries, pies and rolls, doing most of the work by hand;
- measure and mix ingredients, shape and bake the dough and apply fillings and decorations.

Short-order cooks prepare foods to order in restaurants and coffee shops that emphasise fast service. They may do the following:

- grill and garnish hamburgers, prepare sandwiches, fry eggs and cook French fried potatoes, often working on several orders at the same time;
- slice meats and cheeses or prepare coleslaw or potato salad, before the busy period starts;
- clean the grill, food preparation surfaces, counters and floors during slow periods.

Speciality fast-food cooks prepare a limited selection of menu items in fast-food restaurants and cook and package batches of food such as fried chicken and hamburgers, that are made to order or kept warm until sold.

Other kitchen workers carry out more routine and less skilful tasks usually under the supervision of chefs and cooks. They may do the following:

- weigh and measure ingredients, fetch pots and pans, and stir and strain soups and sauces;
- clean, peel and slice potatoes, other vegetables and fruits, and make salads;
- cut and grind meats, poultry and seafood in preparation for cooking;
- clean dishes, equipment, silverware, utensils and work areas.

Restaurants employ kitchen workers depending on the services they offer.

- Fast-food outlets offer only a few items and employ fast-food cooks.
- Smaller, full-service restaurants offering casual dining usually have a limited number of easy-to-prepare items, supplemented by short-order specialities and ready-made desserts. They typically require only one cook to prepare all of the food with assistance from a short-order cook and one or two other kitchen workers.

- Larger establishments may have more varied menus and prepare most of the food they serve. Kitchen staff here often includes several chefs and cooks, sometimes called assistant or apprentice chefs or cooks, a bread and pastry baker and many less skilled kitchen workers. Each chef or cook has specific duties and job titles, like vegetable, fry or sauce cook. Executive chefs coordinate the work of the kitchen staff and often direct certain kinds of food preparation. They decide the size of servings, sometimes plan menus and buy food supplies.

Education: Chefs and cooks may start from the ranks of kitchen helpers or undergo apprenticeship but an increasing number of them are obtaining their training through vocational courses.

Personal Attributes: Able to perform under pressure, and devise and follow efficient work schedules; possesses a high degree of personal cleanliness.

Job Outlook: Job opportunities for chefs, cooks and other kitchen workers will be with an increasing growth in the number of jobs. Jobs will be created by a growing demand for their services as well as due to replacement needs.

Many employers will be forced to offer higher wages, better benefits and more training to attract and retain workers in these jobs. A growing economy, population growth, rising family and personal incomes, and more leisure time will contribute to job growth.

Employment in restaurants is expected to grow rapidly, with the growing demand for restaurants offering table service and more varied menus requiring more highly skilled cooks and chefs. The popularity of fresh baked breads and pastries in fine dining establishments will spur rapid job growth for bakers.

However, employment growth for short-order and speciality fast-food cooks will be slow. Employment growth for institutional and cafeteria chefs and cooks will be fast to average and concentrated in the educational and health services sectors. There is also a trend to employ short-order and fast-food cooks instead of institutional and cafeteria chefs.

Related Occupations: Butchers, cannery workers and industrial bakers.

Food and Beverage Service Workers

Job Description: Food and beverage service workers deal with customers regardless of their workplace, which may be small, informal diners or large, elegant restaurants. They provide quality service to ensure that the patron will revisit the establishment.

Bartenders fill the drink orders that waiters and waitresses take from customers seated in the restaurant or lounge as well as orders from customers seated at the bar. They may do the following:

- mix drinks to suit a customer's taste;
- have a knowledge of dozens of drink recipes and be able to mix drinks accurately, quickly and without waste, especially during the busiest periods;
- collect payment, operate the cash register, clean up after customers have left and serve food items to customers seated at the bar;
- work at service bars in restaurants, hotels and clubs;
- operate automatic equipment to mix drinks of varying complexity at the push of a button;
- order and maintain an inventory of liquor, mixes and other bar supplies;
- arrange the bottles and glassware into attractive displays and often wash glassware used at the bar.

Cafeteria attendants stock serving tables with food, trays, dishes and silverware and may carry trays to dining tables for patrons.

Counter attendants take orders and serve food at counters. They may do the following:

- in cafeterias, serve food displayed on counters and steamtables as requested by patrons, carve meat, dish out vegetables, sauces and soups and fill cups and glasses;
- in lunchrooms and coffee shops, take orders from customers seated at the counter, transmit the orders to the kitchen, pick it up and serve the food;
- fill cups and glasses with coffee, soda and other beverages and prepare fountain specialities such as ice cream sundaes and milkshakes;
- prepare some short-order items like salads and sandwiches and wrap or place orders in containers for take-away;

- clean counters, write up itemised checks and accept payment.

Dining room attendants and bartender helpers assist waiters, waitresses and bartenders in a variety of ways:

- replenish the supply of clean dishes, glasses, linens and silverware in the restaurant dining room;
- keep the bar stocked with drink garnishes, glasses, ice and liquor;
- keep the bar equipment clean and wash glasses;
- set tables with clean tablecloths, napkins, silver-ware, glasses and dishes and serve ice water, rolls and butter to patrons;
- remove dirty dishes and soiled linen from the tables, after the meal is over.

Fast-food workers take orders from customers standing at counters at fast-food restaurants. They may do the following:

- get the ordered beverage and food items, serve them to the customer and accept payment;
- cook and package french fries, make coffee and fill beverage cups using a drink-dispensing machine.

Hosts and hostesses try to evoke a good impression of the restaurant by warmly welcoming guests. They are the restaurants' personal representatives to patrons. They may do the following:

- courteously direct patrons to where they may leave coats and other personal items and indicate where they may wait until their table is ready;
- assign guests to tables suitable for the size of their group, escort them to their seats and provide menus;
- ensure that service is prompt and courteous, the meal is enjoyable and handle complaints of dissatisfied diners;
- schedule dining reservations, arrange parties, organise any special services that are required and also act as cashier.

Waiters and waitresses take customers' orders, serve food and beverages, prepare itemised checks and sometimes accept payments. Their method of working depends on the establishment:

- in coffee shops, they provide fast, efficient, yet courteous service;
- in fine restaurants, where gourmet meals are accompanied by attentive formal service, they serve the meal at a more leisurely pace and offer more personal service to patrons;
- hand out menus, recommend a certain kind of wine to complement a particular entree and explain how various items on the menu are prepared;
- carve meats, serve flambe dishes or prepare some salads and other special dishes at the table side;
- perform duties associated with other food and beverage service occupations as well, like escorting guests to tables, serving customers seated at counters, setting up and clearing tables, and making and presenting bills or cashiering.

Education: There are no specific educational requirements for food and beverage service jobs. Those who have vocational training are at an advantage.

Personal Attributes: Possesses good communication and presentation skills; has a good memory and can handle money; is healthy, friendly and efficient.

Job Outlook: Employment growth for food and beverage service occupations will be fast. There will be plenty of job openings for food and beverage service workers and most openings will be created due to replacement needs.

Growth of the economy, population growth, rising personal incomes and increased leisure time will contribute in a big way to job growth. Since potential earnings are highest in popular restaurants and fine dining establishments, there will be keen competition for the limited number of jobs.

Growth will be different in the various food and beverage service jobs. Full service restaurants will offer a lot of jobs for dining room attendants, hosts and hostesses, and waiters and waitresses. The employment of bartenders may decline as drinking of alcoholic beverages outside the home – particularly cocktails continues to drop.

To attract and retain workers in fast-food outlets, many employers will be forced to offer higher wages, better benefits, more training and increased opportunities for advancement and full-time employment.

Related Occupations: Butlers and flight attendants.

HEALTH SERVICE OCCUPATIONS:

Dental Assistants

Job Description: The job of dental assistants is to help dentists and other specialised dental practitioners like therapists and hygienists during the examination and treatment of teeth, mouth and gums.

The work usually includes some or all of the following:

- preparing patients for dental procedures;
- recording the findings from the oral examination;
- passing instruments and materials to the practitioner when they are needed;
- keeping the patient's mouth clear of saliva, etc. with the suction and water-spraying equipment;
- cleaning and sterilising all the dental equipment and keeping the surgery itself tidy and hygienic;
- developing and mounting dental x-rays;
- making sure that dental supplies are always in stock.

If the dental clinic does not employ a receptionist, the duties might also include:

- making appointments and keeping records of treatment;
- looking after the accounts and collecting payment from patients;
- answering the telephone.

Jobs for dental assistants are found in both the private sector and government clinics and hospitals.

Education: Skills are acquired through dental courses or on-the-job training.

Personal Attributes: Able to respond to orders promptly and correctly; is methodical, good with the hands and highly meticulous about cleanliness.

Job Outlook: Dental services in Malaysia are currently expanding so job opportunities for dental assistants are good. Having had some on-

the-job experience dental assistants can choose to qualify further as a dental therapist.

Related Occupations: Dental therapists and nurses.

Nursing Assistants

Job Description: This job sometimes has other names such as nursing aides or nursing attendants. Basically it involves a wide range of tasks that support the work of the nurses; it may be in a hospital, nursing home or clinic either private or government-run. It could also be working in institutions for the the disabled, the elderly or young children.

Nursing assistants are required to help with the daily work of looking after patients such as the following:

- dressing, undressing and bathing them, distributing food trays and assisting those who cannot feed themselves;
- making beds;
- escorting patients when they go for treatment like physiotherapy or x-rays or for social activities;
- applying simple dressings under the supervision of qualified nurses.

Sometimes the job may also include:

- keeping stock of linen and stores;
- answering phone enquiries and helping visitors to find their way about.

This job almost always involves shift work which means they may be working at night and during weekends and holidays and they will be working in a team with other hospital or clinic personnel.

Education: Nursing training is preferred.

Personal Attributes: Possesses patience and tact; is strong and fit, and willing to do shift work.

Job Outlook: There is always work for nursing assistants. Because people are often unsure of what the job actually involves, turnover is high. But it is an excellent starting place for a nursing career: it gives you background knowledge of the hospital as a workplace and the opportunity to get an idea of many of a nurse's duties.

Related Occupations: Nurses and home care workers.

PERSONAL SERVICE AND BUILDING AND GROUNDS SERVICE OCCUPATIONS:

Beauty Therapists

Job Description: Beauty therapists specialise in providing treatments for the skin and the body. Nowadays, this kind of therapy is carried out not only by hand massage and applying creams and other preparations but also by using electrical instruments.

The job can involve some or all of the following:

- carrying out a skin analysis and giving advice on the selection and application of cosmetics;
- giving facials;
- giving massage treatments;
- performing eyelash and eyebrow tinting, nail extensions, manicures and pedicures;
- giving advice about skin care products and perhaps selling them;
- removing body hair by electrolysis or waxing;
- giving aromatherapy treatment;
- recognising skin conditions that require medical treatment and advising clients accordingly.

As most beauty salons are fairly small businesses it is likely that beauty therapists would also have to do the following:

- act as a receptionist and make appointments;
- keep client records.

Education: Training through beauty courses is required.

Personal Attributes: Possesses good social skills and steady hands; is healthy and well-groomed.

Job Outlook: Various types of beauty therapy are carried out in many more places than small private salons and fitness centres although opportunities should continue to be plentiful in these areas as Malaysians are becoming more health conscious and spending more and more to keep themselves fit and attractive. The luxury tourist sector also offers many opportunities for them to work at resorts, big hotels and cruise liners. The growing film and television industry also needs make-up specialists.

Related Occupations: Beauty consultants and hairdressers.

Child Care Workers

Job Description: The nature of the actual job will depend on the level of qualifications and the experience and the type of organisation the child care worker is in but, overall, she would be required to care for the emotional, physical, social, and sometimes also educational, needs of children. This might be in a day-care centre, a pre-school or kindergarten, an orphanage, even a holiday camp or hospital ward.

Child care workers do some or all of the following basic tasks:

- help children with dressing, eating and relieving themselves;
- supervise their play, making sure they come to no harm;
- guide their behaviour;
- prepare and serve them simple meals;
- provide first aid;
- keep their surroundings clean and safe.

At a more responsible level they might also do some or all of the following:

- observe and record their behaviour and development;
- plan special development programmes;
- cope with children who have special needs;
- supervise and train more junior staff or helpers.

Education: Positions that involve more responsibility may require formal training through courses on child development and early childhood education.

Personal Attributes: Possesses a genuine interest in working with children; has organisational and observational skills, and initiative; is patient, tactful and physically fit.

Job Outlook: With more and more parents going out to work there is likely to be a continued demand for good child care workers. The future should see more day-care centres in the workplace and the demand for child care workers is good.

Related Occupations: Child-minders, kindergarten teachers and youth workers.

Cleaners

Job Description: A cleaner's job is cleaning factories, hotels, offices, schools and even private homes.

Cleaners do some or all of the following:

- sweep floors and clear debris;
- wash floors with a mop or machine;
- clean walls, woodwork and windows;
- dust and polish furniture;
- clean carpets by sweeping or shampooing;
- clean bathrooms and toilets.

Some cleaning can be specialised – carpet shampooing, for example, can involve reconditioning treatments. Cleaning in factories can involve removing heavy rubbish and cleaning machinery. In hotels, a cleaner's job also involves making beds, tidying rooms and replenishing toiletries. The hours of work can be irregular and include week-ends and holidays. Cleaning is often a part-time job.

Cleaners work either for contract cleaning companies or, particularly if they work in private homes, are self-employed.

Education: No formal training is required.

Personal Attributes: Able to cope with routine work; is methodical, reliable and physically fit.

Job Outlook: There is always work for cleaners, particularly in larger towns and cities.

Related Occupation: Housemaids.

Croupiers

Job Description: Croupiers conduct various games in licensed gambling casinos.

The work involves some or all of the following:

- shuffling and dealing cards, or spinning roulette wheels;
- explaining the rules of the games to customers;
- declaring winners, paying them and collecting losing bets;
- selling tokens or chips for gambling purposes.

Personal Attributes: Possesses mathematical skills; able to work long hours and on shifts,

including weekends and public holidays; has a pleasant personality.

Education: The minimum qualification is SRP/PMR and applicants must be 18 years and above. Training is usually provided by the casino.

Job Outlook: There is only one legalised casino in Malaysia. There is not much prospects as the industry is not growing nationally but competent croupiers can take advantage of work opportunities overseas for further prospects.

Related Occupations: Bar attendants and sales assistants.

Sources of Additional Information:

Human Resource Department
Resorts World Berhad
28, Jalan Sultan Ismail
50250 Kuala Lumpur

Driving Instructors

Job Description: Driving instructors with special licences instruct individuals in the theory and practical application of driving skills in a variety of vehicles (cars, trucks, buses, etc.) up to the standard necessary for students to pass examinations and obtain the respective driving licences.

The work involves some or all of the following:

- teaching students how to steer, change gears (if manual) and observe traffic conditions;
- teaching road traffic regulations and advising students on test times.

Education: No specific educational level is required but having held a driver's, licence for a specific number of years and having undergone a medical examination, and police and traffic checks are necessary.

Personal Attributes: Possesses good eyesight and the ability to provide clear instructions; is physically fit, alert, patient and tactful.

Job Outlook: There is a steady demand for driving instructors but it is competitive with the increasing number of driving schools and self-employed driving instructors.

Related Occupations: Bus, coach, courier, delivery or taxi drivers.

Flight Attendants

Job Description: The job of a flight attendant is unique because it is carried out in a very particular situation that combines a variety of rather different duties. One set of these has to do with looking after the comfort of aircraft passengers and flight crew and another is concerned with quite specific safety aspects.

The tasks involves some or all of the following:

- welcoming passengers on board and directing them to their seats;
- seeing that they and their baggage are settled in accordance with the safety regulations;
- attending to their requests during the flight;
- serving meals and drinks;
- providing first-aid when necessary and helping those who are ill;
- responding to the special needs of children travelling alone, mothers with babies, old people, people with disabilities;
- coping with circumstances like decompression, turbulence or unruly passengers;
- carrying out procedures for emergency landings, ditchings, etc. and supervising the evacuation of passengers.

The work schedule involves shifts that cover day and night hours, weekends and holidays. Flight attendants may be away from their home base for considerable periods of time. They get sufficient time to rest and recover between long trips. Uniforms are provided from jetlag.

Education: The minimum qualification is SPM. Training is provided by the airline.

Personal Attributes: Possesses very good communication and social skills, and team spirit; is enthusiastic and well-groomed.

Particular requirements for working with airlines in Malaysia are that they should be between 18 and 25 years old, be single, have good eyesight and be at least 157.5 cm tall.

Job Outlook: There are only a limited number of these jobs and there is usually a lot of competition for them. The airlines usually advertise when they need new recruits.

Related Occupation: Public relations workers.

Florists

Job Description: Florists make floral arrangements in the form of bouquets, sprays, wreaths or vases of flowers and arrange for all sales and delivery of the floral items.

The work involves some or all of the following:

- designing the appropriate floral arrangements according to clients' requirements and occasion;
- selecting the flowers and greenery, trimming the flowers to a suitable length, and strengthening them with wire if necessary before arranging them;
- maintaining flowers in good condition;
- arranging the delivery of flowers within the city and outlying areas;
- doing management and administration work, e.g. keeping accounts;
- supervising staff.

Education: Skills are acquired through vocational courses or on-the-job training.

Personal Attributes: Possesses a good sense of colour, texture and design, and has business acumen.

Job Outlook: The demand for flowers has risen in these recent years mainly due to the people's educational background and cultural influences. Many large organisations utilise flowers to beautify the interior of their buildings and as gifts to important clients during celebrations such as Christmas, etc. However, advancement for a florist is limited unless self-employed.

Related occupations: Nursery workers and sales assistants.

Gardeners

Job Description: Gardeners work in golf courses, parks and landscaped road verges, private homes, and public and private gardens, caring for plants and lawns. They can work for themselves or for big organisations. In bigger organisations they may work in groups and be more specialised.

Their tasks include some or all of the following:

- digging beds, preparing soil and fertilising it;
- planting, weeding and watering;
- pruning trees and hedges;
- mowing lawns and trimming edges;
- building paths, ponds and rockeries;
- identifying plant pests and treating them accordingly;
- maintaining the mechanical equipment they use.

Education: No formal training is required.

Personal Attributes: Is physically fit and willing to work outdoors.

Job Outlook: Employment of gardeners is expected to increase in response to demand for gardening and landscaping services.

Related Occupations: Landscape gardeners and nursery workers.

Governesses

Job Description: A governess is a teacher who is employed to work with children in their own home.

Governesses do some or all of the following:

- plan lessons and a work timetable;
- help the children with their studies;
- organise free-time activities of a broadly educational nature;
- escort the children to visit places of interest.

The job can also involve preparing meals. Governesses are often required to live in.

Education: Those who train in child development and early childhood education have an advantage.

Personal Attributes: Possesses a genuine liking for children; has good organisational skills; is patient.

Job Outlook: As yet there is not much demand for governesses in Malaysia but openings are sometimes advertised.

Related Occupations: Child care workers, kindergarten teachers and primary school teachers.

Hairdressers

Job Description: Hairdressers take complete care of our hair and heads – washing, cutting, styling, colouring, waving – as well as giving treatments to keep the scalp healthy. In private hair salons many people begin by doing the routine and relatively unskilled work like washing hair, and move on gradually to cutting and styling as they gain experience.

The tasks they perform are some or all of the following:

- shampooing, conditioning and rinsing;
- cutting;
- special service like bleaching, colouring, straightening and waving;
- advising clients on styles;
- giving advice on hair care and hair care products;
- making appointments and accepting payment;
- selling hair care products;
- keeping the salon and all its equipment clean.

Education: Training is through hairdressing courses.

Personal Attributes: Possesses good social skills and creativity; has no skin allergies and is good with the hands; is pleasant and well-groomed.

Job Outlook: Population growth, rising incomes and a growing demand for hairdressing services will stimulate the demand for hairdressers. There are opportunities for hairdressers not only in salons but also in television studios. For a personalised service it is also possible to visit clients at home.

Related Occupation: Beauty therapists.

Home Care Workers

Job Description: Home care workers look after people who are housebound such as the elderly or disabled. They also work in hostels and other residential homes.

They do some or all of the following:

- provide assistance with the everyday things like bathing, dressing, eating or using the toilet;
- help people move around;
- keep the house clean and do household chores;

- cook meals;
- perform errands and do the shopping;
- keep people company.

The job can also involve helping mothers with babies.

Education: No formal training is required.

Personal Attributes: Possesses an interest in helping people; has emotional stability, a cheerful disposition and a sense of responsibility; is in good health and does not mind hard work; is compassionate, honest, tactful and discreet.

Job Outlook: A large number of job openings is expected for home care workers as the number of elderly people who have health problems and who can afford home care services is rising.

Related Occupations: Child-care workers and nursing assistants.

Landscape Gardeners

Job Description: The job of a landscape gardener is to build customised garden settings. The work has a considerable creative element and may involve working closely with architects, engineers, horticulturalists and town planners.

Landscape gardeners do some or all of the following:

- understand plans and drawings;
- plan and organise a schedule of work;
- build fences, paths, pergolas, ponds, walls, etc.;
- build or install barbeque pits, jogging tracks, play structures and garden furniture, etc.;
- cultivate a variety of plants;
- install drainage and irrigation systems;
- estimate and order materials.

They may sometimes have to:

- supervise the work of assistant gardeners;
- advise clients on matters concerning their garden or their plants.

Education: Courses in horticulture or botany are advantageous.

Personal Attributes: Is physically fit and enjoys working outdoors.

Job Outlook: Prospects for this kind of work are good. There is a national plan to "Green the Nation" and major landscaping projects are being undertaken by property developers and highway contractors. Most condominium developments have established gardens.

Related Occupations: Gardeners, greenkeepers and nursery workers.

Make-up Artists

Job Description: The work of a make-up artist can be highly creative. He/She can be employed in the film, television or theatre business where some very special effects may have to be created or he/she may work simply to make people as attractive as possible for a special occasion such as a wedding or a modelling assignment.

A make-up artist does some or all of the following:

- prepares the skin and applies make-up;
- has a thorough knowledge of the cosmetic products available;
- advises the client on cosmetic products;
- demonstrates how to use these products to the best effect.

For film, television or theatrical purposes a make-up artist might also have to do the following:

- design masks, prosthetics (false noses, etc.), wigs;
- use cosmetics creatively to suggest ageing, scars, wounds, etc.

You would be working irregular hours and need to travel to different locations. Many professional make-up artists are self-employed.

Education: Training is through beauty courses.

Personal Attributes: Possesses a good eye for colour; able to work irregular hours and travel to different locations; is artistic, creative, resourceful, patient, tactful and well-groomed.

Job Outlook: In Malaysia film-making is a growing industry at present with new production companies opening up to cope with the demand from television companies and advertising agencies. Openings for less specialised work are

available in fashion promotion and in cosmetics retailing.

Related Occupation: Beauty therapists.

PROTECTIVE SERVICE OCCUPATIONS:

Armed Forces Occupations

Job Description: The mission of the Armed Forces has several elements:

- to deter aggression and defeat attack against the nation;
- to strengthen and build alliances;
- to prevent a hostile power from dominating a region critical to our interests;
- to prevent conflicts by reducing sources of regional turmoil through various means, including humanitarian aid, counter terrorism or limiting the spread of militarily significant technology.

The Army manages land-based defence, while the Air Force provides air and space defence. The Navy organises and trains forces primarily for sea defence.

Armed forces personnel handle a wide variety of jobs, with the duties being divided between the officers and enlisted personnel.

Infantry, gun crews and seamanship specialists are the backbone of the Armed Forces.

- Officers plan and direct military operations, supervise security activities and serve as combat troop leaders.
- Enlisted personnel serve as aircraft crew members, armoured vehicle operators, artillery crew, combat engineers, demolition experts, infantrymen, rocket specialists, special operations forces and weapons specialists.

Military personnel assigned to electronic equipment repair occupations are responsible for maintaining and repairing many different types of equipment.

- Officers manage the regular maintenance and repair of air traffic control, avionics, communications and radar equipment.
- Enlisted personnel repair flight control, naviga-

tion, missile guidance and radio equipment as well as telephones, teletype and data processing equipment.

Most skills are directly transferable to jobs in the civilian sector, for example, *military communications and intelligence specialists* have engineering and civilian scientific counterparts.

- Officers serve as cryptologists, information analysts, intelligence gatherers, science and engineering researchers, and translators.
- Enlisted personnel work as air traffic controllers, computer programmers, interpreters and translators, and radio, radar, and sonar operators.

Health professions training obtained in the military is usually recognised in the civilian sector service. Trained health professionals are eligible to apply for certification or registration and all *military medical and dental occupations* have civilian counterparts.

- Medical officers are usually dentists, nurses, optometrists, pharmacists, physicians, therapists, veterinarians and other related specialists in health diagnosing and treating occupations.
- Enlisted personnel are trained to work as dental assistants, emergency medical technicians, medical laboratory technologists and technicians, optical assistants, pharmaceutical assistants, radiological technologists, sanitation specialists and veterinary assistants.

Military experience in other *technical and allied specialty occupations* is also usually directly transferable to civilian life.

- Officers could specialise in a variety of work areas as band directors, mapping directors, meteorologists, and television and motion picture directors.
- Enlisted personnel are trained to work as divers, explosives disposal specialists, illustrators, mapping and surveying specialists, motion picture camera operators, musicians, photographers and weather data collectors.

Functional support and administrative occupations in military service require the same skills as similar

jobs in private businesses and government agencies.

- Officers perform as accountants, adjutants, administrative officers, budget officers, computer systems managers, directors, executives, finance officers, hospital administrators, inspectors, lawyers, personnel managers, public affairs officers and training administrators.
- Enlisted personnel in this category work as accounting clerks, chaplain assistants, computer operators, computer programmers, counselling aides, electric accounting machine operators, payroll clerks, personnel clerks, stenographers, storekeepers and typists.

Personnel in electrical and mechanical equipment repair occupations maintain aircraft, motor vehicles and ships. Skills obtained in these jobs are readily transferable to those in the civilian sector.

- Officers manage the maintenance of aircraft, conventional and nuclear-powered ships, earth-moving equipment, missiles, trucks and other vehicles.
- Enlisted personnel serve as boiler technicians, engine specialists and mechanics. They also install and maintain wire communications systems such as telephones.

Education: Military school training is essential.

Personal Attributes: Possesses certain minimum physical standards such as age, height, weight, vision and overall health.

Job Outlook: Employment prospects will be good in all branches of the Armed Forces.

Military personnel enjoy more job security than their civilian counterparts. Satisfactory job performance generally assures one of steady employment and earnings.

Correction Officers

Job Description: Correction officers are in charge of security and safety of persons who have been arrested, are awaiting trial or other hearing or who have been convicted of a crime and sentenced to serve time in a correctional institution.

They usually do some or all of the following work:

- guard prisoners in small municipal jails or precinct station houses where they have wide ranging responsibilities;
- control inmates in large State and Federal prisons where job duties are more specialised;
- guard aliens being held by the Immigration and Naturalisation Service before being released or deported;
- maintain order within the institution and enforce rules and regulations;
- ensure that inmates are orderly and obey rules, and monitor inmates' activities including bathing, eating, exercising and working;
- assign and supervise inmates' work assignments as well as instruct and help them on specific tasks;
- if necessary, search inmates and their living quarters for drugs or weapons, to settle disputes between inmates and enforce discipline;
- staff security positions in towers and at gates to prevent escapes and count inmates periodically to make sure no one is missing;
- inspect the facilities to assure the safety and security of the prisoners, and check cells and other areas of the institution for unsanitary conditions, fire hazards and evidence of infractions of rules;
- routinely inspect gates, grille doors, locks and window bars for signs of tampering;
- give oral and written reports on inmate conduct and on the quality and quantity of work done by inmates, report disturbances, violations of rules or any unusual occurrences and maintain a daily record of their activities;
- monitor the activities of prisoners from a centralised control centre with the aid of closed circuit television cameras and a computer tracking system;
- escort inmates to and from cells and other areas, and admit and accompany authorised visitors, within the institution;
- escort prisoners between the institution and courtrooms, medical facilities and other points;
- occasionally inspect mail for contraband (prohibited items), administer first aid or assist police authorities by investigating crimes committed within the institution and by searching for escaped inmates;
- arrange a change in a daily schedule so that inmates can visit the library, help inmates get

news of their families, talk over personal problems that may have led to committing a crime or suggest where to look for a job after release from prison;

- supplement the counselling that inmates receive from psychologists, social workers and other mental health professionals, undergo specialised training to have a more formal counselling role and may lead or participate in group counselling sessions.

Correction officers may specialise in a variety of areas.

- *Bailiffs* guard offenders and maintain order in courtrooms during proceedings.
- *Bodyguards* escort people and protect them from injury or invasion of privacy.
- *Correction sergeants* directly supervise correction officers. They usually are responsible for maintaining security and directing the activities of a group of inmates during an assigned watch or in an assigned area.
- *House or store detectives* patrol business establishments to protect against theft and vandalism and to enforce standards of good behaviour.
- *Police officers and deputy sheriffs* maintain law and order, prevent crime and arrest offenders.
- *Probation officers* counsel offenders, process their release from correctional institutions and evaluate their progress in becoming productive members of society.
- *Recreation leaders* organise and instruct offenders in sports, games, arts and crafts.
- *Security guards* protect government, commercial and industrial property against fire, illegal entry, theft and vandalism.

Education: Educational requirements are not stringent and vary according to the type of job and employer.

Personal Attributes: Able to manage people; possesses normal vision, a sense of fairness, maturity, sensitivity and patience; is assertive, self-disciplined and responsible; is physically fit.

Job Outlook: There will be plenty of job opportunities for correction officers with employment growth being faster than the average. Replacement needs will create the majority of job openings.

Correctional institutions have traditionally experienced some difficulty in attracting qualified applicants and this situation is expected to continue, ensuring highly favourable job prospects. Additional officers will be hired to supervise and counsel a growing inmate population.

Expansion and new construction of correctional facilities will also create many new jobs for correction officers. Other factors contributing to the increasing number of correctional facilities include increasing public concern about the spread of illegal drugs and the adoption of mandatory sentencing guidelines calling for longer sentences and reduced parole for inmates.

Related Occupations: Police officers and security officers.

Fire-fighting Occupations

Job Description: Fire-fighters help protect the public against fires that take thousands of lives and destroy property worth billions of dollars. During duty hours, fire-fighters must be prepared to respond to a fire and handle any emergency that arises. Since fire-fighting is dangerous and complex, it requires organisation and teamwork.

Fire-fighters usually perform specific duties assigned by a superior officer. They may do some or all of the following:

- connect hose lines to hydrants, operate a pump or position ladders;
- change duties several times while the company is in action;
- rescue victims and administer emergency medical aid, ventilate smoke-filled areas, operate equipment and salvage the contents of buildings;
- operate increasingly sophisticated equipment and work with ambulance services that provide emergency medical treatment;
- assist in the recovery from natural disasters such as earthquakes and tornadoes and help in the control and cleanup of oil spills and other hazardous chemical incidents;
- manage fire safety in forests, locate fires from

remote fire-lookout stations and report their findings to headquarters by telephone or radio;

- work as fire rangers and patrol areas of the forest to locate and report fires and hazardous conditions, and ensure that travellers and campers are complying with fire regulations;
- control forest fires and parachute from airplanes when necessary to reach inaccessible areas;
- devise and implement fire prevention measures, train fire inspectors to inspect public buildings for fire hazards and check building plans, the condition of fire escapes and fire doors, the storage of flammable materials and other possible hazards;
- work as fire inspectors and inspect pipes, hoses and other fire apparatus to ensure that they are in working order;
- work as fire-protection engineers to identify fire hazards in homes and workplaces, and design appropriate prevention programmes and automatic fire detection and extinguishing systems;
- educate the public about fire prevention and safety measures, and organise talks on this subject before school assemblies and civic groups;
- work as fire marshalls to investigate and gather facts to determine the cause of fires when arson or criminal negligence is suspected or someone is killed or seriously injured;
- testify in court about the evidence that they have gathered;
- attend classroom training, clean and maintain equipment, conduct practice drills and fire inspections and participate in physical fitness activities;
- prepare written reports on fire incidents and review fire science literature to keep abreast of technological developments and administrative practices and policies.

Education: Applicants must meet the height, weight and eyesight requirements. They must also pass the required medical examinations.

Personal Attributes: Is physically fit; able to perform under hazardous conditions, and is not afraid of heights.

Job Outlook: There is a lot of competition for the available openings for fire-fighters due to minimum entry requirements. Other factors

include the exciting and challenging nature of the job and the opportunity to serve the public.

This situation is expected to persist and employment growth for fire-fighters will increase fast. Turnover in this occupation is very low but some jobs are created due to replacement needs. The job is fairly stable and not subject to lay-off during economic instability.

Related Occupations: Armed forces personnel and police officers.

Guards or Security Officers

Job Description: Guards or security officers, patrol and inspect property to protect against fire, theft, vandalism and illegal entry. Their tasks depend on the size, type and location of their employer.

They usually do some or all of the following:

- protect records, merchandise, money and equipment in banks, department stores, hospitals and office buildings;
- work with undercover detectives to watch for theft by customers or store employees in department stores;
- work at airports, ports and railroads and protect merchandise being shipped, as well as property and equipment, and ensure that nothing is stolen while being loaded or unloaded;
- watch for fires, prowlers and trouble among work crew, and screen passengers and visitors for weapons, explosives and other contraband;
- occasionally direct traffic;
- work in public buildings such as art galleries or museums and protect paintings and exhibits, answer routine queries from visitors and sometimes guide tours;
- work in data processing centres, factories, government, laboratories and military bases, and protect valuable information or property;
- check the credentials of persons and vehicles entering and leaving the premises;
- provide information, assist in crowd control and watch for troublemakers at conventions, social affairs, sports events and other public gatherings;
- patrol on foot or make their rounds by car or on a scooter if the property is large;
- maintain radio-contact with other guards patrolling on foot or in motor vehicles;

- operate electronic security systems to monitor perimeter security, environmental functions, communications and other systems;
- use computers to store information on security matters while on duty, like visitors or suspicious occurrences;
- check all doors and windows, see that no unauthorised persons remain after working hours and ensure that fire extinguishers, furnaces, sprinkler systems and various electrical and plumbing systems are working properly;
- sometimes set thermostats or turn on lights for janitorial workers.

Guards usually are uniformed and may carry a night-stick and gun, although the bearing of guns is decreasing. They may also carry a flashlight, whistle, two-way radio and a watch clock – a device that indicates the time at which they reach various checkpoints.

In a large organisation, a security officer often is in charge of the guard force, while in smaller organisations a single worker may be responsible for all security measures. They may specialise depending on the work they do.

- *Armoured car guards* protect money and valuables during transit.
- *Bodyguards* protect individuals from bodily injury, kidnapping or invasion of privacy.
- *University, park or recreation guards* may issue parking permits and direct traffic.
- *Bouncers* patrol places of entertainment such as nightclubs to preserve order among customers and to protect property.
- *Golf course patrollers* prevent unauthorised persons from using the facility and help keep play running smoothly.

Education: The focus is not on educational requirements. Ex-army or police personnel are at an advantage.

Personal Attributes: Possesses keen observation skills and is physically fit; able to deal with people; is responsible and trustworthy.

Job Outlook: Plenty of jobs will become available and the high turnover and the occupation's large

size will contribute to growth in number of openings. There is a lot of scope for part-time or second jobs at night or at weekends.

Increased concern about crime, terrorism and vandalism and rising levels of business investment in expensive ventures will spur the demand for security guards in and around offices, plants, recreation areas and stores.

Job growth will be concentrated among contract security guard agencies since engaging the services of a security guard firm is easier and less costly than assuming direct responsibility for hiring, training and managing a security guard force.

Related Occupations: Correction officers, house or store detectives, police officers, prison officers and private investigators.

Life Guards

Job Description: Life guards coordinate safe and enjoyable recreation for people at beaches or swimming pools through public relations, public education, accident prevention measures and rescue.

The work involves some or all of the following:

- ensuring that swimmers adhere to all safety regulations to prevent accidents;
- rescuing swimmers in difficulty and providing first aid treatment when required;
- providing information through educational materials or talks to the community regarding water safety;
- implementing emergency procedures when necessary;
- ensuring that rescue equipment is well-maintained and undertaking water quality control measures.

Education: Life guard and first aid certificates, with valid annual maintenance of the qualifications, are required.

Personal Attributes: Is physically fit and alert.

Job Outlook: Lifeguards are usually employed by commercial pool owners or club owners.

Related Occupations: Fitness instructors, recreation officers and sportspersons.

Police Officers, Detectives and Special Agents

Job Description: Police officers, detectives and special agents are responsible for a variety of duties that include controlling traffic, and preventing and investigating crimes. In most jurisdictions, whether on or off duty, these officers are expected to exercise their authority whenever necessary. Police officers and detectives are also becoming more involved in community relations — increasing public confidence in the police and mobilising the public to help them fight crime.

Police officers and detectives may do some or all of the following:

- direct traffic at the scene of a fire, investigate a burglary or give first aid to an accident victim, in small communities and rural areas;
- perform specific duties in a large police department, for example, to do patrol or traffic duty, or to do special work like accident prevention;
- specialise in chemical and microscopic analysis, firearms identification and hand writing, and fingerprint identification;
- work with special units such as canine corps, harbour patrols, helicopter patrols, mobile rescue teams, mounted and motorcycle police and youth aid services;
- attempt to become thoroughly familiar with conditions throughout their area and while on patrol, remain alert for anything unusual;
- note suspicious circumstances such as open windows or lights in vacant buildings as well as hazards to public safety such as burned-out street lights or fallen trees;
- enforce traffic regulations and also watch for stolen vehicles;
- regularly report to police headquarters from call boxes, radios or telephones;
- write reports and maintain police records and testify in court when their arrests result in legal action;
- work as division or bureau chiefs and take responsibility for training or certain kinds of criminal investigations;
- command police operations in an assigned area and perform administrative and supervisory duties.

Detectives and special agents are plainclothes investigators who gather facts and collect

evidence for criminal cases. They may do the following:

- conduct interviews, examine records, observe the activities of suspects and participate in raids or arrests;
- undergo specialised training to work on cases related to their particular background, like agents with an accounting background may investigate bankruptcies, embezzlements or fraudulent land deals;
- testify in court about cases that they investigate.

There are various specialists in this field.

Customs agents enforce laws to prevent smuggling of banned goods across borders.

Firearms agents investigate suspected illegal sales of guns or the underpayment of taxes by a liquor or cigarette manufacturer.

Highway patrol officers patrol highways and enforce laws and regulations that govern their use. They may do the following:

- issue traffic citations to motorists who violate the law;
- manage the scene of an accident, direct traffic, give first aid, call for emergency equipment including ambulances and write reports on the incident;
- provide services to motorists on the highways, like radioing for road service for drivers with mechanical trouble, directing tourists to their destination or giving information about lodging, restaurants and tourist attractions;
- provide traffic assistance and control during fires, road repairs and other emergencies as well as during special occurrences such as parades and sports events;
- check the weight of commercial vehicles, conduct driver examinations and give information on highway safety to the public;
- enforce criminal laws in communities and counties that do not have a local police force.

Internal revenue service special agents collect evidence against individuals and companies that are evading the payment of taxes.

Secret service agents protect important leaders, politicians and their immediate families, and visit-

ing foreign dignitaries. They also investigate counterfeiting, the forgery of Government checks or bonds and the fraudulent use of credit cards.

Education: SPM or equivalent is required. Applicants must pass the necessary medical examinations and undergo training.

Personal Attributes: Possesses a sound character and integrity.

Job Outlook: Growth in employment opportunities for police officers, detectives and special agents will be slow despite a more security-conscious society and growing concern about drug-related crimes. Factors contributing to this include budgetary constraints, increased responsibilities of private security firms and low turnover. However, job openings will be created due to replacement needs. Persons having college training in law enforcement should have the best opportunities.

The level of government spending influences the employment of police officers, detectives and special agents. The number of job opportunities can vary from year to year and from place to place, but layoffs are rare.

Related Occupations: Guards, prison officers, probation officers and security officers.

Private Investigators

Job Description: Private investigators are hired by clients to conduct investigations and prepare evidence for court proceedings.

The work involves the following, depending on the nature or type of investigation:

- searching for missing persons or witnesses;
- observing, conducting surveillance and recording all findings;
- taking videos or photographs for evidence;
- working undercover in organisations to obtain specific information;
- researching and gathering information for use in court;
- conducting asset and liability checks;
- giving advice on corporate and personal security;
- assisting in the investigation of debt matters, insurance on workers compensation claims, stolen properties, etc.

Education: Completed SPM or equivalent. Experience as an ex-police officer is advantageous.

Personal Attributes: Possesses strong observational skills; has a good character; is discreet, mature and responsible.

Job Outlook: Most private investigators are self-employed.

Related Occupations: Police officers and security officers.

AGRICULTURE, FORESTRY, FISHING AND RELATED OCCUPATIONS

Animal Attendants

Job Description: Animal attendants look after all kinds of animals in many different settings – animal shelters, boarding kennels and catteries, medical research institutions, nature parks and pet shops, veterinary clinics and zoos. What you would be expected to do would vary depending on where you are working but the basic tasks would be to:

- feed and water animals;
- keep living and sleeping quarters clean and disinfected;
- bathe and groom the animals and treat them for insect pests;
- treat minor injuries.

In some circumstances you might also have to:

- rescue injured and neglected animals;
- put animals down and handle those that have died;
- keep records;
- deal with the animals' owners and members of the public.

In some jobs, such as at a boarding kennel, you would also have to groom and exercise the animals and if you work in a pet shop you would probably have to serve at the counter. In some jobs, too, you would be expected to work during weekends and holidays. Much of your time could be spent outdoors.

Education: There are no formal education requirements. On-the-job training is provided.

Personal Attributes: Possesses a genuine interest in animals; is not allergic to animal fur or hair; is disciplined enough to do the same tasks many times over.

Job Outlook: Employment opportunities are good as concern for animal welfare increases. It is an ideal job for those looking for temporary or part-time work.

Related Occupations: Dog handlers and trainers, gamekeepers, horse trainers, poultry breeders, stable hands and veterinary assistants.

Dog Trainers

Job Description: Dog trainers train dogs to perform specific skills, usually within a 4 to 5-week period.

The work involves some or all of the following:

- training dogs to obey commands;
- teaching dogs to perform functions useful in police work, the defence forces and customs such as to attack aggressors, to track down missing people or to sniff out drugs;
- curing dogs of bad habits such as chasing cars, aggression towards children, barking too much or digging holes in unwarranted areas;
- conducting training classes for owners and their dogs.

Education: Considerable experience with dog is required. A first aid certificate and basic animal nursing training are helpful. The police or customs service departments may choose potential dog trainers from within their services and conduct internal training courses.

Personal Attributes: Possesses a liking for dogs; is physically fit, alert and responsible.

Job Outlook: Dog trainers usually work in partnership with the customs services, police, defence forces, security companies, dog kennels or on a voluntary basis.

Related Occupations: Animal attendants, guide dog instructors, horse trainers and training officers.

Farmers and Farm Managers

Job Description: Farming involves raising animals

and/or growing crops, and cultivating fruit or vegetables.

The work involves some or all of the following:

- feeding of livestock, and handling and transporting them;
- monitoring their health and administering medication;
- keeping records of their condition and body weight;
- keeping their quarters clean;
- maintaining the farm buildings, fences, etc.;
- operating and maintaining farm machinery;
- planting, harvesting and selling crops;
- handling and applying acceptable fertilisers;
- managing the business side of farming, keeping the books, and controlling income and expenditure;
- directing and supervising the work of helpers.

The difference between a farmer and a farm manager is that the farmer usually owns or leases the land while the farm manager is employed to work someone else's land.

Many of the tasks are seasonal.

Education: Farm experience is more important than formal training. However, it is advantageous for a farm manager to have a bachelor's degree in agriculture.

Personal Attributes: Possesses managerial and organisational skills, and a practical approach to solving problems; is physically fit and likes outdoor work.

Job Outlook: Employment of farmers and farm managers is expected to continue to decline.

Related Occupation: Horticulturalists.

Fishermen

Job Description: Fishermen catch and sell fish and shellfish either inshore (close to the land) or deep-sea (on larger boats that go further out). Deep-sea fishing is done with nets but in shallower waters various kinds of fish traps, lines and pots are also used.

An inshore fisherman does some or all of the following:

- sets nets, or traps of baited pots;
- sorts the catch;
- transports and sells the catch;
- repairs nets;
- constructs and repairs standing fish traps;
- handles small boats and outboard engines;
- constructs and maintains floating platforms;
- feeds the growing molluscs that attach to it.

On deep-sea fishing boats a fisherman also does some or all of the following:

- operate winching machinery;
- keep the decks clean;
- drop and weigh anchor and handle ropes;
- cook meals;
- undertake safety and rescue procedures.

Some of the fish (ikan bilis, for instance) is cooked while at sea. On all boats, and particularly sea-going ones, the captain is responsible for the way everything is done and for deciding who does it. Individuals are sometimes given specific tasks including steering the boat. Deep-sea fishing boats are usually at sea for at least three days, sometimes longer.

Education: Experience is more important than formal training.

Personal Attributes: Possesses an understanding of computerised fish-finding and navigation equipment; is comfortable being at sea and living on a boat for days at a time.

Job Outlook: Employment of fishermen is expected to increase slowly. Many operations are currently at or beyond maximum sustainable yield, limiting potential for occupational growth.

Related Occupation: Fish farmers.

Forest Workers

Job Description: Forest workers do a variety of tasks associated with the management of forests and woodlands including the cutting and removing of timber.

They do some or all of the following:

- prepare sites for planting;
- raise and transplant seedlings;

- monitor plants for pests and treat them accordingly;
- prune and thin out excess growth;
- collect seeds;
- build and repair buildings, fences and paths;
- operate and maintain machinery and vehicles;
- fell trees with due regard to safety precautions;
- keep records;
- prepare logs for transportation;
- observe procedures for preserving the environment and wildlife.

Forest workers usually work in teams.

Education: Skills are acquired through on-the-job training.

Personal Attributes: Possesses an interest in trees and the environment; is good at solving practical problems; enjoys outdoor work and is physically fit.

Job Outlook: Little change in the overall employment of forest workers is expected. Despite an increase in demand for lumber and wood products, increased mechanisation of logging operations and improvements in logging equipment will depress the demand for workers.

Related Occupations: Gardeners and nursery workers.

Timber or Forest Products Workers

Job Description: Forest product workers are employed in timber and timber processing mills that cut, dry and dress timber and make it into beams, frames, moulding and many other products. Some mills specialise while others make a full range of products including hardboard, laminates, paper, plywood and pulp. In general the industry now uses highly sophisticated machinery in many of its processes.

The work involves some or all of the following:

- cutting logs to make timber;
- kiln drying;
- stacking timber for transportation;
- operating machinery in the production process;
- operating forklifts.

Some timber mills are situated far from towns.

Education: Skills are acquired through on-the-job training.

Personal Attributes: Is physically fit and safety-conscious.

Job Outlook: This is a buoyant sector of industry particularly in East Malaysia.

CONSTRUCTION TRADES AND EXTRACTIVE OCCUPATIONS

Bricklayers

Job Description: Bricklayers repair and build very attractive yet highly durable structures such as floors, partitions or walls using masonry material like clay bricks, concrete blocks and pre-cast stone. Their work can range from laying a simple masonry walkway to the complex job of installing the ornate exterior of a high-rise building.

Their work usually includes some or all of the following:

- building brick arches and other ornamental brickwork;
- filling mortar in cavities, removing extra mortar and checking alignment of bricks;
- following designs from a blueprint to cut or saw, and place bricks around openings like doors, windows, etc.;
- installing firebrick linings in industrial furnaces;
- operating brick-cutting machines and erecting scaffolding;
- repairing imperfections and cracks, replacing broken or missing masonry in walls and floors, and sealing foundations against dampness using special material;
- using jointing tools for a uniform and neat finish.

Bricklayers are assisted by hod carriers, or helpers, who bring bricks and other materials, mix mortar, and erect and remove scaffolding.

Education: Training is usually through apprenticeship.

Personal Attributes: Able to follow plans and work at heights; is fit and healthy and good with the hands.

Job Outlook: Jobs in the construction field are

dependent on the economy, which indirectly controls all construction activity. Population and business growth will create a need for new factories, hospitals, offices, schools and other structures.

Related Occupations: Concrete workers, plasterers, stonemasons, terrazzo workers and tile setters.

Cabinet Makers

Job Description: Cabinetmakers make or repair furniture made of timber or timber-based products. They also assemble furniture for homes, offices and commercial establishments, and in factories.

They may do some or all of the following:

- choose and prepare the timber or board, and cut the pieces to size using a variety of wood-working tools;
- fit the pieces together, clamp the sections and strengthen the joints with nails, screws, etc.;
- assemble the product and finish it using catches, fit hinges, locks, lacquer or varnish and polish;
- install it in the specified customer location;
- repair damaged articles of furniture;
- study customer specifications and draw plans, or make them based on original designs;
- supervise workers and training;
- design and develop prototypes for assembly-line furniture.

Specialisations are normally based on the type of furniture being produced.

Education: Skills are acquired through apprenticeship or vocational courses.

Personal Attributes: Able to follow written instructions and be highly accurate; is good in mathematics and with the hands.

Job Outlook: Work is available in factories and furniture shops specialising in made-to-order furniture. If the capital is available self-employment is an excellent option.

Related Occupations: Carpenters or joiners, wood carvers and wood machinists.

Carpenters or Joiners

Job Description: Carpenters and joiners cut, fit, and assemble wood and other materials. Carpenters also help in the construction of boats, bridges, buildings, docks, highways, industrial plants and many other structures. Joiners usually work on internal fittings like doors, sashes, staircases and window frames.

The work of carpenters may involve some or all of the following:

- using blueprints or instructions from supervisors to measure and mark the layout, and arrange materials;
- being aware of local building codes which specify where certain materials can be used;
- cutting and shaping ceiling tile, drywall, fibre-glass, plastic and wood, using hand and power tools, joining the materials and finally checking the accuracy of their work to make adjustments if required;
- working with prefabricated components, such as stairs or wall panels, which are usually installed in a single operation;
- doing a variety of other installation and maintenance work like installing partitions, replacing panes of ceiling tiles and glass as well as repairing furniture.

The work of joiners may involve some or all of the following:

- making architectural joinery and staircases;
- manufacturing items like doors, sashes and window frames;
- studying plans and drawings, selecting materials and identifying components required for specific designs.

Carpenters can work in different areas of specialisation depending on their employer.

- In *manufacturing firms*, carpenters may assist in moving or installing machinery.
- Carpenters employed by a *special trade contractor* can specialise in setting forms for concrete construction or erecting scaffolding.
- Carpenters working for *general building contractors* usually frame walls and partitions, hang kitchen cabinets, install panelling and tile

ceilings, and put in doors and windows.

Joiners can work with firms specialising in joinery and usually indoor work is involved.

Education: Training is usually through vocational courses and/or apprenticeship.

Personal Attributes: Possesses basic skills in mathematics; able to work as a team; has a good head for heights, a sense of balance, good health and eyesight.

Job Outlook: The job market for carpenters and joiners is heavily dependent on the economy and thus the building activity. There will be plenty of jobs available for carpenters or joiners as construction activity will increase because of the demand for new housing, commercial and industrial plants, and the need to renovate and modernise existing structures. However the increasing use of easy-to-install prefabricated components may somewhat affect the job market, so newcomers should expect to experience periods of unemployment.

Related Occupations: Cabinet makers and wood machinists.

Carpet Installers

Job Description: Carpet installers fit, install and repair carpets in homes, offices, restaurants, stores and other buildings. Hotels, motels and shopping centres often cover concrete floors with wall-to-wall carpet. The work includes some or all of the following:

- inspecting the floor for any imperfections before installing the carpet and correcting them if necessary;
- measuring the area to be carpeted, planning the layout of the carpet (for best appearance and maximum wear);
- laying, tacking or taping a cushion or underlay for wall-to-wall carpets, measuring and cutting the carpet to size, installing the carpet, trimming the excess and finally attaching the carpet to a stripping to hold it in place;
- taping or sewing sections together for wall-to-wall installations in large rooms using specialised sewing equipment or material.

Carpet installers use hand tools such as drills, ham-

mers, rubber mallets, and staple guns as well as carpet-laying tools such as carpet knives. Working conditions are strenuous and dusty.

Education: Training is usually through apprenticeship.

Personal Attributes: Is physically fit, strong and open to manual work.

Job Outlook: Employment opportunities for carpet installers are expected to be good. This is due to the continued need to renovate and refurbish existing locations, and a growing demand for carpeting in new hospitals, industrial plants, schools and other places. Moreover, new fibres are being developed that are more durable, stain and crush resistant and come in fashionable colours. They will contribute to the growing demand for carpets and for carpet installers.

Related Occupations: Floor layers, lathers and tile setters.

Concrete Masons and Terrazzo Workers

Job Description: Terrazzo workers create attractive floors, panels, patios and walkways by exposing marble chips and other fine particles on the surface of finished concrete. The work is similar to that of concrete masons who work with concrete for bridges, buildings, roads and tunnels, using a variety of machinery and power tools.

Concrete workers may do some or all of the following work:

- prepare a site for placing concrete, supervise casting and spreading of the concrete, and level the freshly placed concrete; after the concrete has been levelled and floated, finishers work on it to produce different finishes like a smooth finish, coarse non-skid finish or pebble finish and finally wash it with a mild acidic solution;
- operate various machines used to prepare large areas of concrete;
- treat, smooth and coat exposed concrete surfaces such as ceilings, columns and wall panels to a uniform finish.

Attractive, marble-chip terrazzo requires three layers of materials. Terrazzo workers may do some or all of the following:

- build a solid, level concrete foundation 3 to 4 inches deep, remove the forms from the foundation and place a 1-inch deep mixture of sandy concrete;
- partially embed metal ferrule strips into the concrete wherever there is to be a joint or change of colour in the terrazzo, before this layer sets, to help prevent cracks and to separate the different designs and colours of the terrazzo panels;
- blend and place a fine marble chip mixture that may be colour-dyed into each of the panels for the final layer, level each panel carefully and toss additional marble chips of various colours into each panel while it is still wet and then roll a lightweight roller over the entire surface;
- grind the surface when completely dry with a terrazzo grinder for a smooth, uniform surface;
- clean, polish and seal the dry surface for a lustrous finish.

Education: Training is usually through apprenticeship.

Personal Attributes: Possesses a basic knowledge of mathematics and technical drawing skills; is strong and physically fit.

Job Outlook: The demand for concrete masons and terrazzo workers will increase as the population and economies grow. More masons will be needed to build new bridges, buildings, factories, highways, hospitals, hotels, office buildings, schools and shopping centres, and repair existing structures. In addition, the increasing use of concrete as a building material will add to the demand. But rising productivity due to improved materials, equipment and tools may affect the demand for workers.

Related Occupations: Bricklayers, marble setters, stonemasons and tile setters.

Electricians

Job Description: Electricians install and maintain electrical systems for a variety of purposes, including climate control, communications and security.

Electricians may do some or all of the following:

- install, replace and maintain the electronic controls for machines in business and industry;

- study blueprints indicating the location of circuits, load centres, outlets, panel boards and other equipment, to install electrical systems in factories, homes, office buildings and other structures;
- place conduit pipes or tubing inside designated partitions, walls or other concealed areas, fasten small metal or plastic switch boxes to the wall and connect the wiring to various components to complete the circuit;
- test the circuits for proper connections;
- install coaxial or fibre optic cable and other wiring for computers and other telecommunications equipment;
- inspect equipment regularly, locate and rectify problems before breakdowns occur and in case of a breakdown undertake the necessary repairs or replacement quickly and efficiently to minimise inconvenience;
- advise management whether continued operation of equipment could be hazardous;
- use hand tools such as pliers, screwdrivers, etc. as well as power tools and test equipment like ammeters, oscilloscopes and test lamps.

Electricians usually specialise in either construction or maintenance, while a growing number do both. They sometimes work with engineers, engineering technicians or industrial machinery repairers when their work involves complex electronic devices.

Education: Training is usually through vocational courses and/or apprenticeship.

Personal Attributes: Possesses agility and dexterity; has good colour vision; is in good health.

Job Outlook: The growing population and economy will create jobs for electricians. They will be needed to install and maintain, or rework, electrical devices and wiring in homes, factories, offices and other structures. New technologies also are expected to continue to stimulate the demand for these workers.

Despite the employment outlook for electricians being very good, people opting for jobs as construction electricians should be prepared for periods of unemployment. This is due to the unpredictable nature of the construction industry. Apprenticeship opportunities are not so good either.

Maintenance electricians working in the

automotive and other manufacturing industries that are dependent on the economy may also be laid off during recessions. Efforts to reduce operating costs and increase productivity may limit opportunities. But this may open up the market for contractual work.

Related Occupations: Air-conditioning mechanics, cable installers and repairers, electronics mechanics and elevator constructors.

Glaziers

Job Description: Glaziers choose, cut, shape and install all varieties of glass as well as plastics and other glass substitutes to be used in display cabinets, doors, furniture, mirrors, windows or windscreens. Glaziers use their knowledge of construction materials and techniques to install glass. The work essentially involves three steps — cutting the glass, smoothing the edges and fitting or glazing it into place.

Glaziers may do some or all of the following work:

- install bathtub enclosures, mirrors and shower doors, and glass for display cases and table tops;
- study drawings and plans to estimate the amount of glass required;
- mount steel and aluminium sashes or frames and attach locks and hinges to glass doors;
- build the metal framework needed to install glass panels or curtain walls in large commercial buildings;
- measure, mark and cut the glass manually at the job site with special hand tools such as glass cutters, glazing knives and suction cups;
- smoothen the glass, polish the edges of the glass and fit it using putty, rubber strips or chemical compounds;
- use power tools such as cutters, drills, grinders and saws;
- make decorative edges and carve designs on the glass;
- make stained glass and feature mirrors;
- use computers in the shop or at the job site to improve layout work and reduce waste of glass.

Glaziers can specialise as:

- *furniture tradespeople*, who fit glass into pre-

fabricated products or during assembly of furniture;

- *glass bevellers*, who smooth the edges of mirrors and other glass items using abrasive belts and grinding wheels;
- *glass cutters*, who cut glass manually to get specified sizes or shapes, and remove blemishes;
- *glass embossers*, who engrave designs on glass using various techniques;
- *glass silverers*, who make mirrors;
- *structural glass tradespeople*, who cut, fit and install glass into doors, display areas or windows in buildings and interiors.

Education: Training is usually through apprenticeship.

Personal Attributes: Possesses the ability to calculate and measure accurately; has good hearing, steady hands and a head for heights.

Job Outlook: Employment opportunities for glaziers are expected to grow due to anticipated increases in residential and non-residential construction and a need to modernise and repair existing structures. The popularity of glass, and improved glass performance in condensation control, insulation, noise reduction, privacy and safety will also spur the demand for glaziers.

Glaziers' jobs are dependent on construction activity, which in turn fluctuates with the local economy. This could lead to more workers than jobs in some area and the opposite in others. In metropolitan areas, employment and apprenticeship opportunities will be readily available since most glazing contractors and glass shops are located here.

Related Occupations: Bricklayers, carpenters, floor layers, terrazzo workers and tile setters.

Insulation Workers

Job Description: Insulation workers install insulating material in refrigerated storage rooms, tanks, vats, vessels, boilers, and steam and hot water pipes to prevent the wasteful transfer of heat. They combine a knowledge of insulation

materials with the skills of cutting, fitting, and installing materials.

Insulation workers may do some or all of the following work:

- use cement, staples, wire, tape or spraying to install insulation;
- insulate steam pipes, fasten insulation in place and fix protective covering in place;
- insulate walls or other flat surfaces by first spraying foam insulation onto a wire mesh and then applying a final coat of plaster to provide a good finish;
- remove the old insulation before installing the new one;
- remove asbestos, which is hazardous to health, follow carefully prescribed asbestos removal techniques and work practices, and use hand tools and special filtered vacuum cleaners and air-filtration devices;
- use common hand tools like knives, pliers, saws, scissors and stapling guns as well as machine tools like power saws to cut insulating materials, welding machines to join sheet metal or secure clamps, and compressors to blow or spray insulation.

Insulation workers usually do not lose work time when weather conditions are poor. Most insulation is applied after buildings are enclosed.

Education: On-the-job training is required.

Personal Attribute: Is physically fit.

Job Outlook: Employment growth for insulation workers will be much faster than other occupations due to the demand for insulation for newly constructed structures and renovation. The demand for asbestos removal in existing structures and replacing it with another insulating material will also add to employment requirements.

Insulation workers in the construction industry should be prepared for periods of unemployment. However, workers employed in industrial plants have a more stable job because maintenance and repair must be done on a regular basis.

Related Occupations: Carpenters, carpet installers, floor layers and roofers.

Painters and Decorators

Job Description: Painters and decorators work on surfaces of walls to treat, decorate or protect them. They apply paint, varnish, wallpaper and other finishes to clean, brighten and protect interior and exterior walls from wear and exposure to weather.

Painters usually do some or all of the following work:

- apply appropriate finishes like paint, stain and varnish to buildings and other structures in accordance with customer specifications and other factors;
- clean and prepare the surfaces to be covered so the paint can be applied properly;
- apply a primer or sealer on new surfaces to prepare them for the last coat;
- mix paints and matching colours, relying on knowledge of paint composition and colour harmony;
- apply decorative paint finishes;
- choose the right paint applicator and tools for each job, considering various factors like the surface to be covered, the desired finish, etc.;
- erect scaffolding like "swing stages" when painting tall buildings, and a "bosun chair" to paint steeples and other conical structures.

Decorators cover walls and ceilings with decorative wall coverings made of fabric, paper or vinyl. Their work involves some or all of the following:

- estimating the amount of material required;
- preparing the surface to be covered by sealing it to enable the covering to stick better;
- removing the old covering when redecorating by soaking, steaming or applying solvents;
- patching holes and getting rid of other imperfections before hanging the new wall covering.

Education: Training is usually through apprenticeship.

Personal Attributes: Possesses normal colour vision, good health and a head for heights.

Job Outlook: Employment opportunities for painters and decorators are expected to grow due mainly to new construction and renovation of

existing buildings. Prospects for persons seeking jobs as painters or decorators should be quite favourable because of the minimal training requirements. A lot of jobs will also be created as painters and decorators transfer to other occupations or leave the labour force.

However, some periods of unemployment can be expected because of the unstable nature of construction activity. Remodelling, restoration and maintenance work does offer many jobs to painters and decorators even when levels of new construction activity decline.

Related Occupations: Billboard posterers, metal sprayers, plasterers, screen printers, sign writers and undercoaters.

Plasterers

Job Description: Plasterers apply plaster to interior walls and ceilings to form fire-resistant and relatively soundproof surfaces. They also apply decorative coats of plaster, cement, etc. to both interiors and exteriors of buildings.

Plasterers usually do some or all of the following:

- apply plaster veneer over drywall to create smooth or textured abrasion-resistant finishes;
- apply durable plasters such as polymer-based acrylic finishes and stucco to exterior surfaces;
- install prefabricated exterior insulation systems over existing walls for good insulation and interesting architectural effects;
- estimate, cut and fix interior fibrous plaster board linings;
- make fibrous plaster moulds and sheets in factories;
- follow architectural blueprints to cast and place ornamental, wall and ceiling designs in plaster;
- cover surfaces like cinder block, concrete and metal lath (supportive wire mesh) foundations;
- using a variety of tools like brushes and trowels;
- create decorative interior surfaces by pressing a brush or trowel firmly against the wet plaster surface and using a circular hand motion to create decorative swirls;
- cover exterior surfaces like cement, concrete, lath and masonry;
- renovate plaster work in older structures and create special architectural effects such as curved surfaces, which are not practical with drywall materials;

- embed marble or gravel chips into the finish coat to achieve a pebble-like, decorative finish.

Specialists in this field include the following:

- *fibrous plasterers*, who make and fix interior linings of fibrous plaster in various buildings;
- *solid plasterers*, who apply protective or decorative coverings of plaster and similar materials to both interiors and exteriors of buildings.

Education: Training is usually through apprenticeship.

Personal Attributes: Able to do neat and accurate work; is good with the hands and hand tools; has a head for heights; is healthy and free from allergies.

Job Outlook: Employment prospects for plasterers look good as jobs will be created due to the increasing demand for plastering. The newer, affordable, fire-retardant and easy-to-use varieties of plaster have made it a popular choice for builders, thus spurring job opportunities for plasterers.

However, since plasterers work mainly in construction they may face unstable job prospects due to changes in the economy.

Related Occupations: Bricklayers, concrete masons, marble setters, painters or decorators, stonemasons, terrazzo workers and tile setters.

Plumbers and Pipe Fitters

Job Description: Plumbers and pipe fitters install, maintain and repair many different types of pipe systems like those for air-conditioning, gas pipelines, municipal water supply and waste disposal, and in power plants and manufacturing set-ups. Plumbing and pipe fitting are sometimes considered a single trade but workers normally specialise in one or the other.

Plumbers may do some or all of the following:

- install and repair gas, drainage, water and waste disposal systems in homes and commercial and industrial buildings;
- study and follow plans and then estimate the materials required;
- install and repair plumbing fixtures like

bathbubs, showers, sinks and toilets, and appliances such as dishwashers and water heaters.

Pipe fitters may do some or all of the following:

- install and repair both high and low-pressure pipe systems used in manufacturing, generation of electricity, and for heating and cooling buildings;
- specialise as steam fitters, who install pipe systems that move liquids or gases under high pressure;
- specialise as sprinkler fitters, who install automatic fire sprinkler systems in buildings.

Plumbers can specialise in a number of fields depending on their work. These include the following:

- *drainers*, who install, maintain and repair sewerage systems and storm pipes, and install holding wells, septic tanks, etc;
- *gas fitters*, who work with gas lines, meters, regulators and appliances;
- *heating and ventilation plumbers*, who install and maintain heating and cooling systems;
- *irrigation installers*, who design and implement large water supply and sprinkler systems for golf courses and parks;
- *roofing plumbers*, who fix drainpipes, gutters and metal roofs.

Education: Training is usually through apprenticeship.

Personal Attributes: Is good with the hands, comfortable with heights and physically fit.

Job Outlook: Increasing construction activity may spur a demand for these workers to install and maintain the various plumbing and pipe systems. However, most organisations tend to employ their own plumbers and pipe fitters. They are also hiring contractual labour to cut down on expenses.

The temporary nature of construction projects means that plumbers and pipe fitters sometimes experience short bouts of unemployment when the project ends. Employment and apprenticeship of these workers are very

dependent on changes in economic conditions compared to other construction trades. However, the upkeep and replacement of existing piping systems as well as the installation of fire sprinkler systems provide jobs for many pipe fitters, plumbers and sprinkler fitters, even when construction activity declines.

Related Occupations: Air-conditioning, heating and refrigeration mechanics, boilermakers and industrial machinery repairers.

Roofers

Job Description: Roofers repair, replace and install roofs to protect buildings and their contents from water damage. They work with a variety of materials like asphalt, fibreglass, gravel, metal and shingles made of asphalt, rubber, slate, tar, thermoplastic, tile, wood, etc.

They usually do some or all of the following:

- waterproof foundation walls and floors;
- work on both flat and pitched types of roofs or specialise in any one kind;
- put overlapping layers of insulation, molten bitumen and partially overlapping layers of roofing felt, and then seal the seams to make the surface watertight, repeating these steps as required;
- glaze the top layer to a smooth finish or embed gravel for a rough finish;
- cover flat roofs with a single-ply membrane of waterproof rubber or thermoplastic compounds over the roof's insulation and sealing the seams;
- apply shingles over roofs, fit them over intersecting roofs and around vent pipes and chimneys, ensuring that the finished roof is completely watertight;
- waterproof and damp-proof masonry and concrete walls and floors.

Education: Training is usually through apprenticeship.

Personal Attributes: Has good balance and a head for heights; is in good physical condition.

Job Outlook: Job prospects for roofers look good. Since roofs deteriorate faster than most other parts of buildings and need to be repaired or replaced regularly, demand for roofers is less

dependent on the economy. New construction of industrial, commercial and residential buildings will also add to the demand for roofers. Employment growth may be restricted to some extent by the higher productivity of roofers due to advanced materials and techniques.

Related Occupations: Carpenters, concrete masons, floor covering installers, plasterers, terrazzo workers and tile setters.

Roustabouts

Job Description: Roustabouts do most of the routine physical labour and maintenance in and around oil fields, gas facilities and pipelines. They assist skilled oil field workers.

They may do some or all of the following work:

- dig ditches or trenches for foundations or drainage, load and unload trucks and boats, mix concrete, paint equipment, cut down trees and connect pipes and hydraulic hoses;
- assemble and perform minor repairs on oil field machinery and equipment;
- use hand tools such as hammers, shovels and wrenches, and operating equipment such as electronic testers, hand-held computers, motorised lifts and power tools;
- assume maintenance responsibilities;
- work with crews around existing oil wells or for drilling contractors;
- assist skilled workers such as electricians, mechanics and welders.

They generally work under the supervision of a maintenance superintendent.

Education: This job requires little or no formal training although it is advantageous to have on-the-job experience.

Personal Attributes: Possesses mechanical ability, agility, coordination and good eyesight; is physically fit.

Job Outlook: Job opportunities for roustabouts are expected to be limited. This is a result of reduced exploration and failing production in the domestic oil industry as well as increasing automation of oil field operations.

Since turnover in this occupation is very high, most jobs will come about through a need to

replace workers. However, many roustabouts who leave will not be replaced. Roustabouts are subject to layoffs as employment is dependent on changes in the economy and particularly to the level of activity in the oil industry.

Prospects are brighter for persons with previous experience as a roustabout or formal training in petroleum technology. Job opportunities are expected to be better on offshore rigs than in onshore activities.

Related Occupations: Construction labourers, dockhands and material handlers.

Sheetmetal Workers

Job Description: Sheetmetal workers cut, shape, install and maintain products made from metal sheets. They also work with fibreglass and plastic materials. Although some workers specialise in fabrication, installation or maintenance, most do all three jobs.

They usually do some or all of the following work:

- produce duct systems for air-conditioning, ventilation and pollution control, roofs, rain gutters and downspouts, restaurant equipment, skylights, outdoor signs and many other building parts;
- manufacture aircraft sheetmetal parts using specialised drawing and calculation skills;
- study plans and specifications to determine the kind and quantity of materials that are needed;
- fabricate their products at a manufacturing set-up, away from the construction site;
- measure, cut, bend, shape and fasten pieces of sheet metal to make various custom products;
- work manually or use computerised metalworking equipment like computer-controlled saws, lasers, presses and shears to experiment with different layouts to minimise wastage;
- cut or stamp the parts on machine tools, checking each part for accuracy and repairing it if required;
- fasten the seams and joints together with bolts, cement, rivets, solder, welds or special sheetmetal drive clips and other connecting devices;
- assemble the pieces at the construction site while installing them, using drills, hammers, punches and shears;

- complete certain assignments at the job site like installing a metal roof;
- specialise in testing and servicing existing air-conditioning and ventilation systems to ensure they are functioning properly and efficiently;
- remove asbestos and toxic materials following prescribed safety regulations.

Education: Training is usually through apprenticeship.

Personal Attributes: Possesses mathematical and mechanical aptitude; has good eye-hand coordination, spatial and form perception, and manual dexterity; is physically fit.

Job Outlook: Employment growth for sheetmetal workers in construction is expected to be good. Jobs will open up as more commercial, industrial and residential structures are built, requiring sheetmetal installation.

Installation work in the older buildings as well as other types of renovation and maintenance work should boost employment. Decorative sheetmetal products and increased architectural restoration are expected to add to the demand for sheetmetal workers.

Related Occupations: Air-conditioning, heating and refrigeration technicians, boilermakers, glaziers, machinists, metal fabricators, metal pattern makers, tool and die makers and vehicle body makers.

Stonemasons

Job Description: Stonemasons and bricklayers work in very similar trades. Stonemasons cut, carve and design stone blocks and masonry slabs to be used in the building and renovation of floors, walls, monuments and stone structures. They combine a thorough knowledge of bricks, concrete blocks, marble and stone with manual skill to create attractive and extremely durable structures.

They normally use two types of stone — natural cut, like granite, limestone and marble and artificial stone made from concrete, marble chips or other masonry materials. They may do some or all of the following:

- work on structures such as hotels, houses of worship and office buildings;

- work from templates or sets of drawings in which each stone has been numbered for identification;
- repair imperfections and cracks, and replace broken or missing masonry units in walls and floors;
- lay stone paving, fix stone exteriors to buildings and cut lettering into stonework;
- construct stone walls by first setting a course of stones into a shallow bed of mortar, aligning the stones, wedging them into position and alternating layers of mortar and courses of stone;
- remove the wedges, fill the joints between stones, use special tools to give a smooth and attractive finish and finally wash the stone with a cleansing solution to remove stains and dry mortar;
- attach brackets to large stones and weld or bolt them to anchors in the wall, to hold them in place;
- use special hand or machine tools to cut stone along the grain to make various shapes and sizes;
- cut and polish granite and marble to be used for tabletops in kitchens and bathrooms.

They are assisted by helpers who locate and bring the pre-numbered stones to them and by derrick operators using hoists to lift large stone pieces into place.

Stonemasons can specialise in various areas like setting marble, lettering, cutting and polishing or stone fixing.

Refractory masons usually work in steel mills. They install firebricks and refractory tiles in high-temperature boilers, furnaces, soaking pits, etc., and build kilns and furnaces.

Many masons are additionally qualified to work with different materials. They can also install marble and stone if full-time stone and marble masons are not available.

Education: Training is usually through apprenticeship.

Personal Attributes: Possesses an aptitude for technical drawings; is strong, good with the hands and fairly comfortable with heights.

Job Outlook: Jobs for stonemasons, like many other construction workers, will depend on changes in the economy. When the level of construction activity falls, workers will face the prospect of being

laid off. Employment opportunities in refractive work will decline, as is the case with other occupations in the primary metal industry.

On the whole, prospects for stonemasons are expected to be good as the increasing population will mean new hospitals, offices, schools and other structures.

Related Occupations: Bricklayers, carpenters, concrete masons, plasterers, terrazzo workers and tile setters.

Structural and Reinforcing Ironworkers

Job Description: Structural and reinforcing ironworkers play an essential role in erecting bridges, buildings, highways, power transmission towers and other structures. They fabricate, assemble, and install products like frames made of steel columns, beams and girders used in the various structures. Metal catwalks, floor gratings, ladders, stairways, window frames as well as decorative ironwork, fences, lamp-posts and railings are also used to make these structures more functional and attractive.

Structural and reinforcing ironworkers may do some or all of the following:

- repair, renovate and maintain older buildings and structures such as automobile factories, bridges, highways, steel mills and utility plants;
- erect the steel frames and assemble the cranes and derricks to move materials and equipment around the construction site;
- connect steel columns, beams and girders following blueprints and instructions from supervisors and superintendents;
- unload and stack the fabricated steel to be hoisted easily when needed;
- set and fasten the bars in the forms that hold concrete, following blueprints showing the location, size and number of reinforcing bars;
- cut and bend the bars to size if necessary, using various equipment;
- cut and fit the welded wire fabric being used to reinforce the concrete;
- cut structural steel, reinforcing rods, and ornamental iron to the proper size with holes drilled for bolts and numbered for assembly, in fabricating shops;
- install ornamental ironwork and related pieces after the exterior of the building has been completed, ensuring a secure fit;

- erect metal tanks used to store petroleum, water or other fluids;
- assemble prefabricated metal buildings according to plans or specifications.

Education: Training is usually through apprenticeship.

Personal Attributes: Possesses good agility, balance, eyesight, and spatial perception in order to work at great heights on narrow beams and girders; is in good physical condition.

Job Outlook: The increase in construction coupled with the need for repair and maintenance of older buildings and structures is expected to increase employment demand. More ironworkers will be needed to build incinerators and other structures to contain hazardous materials as part of ongoing toxic waste cleanup. The number of jobs available depends largely on the economy, thus during economic lows, ironworkers can experience high rates of unemployment.

Related Occupations: Concrete masons, operating engineers and welders.

Tile Setters — Wall and Floor, Roof

Job Description: Wall and floor tile setters, or tilers, set clay glass, ceramic and other tiles in ceilings, floors and walls. Roof tilers cover structures with roofing tiles, shingles or slates. Most of the work involved is for commercial buildings, houses, swimming pools and some amount of renovation work is also done. Tile setters combine a knowledge of tools and masonry materials with skill and dexterity to produce attractive, durable surfaces.

Wall and floor tilers usually do some or all of the following:

- set tiles, generally ranging in size from 1 inch to 12 inches square, using cement or mastic;
- nail a support of metal mesh to the ceiling or wall to be tiled, if cement is used;
- use a trowel to apply a scratch coat onto the metal screen and a small rake-like tool to scratch the surface of the soft mortar, and let it dry;
- apply another coat of mortar to level the surface, apply mortar to the back of the tile and place it onto the surface;
- set tiles in mastic, usually on a flat, solid surface

like concrete, drywall, plaster or wood, spread mastic on the surface or apply cement adhesive to the back of the tile and position it;

- prearrange tiles on a dry floor according to a specified design, examine the pattern and make changes if required;
- use machine saws to cut tiles to fit around pipes, wash basins and tubs, and cover all exposed areas;
- place the tile and gently tap the surface to seat the tiles evenly, fill all the joints with fine cement and scrape off any excess, and finally finish the joints with a damp sponge for a uniform appearance.

Roof tilers usually do some or all of the following work:

- study drawings, plans and the job site to estimate the amount of materials required;
- set up ladders and tile elevators, fix battens for fixing tiles across roof rafters, and place and secure roofing underlays;
- place overlapping layers of tiles, cut and shape roofing material to fit around chimneys, slopes and vents, and fix ridge caps and gable ends with cement;
- clean the roof and remove all extra material after completing the job;
- lay shingles, slates or aluminium or steel tiles.

Education: Training is usually through apprenticeship.

Personal Attributes: Able to do simple calculations and turn in neat and accurate work; possesses manual dexterity, a good sense of colour harmony, balance and coordination; is comfortable with heights and in good physical condition.

Job Outlook: There will be a demand for tilers due to an increase in construction of buildings like hospitals, restaurants, schools and shopping malls that extensively use tiles. The increasing popularity of tile as a building material for residential buildings is also expected to increase the demand for tile setters. However, there will be fewer jobs in tiling as compared to other construction occupations.

Related Occupations: Bricklayers, concrete masons, floor coverers, plasterers, stonemasons and terrazzo workers.

TRANSPORTATION AND MATERIAL MOVING OCCUPATIONS

Bus Drivers

Job Description: Bus drivers transfer people between cities and regions of a state or of the country, within a metropolitan area or county and to and from schools or factories.

They usually do some or all of the following:

- follow time schedules and routes over highways and city and suburban streets to provide an alternative form of transportation;
- operate as intercity and local transit bus drivers;
- report to their assigned terminal or garage, receive tickets and transfers, and prepare trip report forms;
- check the vehicle's tires, brakes, windshield wipers, lights, oil, fuel, water, and safety equipment such as fire extinguishers, first aid kits and emergency reflectors;
- pick up and discharge passengers at bus stops or stations, or, in the case of students, at corners or in front of houses;
- collect fares, answer queries about schedules, routes and transfer points, and sometimes announce stops;
- constantly be alert to prevent accidents, especially in heavy traffic or in bad weather;
- transport students and teachers on field trips or to sporting events;
- operate chartered buses to pick up groups, take them to their destination and generally remain with them for the duration of the trip;
- be able to fill out accident reports when necessary.

Education: No formal academic qualifications are required. Bus drivers must have a commercial driver's licence and must follow the standards and regulations set by the government.

Personal Attributes: Possesses good vision and hearing; is in good health; has even temperament and emotional stability.

Job Outlook: Job prospects for bus drivers look good especially for persons with good driving records. Employment opportunities will be best in rapidly growing metropolitan areas, especially for schoolbus drivers.

Related Occupations: Chauffeurs, taxi drivers and truck drivers.

Material Moving Equipment Operators

Job Description: Material moving equipment operators use different machinery to move construction materials and other manufactured goods, earth, logs, petroleum products, grain, coal or other heavy materials over short distances on and off trucks and ships.

They usually do some or all of the following:

- control equipment by moving levers or foot pedals, operating switches or turning dials;
- set up and inspect equipment and make adjustments and minor repairs.

Material moving equipment operators usually are classified by the type of machines they operate.

- *Crane and tower operators* lift and move materials, machinery or other heavy objects using mechanical or hydraulic booms and tower and cable equipment. Cranes are used on construction sites and more often in manufacturing and other industries.
- *Construction equipment operators* work in the mining, logging, utilities and other industries as well as the construction industry, and operate bulldozers, cranes, loaders and similar equipment. They also operate industrial trucks and tractors and similar equipment in manufacturing plants and warehouses.
- *Excavation and loading machine operators* run and tend machinery equipped with scoops, shovels or buckets to excavate earth at construction sites and to load and move loose materials, mainly in the construction and mining industries.
- *Grader, dozer and scraper operators* remove, distribute, level, and grade earth with vehicles equipped with blades. They operate bulldozers, road graders, trench excavators and similar equipment. They usually work in the construction industry, and also do mainly maintenance and repair work for government departments.
- *Hoist and winch operators* lift and pull loads by

using power-operated equipment, usually in loading operations in construction, manufacturing, logging, transportation, public utilities and mining.

- *Industrial truck and tractor operators*, who drive and control industrial trucks like a forklift or lift truck, or tractors. A typical industrial truck, often called a "fork-lift" has a hydraulic lifting mechanism and forks. It carries loads on a skid or pallet around a factory or warehouse. Industrial tractor operators pull trailers loaded with materials, goods, or equipment within factories and warehouses, or around outdoor storage areas.

Other specialisations for material moving equipment operators are in tending to air compressors or pumps at construction sites, oil or natural gas pumps and compressors at oil and gas wells and pipelines, and operating ship loading and unloading equipment.

Education: On-the-job training is required.

Personal Attributes: Possesses a good sense of balance, the ability to judge distance and good eye-hand-foot coordination.

Job Outlook: Job opportunities for material moving equipment operators depend on the economic outlook of the industries that employ them. Overall employment growth for material moving equipment operators will increase.

Related Occupations: Bus drivers and manufacturing equipment operators.

Rail Transportation Workers

Job Description: Rail transportation workers assist the smooth movement and transfer of passengers and cargo by our nation's trains and subways. Railroad transportation workers include locomotive and railroad engineers, road and yard conductors, and brake and subway operators.

Locomotive engineers and railyard engineers are highly skilled and operate locomotives in yards, stations, and over long distances between other stations and yards. Locomotive engineers operate trains carrying cargo and passengers between stations, while railyard engineers move cars within yards to assemble or disassemble trains.

They usually do some or all of the following:

- operate the throttle to start and accelerate the train and use airbrakes or dynamic brakes to slow and stop it;
- monitor gauges and meters that measure speed, fuel, temperature, battery charge and air pressure in the brake lines;
- watch for signals that indicate track obstructions, other train movements and speed limits;
- be up-to-date on the signal systems, yards and terminals along their routes and know every detail about their train, since every train reacts differently to different situations like braking, acceleration and curves;
- run diesel locomotives; a few run electric locomotives;
- check locomotives for mechanical problems before and after each run, make any minor repairs instantly and report all major problems to the engine shop supervisor.

Brake operators play a pivotal role in making locomotives and cars into trains.

There are other engineers called *dinkey operators* who work at industrial plants or mines operating smaller engines that pull cars loaded with coal, rock or supplies around the site.

Freight train crews include either one or two *brake, signal and switch operators* – one in the locomotive with the engineer and another in the rear car. They do some or all of the following:

- undertake the physical work involved in adding and removing cars at railroad stations, and assembling and disassembling trains in railroad yards;
- work under the direction of conductors;
- inspect the train to make sure that all couplers and airhoses are fastened, that handbrakes on all the cars are released and that the airbrakes are functioning properly;
- regularly look for smoke, sparks and other signs of sticking brakes, overheated axle bearings and other potentially faulty equipment, while the train is moving;
- make minor repairs to airhoses and couplers;
- set up signals to protect both ends of the train, in case of unexpected stops;
- run ahead to switch the train to the proper track manually, when freight trains approach an industrial site;

- uncouple the cars and throw track switches to route them to certain tracks if they are to be unloaded;
- route the cars to an outgoing train if their final destination is further down the line;
- set handbrakes to secure cars.

Road conductors and yard conductors are in charge of the train and yard crews. Road conductors usually move with freight or passenger trains and may do some or all of the following:

- keep records of each car's contents and destination and ensure that cars are added and removed as per schedule;
- collect tickets and fares and assist passengers when assigned to passenger trains;
- signal engineers when to pull out of the station;
- meet with the engineer before the train leaves the terminal, and discuss instructions received from the dispatcher concerning the train's route, timetable and cargo;
- receive additional information by radio while enroute, about track conditions ahead or instructions to pull off at the next available stop to let another train pass;
- interact with engineers during the run using two-way radios, pass on the instructions, remind engineers of stops and report track conditions and the presence of other trains;
- receive information from brake operators regarding any equipment problems and arrange for removal of defective cars at the nearest station or stop;
- relay information to dispatchers using a radio or wayside telephone.

Subway operators control subway trains, while observing the signal system. They may do some or all of the following:

- start, slow or stop the subway train on signal;
- make announcements to passengers, open and close the doors, and ensure that passengers get on and off safely;
- have a basic understanding of the operating system and be able to recognise common equipment problems;
- contact their supervisor in case of breakdowns or emergencies, and evacuate subway cars if necessary;
- control the amount of time spent at each station to maintain the time schedule.

Yard conductors supervise the crews that assemble and disassemble trains. They usually do some or all of the following:

- tell engineers where to move cars, to special tracks for unloading or to other tracks while waiting to be assembled;
- tell brake operators which cars to couple and uncouple, and which switches to throw to divert the locomotive or cars to the proper track;
- use electrical remote controls, where automatic classification systems are available, to operate the track switches that route cars to the correct track.

Education: Most railroad transportation workers begin as trainees.

Personal Attributes: Possesses mechanical aptitude and manual dexterity; has good hearing, eyesight, colour vision and good hand-eye coordination; is physically fit.

Job Outlook: Job growth will be slower than average as computerisation will decrease the amount of work to be done. Employment opportunities for locomotive and yard engineers should be slightly better than other rail occupations, while job opportunities for brake operators should be the most adversely affected.

Related Occupations: Other transport workers.

Taxi Drivers and Chauffeurs

Job Description: Taxi drivers and chauffeurs pick up and drive people to their destination in cars, limousines, or vans and usually charge passengers a fee. Taxi drivers, also called cab drivers, drive taxis or cabs that are licensed and modified for transporting passengers.

Taxi drivers usually do some or all of the following:

- transport passengers to airports, convention centres, hotels, places of entertainment or their desired destination;
- collect fares from passengers based on the meter, that calculates the number of miles that are travelled or the amount of time spent reaching the destination;
- maintain records of the length of each trip, the point of pick-up and the destination;

- when starting a shift, they report to a cab service or garage and pick up the assigned cab, and a trip sheet to record details like name, date of work and cab identification number;
- check the cab's fuel and oil levels, and ensure that the brakes, lights and windshield wipers are working;
- pick up passengers based on information relayed, on a two-way radio, by a dispatcher who handles passenger calls, or cruise streets and pick up passengers who hail them, or wait at cab stands in taxi lines at airports, hotels, train stations, etc.;
- be familiar with streets and commonly requested destinations, to use the most efficient routes;
- know locations of fire and police departments, as well as hospitals, in case of an emergency.

Chauffeurs drive a variety of passengers in private automobiles, limousines or vans owned by limousine companies.

They usually do some or all of the following:

- transport travellers and other persons between hotels and airports or bus and train terminals in large vans;
- drive luxury automobiles such as limousines to popular entertainment and social events;
- work full time for individuals and private companies to provide personal transportation;
- prepare their automobile for use, maintain, clean and polish the interior and exterior, check fuel and oil levels, and ensure the lights, tyres, brakes and windshield wipers are working;
- undertake routine maintenance and carry out minor repairs, like changing tyres or adding oil and other fluids when required;
- take the vehicle to a professional mechanic for major repairs;
- provide attentive service and maintain good public relations with their passengers, for example, help them into the car, hold the door open, hold umbrellas when raining, and load packages and luggage into the trunk of the car;
- run errands for their employers, like delivering packages or picking up items;
- meet persons arriving at airports;
- offer conveniences and luxuries in their limousines to insure a pleasurable ride, such as newspapers, music, drinks, televisions, and telephones.

Education: Formal academic qualifications are not required. Taxi drivers and chauffeurs must have a driver's licence and follow the standards and regulations set by the government.

Personal Attributes: Able to get along with many different types of people; possesses patience and tolerance; is dependable, responsible and self-motivated.

Job Outlook: Job prospects for taxi drivers and chauffeurs look good. Persons with good driving records and who are open to flexible work schedules are at a definite advantage. Opportunities should be best in rapidly expanding metropolitan areas and may fluctuate seasonally.

Related Occupations: Delivery and courier drivers.

Truck Drivers

Job Description: Truck drivers operate heavy vehicles to transport goods and materials from point to point.

They usually do some or all of the following:

- make the initial pickup from factories, consolidate cargo at terminals for intercity shipment and deliver goods from terminals to stores and homes;
- inspect the trucks to ensure the brakes, windshield wipers and lights are working, and ensure all safety equipment is on board and in working order;
- adjust mirrors so that both sides of the truck are visible from the driver's seat and check that the cargo is properly loaded and will not shift during the trip;
- report faulty or missing equipment to the dispatcher as well as cargo that is not loaded properly;
- be alert to prevent accidents and drive their trucks efficiently;
- interact with dispatchers for information on when to report for work and where to haul the freight;
- spend most of their working time behind the wheel but may be required to unload their cargo;
- haul specialty cargo and often load or unload their trucks, since only they are familiar with this procedure;

- process and fill in delivery forms;
- carry out sales and customer relations responsibilities like delivery of products, customer relations and installation.

The work of local truck drivers varies, depending on the product they transport.

- *Auto-transport drivers*, for example, drive and position the cars on the trailers and head ramps and remove them at the final destination.
- *Gasoline tank truck drivers* attach the hoses and operate the pumps on their trucks to transfer the gasoline to gas stations' storage tanks.
- *Lumber truck drivers*, on the other hand, make several trips from the lumber yard to one or more construction sites.
- *Produce truckers* usually pick up a loaded truck in the early morning and spend the rest of the day delivering produce to grocery stores.
- *Vending machine driver-sales workers* restock, service and maintain machines in factories, schools, and other buildings, remove money deposited in the cash boxes and provide customer feedback.

Education: No formal academic qualifications are required. Truck drivers must have a commercial driver's licence and must follow the standards and regulations set by the government.

Personal Attributes: Possesses good vision and hearing; is in good health; has even temperament and emotional stability.

Job Outlook: Employment growth for truck drivers is expected to be good as the economy grows and the amount of freight carried by trucks increases. Job opportunities should be favourable for people interested in truckdriving as a career.

This occupation probably has among the largest number of job openings each year. Openings will be due to growth in demand for drivers but the majority will arise as experienced drivers leave the labour force for numerous reasons.

Related Occupations: Ambulance drivers, bus and coach drivers, delivery or courier drivers, furniture removals personnel and tow-truck drivers.

EMPLOYMENT

The rapid economic expansion in Malaysia has led to the following:

- virtual full employment, with the unemployment rate declining by 2.8 per cent in 1995,
- greater automation;
- shortage of skilled manpower, calling for training and retraining.

Employment growth is expected to average at 2.8 per cent per annum for the Seventh Malaysian Plan period. We can safely assume the following:

- Emphasis will be given to productivity-driven growth, requiring higher levels of professional and skilled manpower and administrative and managerial expertise;

- Scientific and technological know-how will also be pursued;
- The Government will continue to play a major role in human resource development in expanding the educational and training institutions.

Employment

- The dynamic economy during the late eighties created a strong demand for manpower at all levels.
- The unemployment rate fell from 5.1 per cent in 1990 to 2.8 per cent in 1995.
- A high turnover of several categories of skilled and professional workers was also recorded.
- These factors translated into shortage of skilled manpower.

EMPLOYMENT BY SECTOR, 1990, 1995 AND 2000 ('000 persons)

Sector	1990		1995		2000	
	Total	%	Total	%	Total	%
Agriculture, Forestry, Livestock & Fishing	1,738.0	26.0	1,428.7	18.0	1,187.7	13.1
Construction	424.0	6.3	659.4	8.3	845.4	9.3
Electricity, Gas & Water	47.0	0.7	69.1	0.9	84.0	0.9
Finance, Insurance, Real Estate & Business Services	258.0	3.9	378.5	4.8	479.0	5.3
Manufacturing	1,333.0	19.9	2,051.6	25.9	2,616.3	28.9
Mining & Quarrying	37.0	0.6	40.7	0.5	44.5	0.5
Transport, Storage & Communications	302.0	4.5	395.2	5.0	506.9	5.6
Wholesale & Retail Trade, Hotels & Restaurants	1,218.0	18.2	1,327.8	16.8	1,469.6	16.2
Other Services	1,329.0	19.9	1,564.4	19.8	1,832.8	20.2
Total Employed	6,686.0	100.0	7,915.4	100.0	9,066.2	100.0
Labour Force	7,042.2		8,140.0		9,327.1	
Unemployment	356.2		224.6		260.9	
Unemployment Rate (%)	5.1		2.8		2.8	

- In the Sixth Malaysian Plan period, one million additional entrants into the labour market was recorded, or about 220,000 persons per year.
- People were reportedly entering the workforce at a later age due to fertility decline and extension of the years of schooling; thus there was a gradual decrease in the number of workers in the 15-24 age group.
- Educational profiles of the labour force show a progressively more educated workforce; there is a need nevertheless to intensify efforts to increase the supply of highly-educated manpower.
- 1.2 million new jobs were created during 1991-1995, and although the labour force grew at 2.9 per cent, employment expanded at a faster rate of 3.4 per cent per annum. Consequently, labour shortages were recorded in most sectors of the economy.
- Manufacturing sector – accounted for one quarter of total employment, and growing at 9.0 per cent. This sector also generated almost 60 per cent of net employment creation.
- Services sector – accounted for about one half of total employment and 47 per cent of total job creation during 1991-95.
- Construction sector – grew at 9.2 per cent per annum, accounted for 19 per cent of total job creation.
- Agriculture sector – declined by 3.6 per cent resulting from a slower output growth and increasing mechanisation.
- The professional and technical categories recorded average annual rates of growth of 6.8 per cent, while the administrative and managerial categories had a 5.5 per cent growth rate.
- The demand is high for tertiary education, technical and professional training. R&D per-

sonnel are needed to build the scientific and technological capability and competence for sustained economic growth.

- Administrative and managerial manpower – grew at an average 5.5 per cent per annum, about 4.1 per cent of total job creation.
- Service workers – grew at 4.8 per cent per annum, and 16.6 per cent of 203,900 jobs were created. About 40 per cent of these were in the tourism industry.

Manpower Development

- The growing manufacturing sector has led to increasing demand for skilled and semi-skilled manpower.
- Employment data from manufacturing industries showed that demand was highest for unskilled workers.
- About 149,580 skilled and semi-skilled manpower were produced by both the public and private education sectors during 1991-95.
- To increase the manpower supply, the Human Resources Development Fund (HRDF) was established in 1992 to stimulate the private sector is involvement in training and retraining workers.

Prospects, 1996 – 2000

- Employment is expected to grow at 2.8 per cent per annum during this period.
- All sectors with the exception of the agriculture sector are expected to register positive employment growth.
- The manufacturing sector will lead the creation of new jobs.
- A growth of 3.2 per cent is to be anticipated by

EMPLOYMENT BY OCCUPATION, 1990, 1995 AND 2000

Sector	1990		1995		2000	
	Total	%	Total	%	Total	%
Administrative & Managerial	63.8	2.4	213.7	2.7	290.1	3.2
Agriculture Workers	1,890.7	28.3	1,662.2	21.0	16.4	
Clerical Workers	652.6	9.8	799.5	10.1	933.8	10.3
Production Workers	1,846.0	27.6	2,548.8	32.2	3,046.2	33.6
Professional & Technical	586.4	8.8	815.3	10.3	1,097.1	12.1
Sale Workers	768.9	11.5	894.4	11.3	1,042.6	11.5
Service Workers	777.6	11.6	9,81.5	12.4	1,169.5	12.9
Teachers & Nurses	221.8	3.3	280.7	3.5	356.6	3.9
Total	6,686.0	100.0	7,915.4	100.0	9,066.2	100.0

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LABOUR FORCE, EMPLOYMENT AND UNEMPLOYMENT BY STATE, 1995 — 2000 ('000)

State Labour	1995	2000		Labour Force	Employment	Unemployment Rate (%)
	Force	Employment	Unemployment Rate (%)			
Johor	1,002.3	982.2	2.0	1,139.0	1,114.3	2.2
Kedah	541.6	529.6	2.2	620.2	605.7	2.3
Kelantan	473.0	451.6	4.5	561.9	533.9	5.0
Kuala Lumpur	623.1	620.2	0.5	699.5	696.1	0.5
Melaka	225.2	221.2	1.8	259.4	254.6	1.9
Negeri Sembilan	306.6	299.8	2.2	352.7	344.3	2.4
Pahang	40.8	425.4	3.5	510.6	492.0	3.6
Perak	778.8	760.7	2.3	873.6	852.1	2.5
Perlis	72.9	70.9	2.7	84.3	81.9	2.8
Pulau Pinang	504.8	501.5	0.7	565.1	560.1	0.9
Sabah	846.4	798.6	5.6	1,007.8	950.6	5.7
Sarawak	850.9	809.4	4.9	945.6	907.3	4.1
Selangor	1,137.3	1,124.9	1.1	1,306.8	1,291.3	1.2
Terengganu	336.5	319.4	5.1	400.6	382.0	4.6
Malaysia	8,140.2	7,915.4	2.8	9,327.1	9,066.2	2.8

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the services sector during 1996 – 2000.

- The services sub-sector, comprising community, social and personal services is expected to have the highest rate of growth at 6.3 per cent per annum and accounting for 21 per cent of total net job creation.
- The agriculture sector is projected to demand less for labour due to the slower growth in that industry. However, the ability of its workforce to enhance productivity is essential.
- The demand for administrative and managerial people is estimated to register the highest growth rate.
- The professional and technical category will account for 12.1 per cent of total employment by the year 2000, comparable to newly industrialised economies.
- A high demand for assistant engineers, engineers, pharmacists, physicians, surgeons, and other health personnel is to be anticipated.
- Major specialist areas also in high demand are anaesthesiology, cardiology, forensic medicine, general health, haematology, general surgery, obstetrics and gynaecology, orthopaedics, paediatrics, pathology and psychiatry.
- About 23,300 scientists and technologists are

EMPLOYMENT IN THE MANUFACTURING SECTOR BY CATEGORY OF WORKERS, 1990 — 1995

Category	1990	Share (%)	1995	Share (%)	Average Annual Growth Rate, 1991-95 (%)
Clerical	88,840	6.7	129,250	6.3	7.8
General Workers	53,620	4.0	63,600	3.1	3.5
Managerial & Professional	50,281	3.8	88,219	4.3	11.9
Technical & Supervisory	114,592	8.6	184,644	9.0	10.0
Skilled	351,765	26.4	533,416	26.0	8.7
Semi-skilled	209,698	15.7	359,030	17.5	11.4
Unskilled	464,034	34.8	693,441	33.8	8.4
Total	1,332,829	100.0	2,051,600	100.0	9.0

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estimated to be required by the year 2000. Therefore, the human resource policy thrust for the Seventh Plan is to increase the supply of R&D personnel.

- Employment is expected to grow at a slower rate during the 1996-2000 period because of higher capital intensity and more efficient utilisation of labour.
- The growth rate for the less-developed states is projected to be higher than that of the developed states due to diversification from agriculture to manufacturing and services activities.
- In the developed states, the bulk of new job creation will be in Selangor and Johor due to expansion of manufacturing and construction activities there.
- Skill Development Centres (SDCs) were established in the states of Johor, Kedah, Melaka, Pahang, Perak, Sarawak, Selangor and Terengganu, showing the private sector's participation in the training of workers.
- Disparities continue to exist between the type and number of manpower produced and that required by the nation, although efforts are being made to develop high level and specialised skills.
- By the end of the Sixth Plan period, there were more arts graduates (62%) compared with science and technical graduates (25% and 14% respectively). This trend does not go well for the establishment of a strong technological base.
- This has also affected the number of qualified personnel for R&D activities. The largest source of R&D manpower comes from the public sec-

REGISTERED PROFESSIONALS, 1995

Profession	1995	Average Annual Growth Rate (%), 1991-95
Accountants	8,844	9.7
Architects	1,334	6.4
Dentists	1,869	2.3
Doctors	9,608	6.5
Engineers	27,349	6.3
Lawyers	5,976	13.6
Surveyors	2,709	16.1
Veterinary Surgeons	772	2.7
Total	58,461	7.6

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OUTPUT OF DEGREE COURSES, 1996 — 2000 (number)

Course	6MP		7MP	
	Number	%	Number	%
Arts & Humanities including Business, Economics & Law	49,018	62	82,123	57
Science including Agricultural Sciences, Medicine, Pure Sciences & Others	19,642	25	40,077	28
Architecture, Engineering, Surveying, Technical & Others	10,508	13	21,953	15
Total	79,168	100	144,153	100

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tor; substantial portion of whom are engaged in applied or developmental research. The market-oriented research sector, however, is still limited.

- Output of graduates in science and engineering fields is expected to increase by more than two-fold during the Seventh Plan period.
- Greater emphasis will also be given to the teaching and learning of basic sciences and of technical-oriented instruction at the primary, secondary and tertiary levels of education.
- Know-how and applications in the mathematical, scientific and technological fields will be improved to keep abreast with expansion.
- To ensure a continued source of technology experts, in-service training, off-campus schemes and distance learning will be further strengthened.
- Scholarships will be provided for by the human resource fund, particularly at the postgraduate and post-doctoral levels. Fellowships are granted for graduate research and advanced studies.
- To support R&D activities, on-the-job and in-house training as well as formal training will be provided to high and middle-level technical manpower.

Manpower for Information Technology

- A total of 27,174 IT-related personnel were required during the Plan period.
- Skills needed were in the areas of consulting, operations management, R&D, systems development and engineering, software develop-

ment advertisement database management and training.

- Total output of IT personnel from the public and private sector institutions amounted to 20,166 people.
- Greater use of IT in organisations is likely to result in the increasing demand for workers with computer and information management skills.
- Other sectors in general and specialised fields such as education, health, manufacturing and publishing, are also demanding for computer-literate workforce.

OUTPUT AND DEMAND OF INFORMATION TECHNOLOGY MANPOWER, 1991 — 1995

	Number
OUTPUT	20,166
Public Sector	10,166
Universities and Colleges	6,520
Degree	3,141
Diploma	3,379
Polytechnics	3,646
Diploma	885
Certificate	2,761
Private Sector	10,000
DEMAND	27,174
Public Sector	3,042
Private Sector	24,132
GAP (Output less Demand)	7,008

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- The tourism industry is showing continuous growth and increased employment opportunities during the Plan period. In 1995, an estimated 106,200 people were employed compared with 68,837 in 1990.
- The accommodation sub-sector had the largest number employed, comprising about 58 per cent of the industry's total workforce, followed by tour and travel agencies and the airlines.
- This industry also experienced manpower shortage, particularly in the supervisory and managerial levels.
- Extended coverage of the Human Resources Development Fund to that of training in the hotel and travel sectors is to encourage the provision of training in the industry.
- The private sectors, through the Malaysian Association of Tour and Travel agents (MATTA) and the Malaysian Association of Hotels (MAH),

continue to provide formal and in-service training.

Youth Population and Employment

- Total number of youths employed in 1995 was approximately 1.86 million or 23.5 per cent of the total employed compared with 1.81 million in 1990.
- The manufacturing sector continued to absorb the largest share of employed youths, accounting for about 37.9 per cent in 1995.
- There is also an indication of youth migration to urban areas in search of better job opportunities, with those who found employment in these areas increasing from 33.6 per cent in 1990 to 56.5 per cent in 1995.
- The Seventh Plan will have a greater focus on the development of a resilient youth community which is able to contribute positively to nation-building and which has the capability to face the challenges of a rapidly industrialising nation.
- The National Youth Policy, under the Ministry of Youth and Sports, focuses on youths in the 15-24 age-group with the aim of developing them into a productive labour force.
- It is anticipated that in the year 2000, about 41.6 per cent of the total youth population will be employed and 4.0 percent or 176,000 unemployed will be actively seeking jobs.

YOUTH EMPLOYMENT BY SECTOR, 1990 AND 1995 (%)

Sector	1990	1995
	Total	Total
Agriculture, Forestry, Livestock & Fisheries	19.3	13.1
Construction	6.1	6.9
Electricity, Gas & Water	0.2	0.3
Finance, Insurance, Real Estate & Business Services	3.4	5.4
Manufacturing	32.8	37.9
Mining & Quarrying	0.3	0.3
Transport, Storage & Communications	2.6	3.2
Wholesale & Retail Trade, Hotels & Restaurant	20.5	19.6
Other Services	14.8	13.3
Total	100.0	100.0

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- Of the total outside the labour force, 1.3 million will be enrolled in local and foreign educational and training institutions.
- Youth participation in the professional and technical as well as the administrative and managerial occupations will be higher due to increasing demands.

YOUTH EMPLOYMENT BY OCCUPATION, 1990 AND 1995 (%)

OCCUPATION CATEGORY	1990 TOTAL	1995 TOTAL
Malaysia		
Administrative & Managerial Workers	0.3	0.8
Agriculture Workers	19.1	12.8
Clerical & Related Workers	10.3	14.0
Production & Related Workers	43.0	45.4
Professional, Technical & Related Workers	4.8	6.7
Sales & Related Workers	11.3	10.6
Service Workers	11.2	9.7
Total	100.0	100.0
Urban	33.6	56.5
Administrative & Managerial Workers	0.7	1.1
Agriculture Workers	2.2	1.5
Clerical & Related Workers	15.5	19.5
Production & Related Workers	46.6	44.5
Professional, Technical & Related Workers	6.0	7.9
Sales & Related Workers	14.8	13.6
Service Workers	14.2	11.9
Total	100.0	100.0
Rural	66.4	43.5
Administrative & Managerial Workers	0.2	0.2
Agriculture Workers	27.9	27.6
Clerical & Related Workers	7.6	6.8
Production & Related Workers	41.1	46.9
Professional, Technical & Related Workers	4.1	5.1
Sales & Related Workers	9.5	6.7
Service Workers	9.6	6.7
Total	100.0	100.0

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Human Resource Development

- The rapid industrialisation in Malaysia will place new demands on high-level technical skills, management and entrepreneurial capabilities.
- The thrust of human resource development under the New Development Policy (NDP) will be to meet the objectives of growth and equity.
- Increased use of knowledge and skills of the labour force is required in the fast changing global environment.
- The development of educated, well-trained and flexible manpower will be given emphasis.
- The rural labour will also be given attention to enable them to enter the labour market which is becoming more sophisticated and technologically oriented.
- The total labour force, that is, people aged 15-64, both employed and unemployed, is expected to increase from 7 million in 1990 to 9.4 million in the year 2000 (an increase of 2.9 per cent per annum).
- A growth of 2.9 per cent per annum is expected to add some 2.4 million persons to the labour force.
- With expanding employment opportunities, more women are expected to participate in the economy.
- Based on a GDP growth of 7 per cent per annum, the demand for labour will increase by 3.1 per cent annually.
- Total employment is projected to increase from 6.6 million in 1990 to 9.0 million in the year 2000.
- At this employment growth rate, the unemployment rate will be reduced from the 1990 level of 6 per cent to about 4 per cent of the labour force by the end of the decade.
- A higher unemployment rate is expected for the less-developed states, thus, more employment opportunities will be created through the diversification of the economic base and the provision of better educational and training in these states.
- The growth in Government services is expected to be moderate, consistent with the Government's objective of reducing the size and role of the public sector.
- The demand for industrial manpower points towards the need for a labour force with a broad-based education emphasising communication abilities, mathematics and science and

PROFILE OF LABOUR FORCE, 1990 — 2000

	1990 ('000)	(%)	2000 ('000)	(%)
Total Labour Force	7,046.5		9,364.5	
Age-Distribution		(100.0)		(100.0)
15-24	2,029.5	28.8	2,454.5	26.2
25-34	2,169.6	30.8	2,758.6	29.5
35-54	2,417.4	34.3	3,569.9	38.1
55-64	430.0	6.1	581.5	6.2
Educational Structure		(100.0)		(100.0)
Primary	3,558.5	50.5	2,528.4	27.0
Lower & Middle Secondary	2,994.8	42.5	5,806.0	62.0
Upper Secondary & above	493.2	7.0	1,030.1	11.0
Labour Force Participation Rate (%)				
Male		66		68
Female		85		86
		47		49

Malaysia MIDA/WONG KAM CHOON/MALAYSIA PROGRESS 1994 (Human Resources Development).

DEMAND FOR SELECTED PROFESSIONAL AND TECHNICAL OCCUPATIONS, 1991 — 2000

OCCUPATION	EMPLOYMENT 2000	NET INCREASE 1991 - 2000
Engineers	56,600	30,100
Chemical	2,000	1,200
Civil	19,500	8,400
Electrical & Electronic	14,600	8,400
Mechanical	10,800	5,600
Others	9,700	6,500
Engineering Assistants	195,300	122,900
Chemical	6,000	5,400
Civil	58,500	31,400
Electrical & Electronic	75,900	43,600
Mechanical	32,400	26,000
Others	22,500	16,500
Medical Health	17,600	6,000
Dental Surgeons	2,200	500
Pharmacists	3,100	1,100
Physicians & Surgeons	12,300	4,400
Medical & Health Assistants	57,400	10,100
Dentists & Dental Nurses	2,700	700
Medical & Lab. Med Assts.	13,000	3,500
Pharmaceutical Assts.	2,400	900
Professional Nurses	39,300	5,000
School Teachers	252,500	74,900

Malaysia MIDA/WONG KAM CHOON/MALAYSIA PROGRESS 1994 (Human Resources Development).

proficiency in English.

- Industrial restructuring is expected with the rapid industrialisation of the economy, creating pressures for advanced-level machinists plus tool, mould and die makers, experienced engineers and technicians, and managers.
- The basic support for manufacturing activities would include industrial skills such as tooling and fabrication of precision parts and components, precision instrument calibration and product design.
- Knowledge and skills required in the nineties will not be single discipline-based, but will be orientated towards a mix of technical, statistical and computer-based disciplines.
- The services sub-sectors, such as banking, finance, freight, hospitality, information technology and insurance, will also be required to support the expansion of activities in the main services sector.

Institutional Changes

- The greater costs of foreign education will place a demand on available domestic educational and training facilities in both the public and private sectors.
- A fuller utilisation of existing facilities is expected, such as off-campus schemes, distance learning, open university programmes and the expansion of specialised classes for continuing education.
- Private sector participation in higher education, especially in providing technical and pro-

fessional courses and through twinning programmes, will be encouraged by the Government.

Prospective Employment in Manufacturing Sector 1990-1998

Overview of Manpower Requirements:

- 314,995 manpower is required from 1990-1998 by investors.
- Majority of the demand include 162,480 semi-skilled workers, followed by 92,485 unskilled workers and 21,077 craft-skills-workers.
- Approximately 81 per cent of the total demand for that period is represented by semi-skilled and the unskilled workers.

Manpower Needs According to Categories of Occupations

Engineering graduates:

- A total of 9,273 engineers are required for the period 1990-1998.
- Major demand includes 2,393 mechanical engineers; 1,658 production engineers and 1,466 electronic engineers.

Science graduates:

- Three main occupations are chemists, microbiologists and physicists.

NEW VACANCIES REPORTED AT THE EMPLOYMENT SERVICE BY OCCUPATIONAL GROUPS

PERIOD	PROFESSIONAL, TECHNICAL AND RELATED WORKERS	ADMINISTRATIVE AND MANAGERIAL WORKERS	CLERICAL AND RELATED WORKERS	SALES WORKERS	SERVICE WORKERS	AGRICULTURAL, ANIMAL HUSBANDRY AND FORESTRY WORKERS, FISHERMEN AND HUNTERS	PRODUCTION AND RELATED WORKERS, TRANSPORT OPERATORS AND LABOURERS
1991	2,667	420	13,157	1,533	1,514	1,424	38,249
1992	2,584	383	9,960	1,469	1,927	9,696	57,281
1993	3,036	453	10,165	1,417	1,869	2,657	57,434
1994	3,773	655	11,472	1,947	1,823	4,598	33,142
1995	3,370	666	12,328	1,472	2,391	1,207	36,969
1996							
Jan.	333	41	939	107	251	153	3,503
Feb.	241	36	624	62	152	215	1,780
Mar.	252	23	1,008	108	242	48	3,838

NEW VACANCIES REPORTED AT THE EMPLOYMENT SERVICE BY INDUSTRY

PERIOD	AGRICULTURE, FORESTRY, HUNTING AND FISHING	MINING AND QUARRYING	MANUFACTURING	ELECTRICITY, GAS AND WATER	CONSTRUCTION	WHOLESALE AND RETAIL TRADE, HOTELS AND RESTAURANTS	TRANSPORT, STORAGE AND COMMUNICATIONS	FINANCE, INSURANCE, REAL ESTATE AND BUSINESS SERVICES	SERVICES
1991	4,514	205	34,171	134	1,999	4,421	1,456	3,543	8,416
1992	14,175	218	49,698	42	2,605	4,677	1,743	3,801	6,315
1993	5,513	205	50,939	19	3,629	5,203	1,457	3,506	6,560
1994	6,087	119	32,101	146	2,491	5,120	1,881	3,266	6,199
1995	2,098	271	36,237	71	2,953	6,047	1,660	3,787	5,288
1996									
Jan.	43	15	3,187	39	298	424	528	244	349
Feb.	330	29	1,807	5	76	272	104	216	291
Mar.	108	8	3,599	69	214	514	149	535	505

Manpower Department, Monthly Statistical Bulletin, Department of Statistics, Malaysia (May 1996).

- The demand for these occupations is not significant where they constitute only 0.23 per cent of the total manpower required by investors for the 1990-1998 period.

Other graduates:

- Accountants, computer programmers, lawyers, management executives and systems analysts fall under this category.
- A total of 6,634 other graduates are needed where the major demand are for 3,889 management executives.

Technicians:

- During the 1990-1998 period, 22.2 per cent of the total technicians needed are for mechanical technicians.
- Both engineers and technicians are seen to have the same demand trend of traditional and non-traditional trades, attributed to the complementary role of technicians to engineer.

Craft-Skills Workers:

- The highest demand for this category of workers is for 4,519 general machinists, representing approximately 21.4 per cent of the total demand.
- Other significant demand include 3,688 plant maintenance mechanics, 2,452 electricians, 2,031 welders and 1,671 precision machinists.

CAD-CAM Operators:

- Survey results showed that 8,996 CAD-CAM operators are required for the 1990-1998 period.
- An average of 6.15 CAD-CAM operators are required per establishment.

Semi-Skilled and Unskilled Workers:

- This category of workers constitutes approximately 81 per cent of total manpower required.
- The semi-skilled need only 2-6 months on-the-job training and they are highly demanded especially for production line jobs.
- Normally, semi-skilled and skilled workers represent 80-85 per cent of the total workforce in any establishment.

PERCENTAGE DISTRIBUTION OF EMPLOYED PERSONS BY AGE GROUP

Age Group	1988	1989	1990	1992	1993
Total	100.0	100.0	100.0	100.0	100.0
15-24	26.7	26.7	27.1	26.1	24.9
25-34	31.2	31.5	31.5	31.8	31.9
35-54	35.8	35.8	35.4	36.0	37.4
55-64	6.3	6.0	6.0	6.1	5.8

Labour Force Supply, Department of Statistics, Malaysia (Yearbook of Statistics, 1994, Department of Statistics, 1995).

OFFICE OCCUPATIONS — AVERAGE STARTING SALARY, MONTHLY SALARY AND MONTHLY EARNINGS

TYPE OF OCCUPATIONS	SEX	AVERAGE STARTING SALARY	AVERAGE MONTHLY SALARY	AVERAGE MONTHLY EARNINGS
Accountant	M	317.87	3342.35	3422.35
	F	2168.78	2861.37	2901.45
Administration Clerk/	M	439.79	748.80	904.13
Clerk General	F	417.93	599.84	704.32
Assistant Accountant	M	935.64	1272.56	1492.40
Bookkeeper/Accounts Clerk	M	554.82	850.64	983.75
	F	507.21	732.30	817.70
Clerk, Material Planning	M	455.89	579.90	858.77
	F	350.00	477.06	620.45
Computer Operator/	M	-	-	-
Data Operator Processor	F	493.91	834.39	1014.16
Computer Programmer	M	1084.56	1419.39	1487.13
	F	1011.07	1349.36	1404.55
Confidential Secretary	M	868.35	1155.41	1211.29
	F	943.74	1346.64	1411.82
Despatch Boy	M	416.67	493.98	514.27
	F	-	-	-
EDP Manager	M	3049.33	4107.39	4197.42
	F	-	-	-
Executive Director	M	2273.83	2547.74	2773.83
	F	-	-	-
General Manager	M	3677.91	4674.50	4768.39
	F	-	-	-
Human Resources Manager	M	2763.57	3561.33	4168.96
	F	2073.61	2901.55	2912.70
Managing Director	M	4257.53	5497.77	5634.60
	F	-	-	-
Material Planning Officer	M	566.35	751.72	1136.58
	F	663.59	891.02	1075.56
Nutritional Executive	F	920.00	1290.45	1290.45
Peon/Office Boy	M	331.73	502.60	620.49
	F	-	-	-
Personnel Clerk	M	-	-	-
	F	510.93	742.69	911.04
Production Manager	M	2566.83	3646.56	3815.26
	F	1896.47	2436.24	2491.53
Production Clerk	M	400.13	474.02	609.39
	F	475.76	514.11	622.62
Purchasing Clerk	M	-	-	-
	F	537.95	603.32	814.97
Sales Representative	M	546.54	829.92	1232.63
	F	496.00	808.46	987.86
Sales/Marketing Manager	M	2321.94	3247.22	3391.68
	F	1635.26	2372.21	2416.08
Salesman, Retail	M	556.96	859.08	844.42
	F	-	-	-
Shipping Clerk	M	532.23	668.92	987.66
	F	457.12	548.74	725.33
Stenographer	F	655.71	818.57	947.36
Systems Analyst	M	1689.20	2402.72	2418.29
	F	1745.00	2563.00	2511.33
Tally Clerk	M	473.05	473.05	527.62
	F	207.00	303.13	365.24
Telephone Operator	M	381.33	686.29	691.00
	F	437.73	634.62	737.81
Typist	M	393.26	587.66	706.74
	F	439.78	606.07	776.15
Weighbridge Clerk	M	-	-	-
	F	295.52	450.52	513.86

MAINTENANCE OCCUPATIONS — AVERAGE STARTING SALARY, MONTHLY SALARY AND MONTHLY EARNINGS

TYPE OF OCCUPATIONS	TYPE OF PAY	SEX	AVERAGE RATE PAID	AVERAGE STARTING SALARY	AVERAGE MONTHLY SALARY	AVERAGE MONTHLY EARNINGS
Assistant Storekeeper	M	M		375.92	479.23	623.82
		F				
Boilerman	H	M	2.30	421.50	889.62	1298.46
		D	14.44	369.19	416.36	553.43
		M		584.39	911.71	1140.45
Chargeman	H	M	4.04	861.37	1105.08	1645.69
		M		941.20	1400.69	1881.37
Crane Operator Gantry	M	M		715.23	882.50	1217.82
Driver Lorry/Van	D	M	16.28	493.96	664.10	828.88
		M		425.20	556.05	783.45
Driver, Truck/Forklift	D	M	12.59	379.61	465.12	584.61
		M		444.91	615.89	835.13
Electrical Fitter, General	M	M		561.90	770.00	915.38
Fireman, General	D	M	10.89	276.00	325.45	580.61
		M		327.33	423.28	520.06
Labourer, Housekeeping	H	M	1.33	326.66	417.90	739.87
		F	1.22	311.38	391.79	391.79
	D	M	13.55	296.81	351.39	381.30
		F	6.94	307.34	325.88	361.05
	M	M		318.83	465.62	614.91
		F		309.28	435.15	585.34
Lorry, Attendant	D	M	11.53	299.75	355.22	440.92
		M		255.45	368.64	662.27
Machinery Fitter, General	M	M		440.91	604.60	961.78
Machinist	H	M	2.32	463.37	488.20	646.86
		D	15.23	363.89	607.47	690.24
		M		539.88	772.32	988.63
Maintenance Supervisor	H	D	3.05	781.50	1427.50	1452.50
		M	32.58	799.76	972.17	1173.01
		M		836.46	1187.51	1458.78
Maintenance Technician	H	M	3.23	610.93	623.06	731.01
		D	18.02	432.44	566.53	674.42
		M		637.22	893.48	1124.68
Maintenance, Electrician	H	D	3.01	598.88	829.33	1089.25
		M	18.82	492.39	593.95	704.86
		M		490.00	484.10	862.60
Mechanical, Technician	H	M		380.21	395.26	660.70
Packer Hand	H	M	1.46	270.10	304.38	447.93
		D	11.82	327.38	414.25	564.27
		M		245.20	368.58	589.15
Plant Maintenance						
Mechanic	H	M	4.14	788.73	863.20	1056.51
		D	10.32	359.97	557.64	702.27
		M		718.02	1022.41	1635.92
Scoop-Truck Operator/Shovel						
Loader Driver	D	M	-	-	-	-
		M		552.43	630.19	735.76
Storekeeper	H	M	2.33	463.89	510.33	623.86
		F				
	D	M	22.47	393.57	494.85	922.88
		F	17.37	411.76	501.10	638.93
	M	M		427.15	646.52	797.92
	F		433.85	592.40	704.89	
Watchman, Guard	H	M	1.7	383.85	421.23	551.99
		D	8.76	354.88	278.68	406.33
		M		476.74	540.96	980.02
	F		363.45	546.07	625.13	
Welder	D	M	20.25	253.22	438.08	574.35
		M		474.60	612.84	855.98

**PRODUCTION OCCUPATIONS — AVERAGE RATE PAID,
STARTING SALARY AND MONTHLY EARNINGS**

TYPE OF OCCUPATION	TYPE OF PAY	SEX	AVERAGE RATE PAID	AVERAGE STARTING SALARY	AVERAGE MONTHLY SALARY	AVERAGE MONTHLY EARNINGS
Assistant Engineer/ Technical Assistant	D	M	36.00	900.00	1000.00	1135.00
	F	F	38.00	950.00	1150.00	1395.00
Boilermaker/Boilersmith	D	M	25.21	650.28	726.89	869.66
	M	M		391.00	849.26	1157.11
Chemist	M	M		1484.92	1825.92	1933.89
		F		1299.16	1739.14	1805.80
Draughtsman, General	M	M		637.33	1202.00	1352.39
	F			693.00	1171.00	1441.49
Electrical Engineer	M	M		3638.46	5876.92	6150.96
Electro/Electric, Engineer	M	M		1793.33	2856.00	2927.56
Electro/ Mechanical Engineer	H	M		1202.34	2075.00	2613.83
	D	M				
	M	M		1900.00	2979.00	2979.00
Electro/Electric, Technician	H	M	3.69	761.08	1141.77	1549.26
	D	M	30.22	785.00	1140.50	1439.98
	M	M		591.99	887.74	1176.70
		F		535.93	780.02	1049.37
Electro/Mechanical Technician	M	M		800.00	1400.00	1500.00
Electronic Engineer	M	M		1680.25	2046.79	2078.72
		F				
Engineer, General	M	M		1726.78	2507.32	2633.50
		F		1844.08	2316.36	2510.82
Engineering Assistant, Electrical, General	M	M		461.36	598.61	865.61
General Worker	H	M	1.15	233.89	311.31	341.16
		F	1.50	262.74	465.33	503.33
	D	M	11.27	313.01	319.89	460.94
		F	7.59	282.17	296.85	359.11
	M	M		419.40	454.25	511.19
		F		233.09	346.01	346.40
Industrial Efficiency Engineer	M	M		1652.27	1854.55	1929.41
Lab Assistant	M	M		418.00	611.85	846.63
		F		426.81	519.63	577.75
Machine Mechanic, General	M	M		455.63	713.10	949.86
Machine Operator	H	M	2.24	341.64	576.17	645.84
		F	2.10	350.74	595.48	730.32
	D	M	11.47	318.40	349.94	453.15
		F	10.71	290.76	323.72	352.04
	M	M		344.08	555.90	837.26
		F		435.99	572.73	
Mechanical Engineer	M	M		1768.86	2079.04	2170.40
		F		1921.67	2223.33	2223.33
Mechanical, Technician	D	M	30.00	750.00	810.00	1055.00
		M		607.083	875.59	1464.03
		F		623.85	721.94	1508.87
Other Engineering Assistants and Related Technicians	M	M		724.00	882.25	1153.35
Production Operator	H	M	1.29	247.91	309.50	404.74
		F	1.58	257.84	357.02	436.39
	D	M	12.07	266.69	288.90	420.77
		F	7.06	240.57	342.90	498.33
	M	M		316.98	367.78	530.96
		F		258.67	365.10	431.78
Production Engineer	M	M		1551.73	1817.85	1942.34
Quality Control Engineer	M	M		1243.41	1760.88	1868.44
		F		1420.00	2110.47	2218.79
Quality Control Technician	H	M	4.74	840.24	908.35	912.10
		D	M	10.37	351.62	440.00
	F		16.92	388.67	455.35	616.27

		M		550.36 452.78	787.37 617.38	1079.35 729.56
Quality Control, Assistant	M	M F		604.00	920.72	1231.28
Supervisor/General Foreman	H	M F	3.47	693.56	862.00	962.10
	D	M F	21.13 16.95	514.45 474.84	587.59 502.13	738.79 660.73
	M	M F		802.93 695.70	1160.31 940.70	1399.24 1153.92
Supervisor/General Foreman Installation of Electrical and Electronic Group	M	M		1476.29	1858.07	1996.29
Supervisor/General Foreman, Fabrication of Products of Paper, Plastics, Rubber, Chemical Pharmaceutical Products and Synthetic Materials	M	M		668.46	935.54	1088.25
Supervisor/General Foreman, Manufacturing of Machinery and Metal Products	M	M		858.62	1856.31	2595.86

Occupational Wage Survey in The Manufacturing Sector 1992. Published October 1993, Ministry of Human Resources.

HOTEL INDUSTRY — AVERAGE EARNINGS BY TYPE OF OCCUPATIONS AND GENDER, JULY 1992

OCCUPATIONS	GENDER	AVERAGE EARNINGS (RM)
Accounts Clerk	M	644
	F	634
Assistant Manager	M	1453
	F	1128
Bartender	M	472
	F	573
Chambermaid	M	581
	F	446
Chargeman	M	935
	F	-
Chief Cook	M	1479
	F	979
Cook	M	667
	F	659
Electrician	M	630
	F	-
General Worker	M	463
	F	458
Hotel Receptionist	M	435
	F	434
Kitchen Assistant	M	536
	F	477
Laundry Maid	M	534
	F	488
Maintenance Man, Building	M	707
	F	-
Manager	M	2503
	F	2412
Plumber	M	632
	F	-
Reservation Clerk	M	496
	F	584
Room Boy	M	447
	F	460
Waitress	F	577
	M	503

Labour Indicators 1992, Ministry of Human Resources, December 1993.

BANKING INDUSTRY — AVERAGE BASIC SALARY, STARTING SALARY, MONTHLY EARNINGS AND ANNUAL INCREMENT

OCCUPATIONS	SEX	AVERAGE BASIC SALARY (RM)	AVERAGE EARNINGS (RM)	AVERAGE ANNUAL INCREMENT (RM)	AVERAGE STARTING SALARIES (RM)
Administration Manager	M	6817.35	7115.37	566.72	-
	F	4369.86	4427.86	690.40	-
	All	6416.62	6730.19	606.71	-
Bank Officer/Executive	M	2067.70	2291.63	229.95	1397.84
	F	2012.05	2130.21	379.33	1392.22
	All	2084.95	2234.56	278.97	1395.71
Branch Manager	M	4453.55	4897.71	327.51	3121.08
	F	3605.87	3888.31	308.98	-
	All	4408.70	4844.31	326.69	3090.07
Cashier	M	880.39	952.93	68.77	555.17
	F	1366.72	1445.04	62.25	532.62
	All	1082.23	1157.17	66.18	533.96
Clerk	M	871.26	995.43	68.11	567.90
	F	868.74	967.36	72.69	559.74
	All	869.94	980.65	70.47	503.10
Computer Operator	M	880.39	952.93	68.77	555.17
	F	1366.72	1445.04	62.25	532.62
	All	1082.23	1157.17	66.18	533.96
Computer Programmer	M	1810.12	1904.26	152.67	1474.63
	F	1711.75	1804.98	157.67	1249.22
	All	1774.99	1868.81	154.29	1380.36
Driver	M	705.15	854.95	64.55	473.16
	F	-	-	-	-
	All	705.15	854.95	64.55	473.16
EDP Manager	M	6010.39	6113.62	634.02	-
	F	-	-	-	-
	All	5610.06	5697.26	602.90	-
Finance Manager	M	5579.76	5653.14	470.11	-
	F	5214.16	5351.00	918.84	-
	All	5494.00	5582.27	589.21	-
Guard	M	647.82	759.76	31.88	-
	F	-	-	-	-
	All	647.82	759.76	31.88	-
Internal Audit Manager	M	-	6423.44	579.17	-
	F	4369.80	4427.86	690.40	-
	All	6795.90	6038.33	602.70	-
Investment Securities Manager	M	6560.24	6713.18	1290.21	-
	F	-	-	-	-
	All	6225.70	6375.70	1121.95	-
Manager	M	6231.66	6476.36	640.56	-
	F	4371.36	4377.13	627.04	-
	All	5917.59	6121.94	638.42	-
Messenger/Office Boy	M	632.81	714.84	45.11	368.37
	F	711.44	734.68	27.17	-
	All	638.63	716.31	43.76	368.54
Public Relations Officer	M	1847.82	1892.82	257.56	-
	F	2215.96	2215.96	151.13	-
	All	2043.64	2064.70	207.47	-
Stenographer	M	1375.29	1375.29	235.38	-
	F	1420.10	1427.73	109.61	864.06
	All	1419.38	1426.89	111.70	860.52
Systems Analyst	M	3124.50	3277.60	321.91	2067.37
	F	2590.36	2659.18	249.98	2420.18
	All	2910.13	3029.40	294.41	2233.97
Tea Lady/Coffee Girl	M	-	-	-	-
	F	497.83	500.65	61.33	-
	All	497.83	500.65	61.33	-

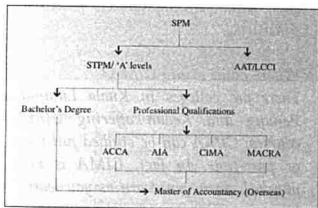
CHAPTER 5

COURSES

Accountancy

Qualifications awarded:

1. Certificate in Accounting
2. Diploma in Accounting e.g. AAT, LCCI
3. Professional qualifications e.g. ACCA, AIA, CIMA, MACPA
4. Bachelor's degree in Accountancy
5. Certificate Diploma in Accounting and Finance (for graduates only)



Scope:

1. Cost and Management Accounting
2. Economics
3. Business Mathematics
4. Business Law
5. ACCA — 3 levels (Foundation, Certificate and Final)
6. CIMA — Stage 1-4

Entry requirements:

1. Certificate —
For beginners who have no knowledge of accounts
2. Diploma —

- a) Candidates must be at least 16 years old
 - b) SPM or equivalent with a credit in English
3. Professional qualifications —
 - a) 2 Principal passes in STPM/'A' levels or equivalent
 - b) LCCI Higher Diploma
 - c) Proficient in English
 4. Bachelor's degree — STPM/'A' levels or equivalent

Duration:

1. Certificate — 3 months
2. Diploma — 1 to 2 years (P/T and F/T available)
3. Professional qualifications —
6 months to 1 year for each stage/level
4. Bachelor's degree — 3 to 4 years

Fees:

1. Certificate — RM900-1,000
2. Higher Diploma — RM1,000-1,500
3. Professional qualifications — RM1,500-2,000/stage or level
4. Bachelor's degree — RM5,000-11,000/year

Schools:

1. AMC, School of Business, Sabah
2. Bakti College (twinning available)
3. Bintang Academy
4. EU Institute
5. HELP Institute (twinning available)
6. Ipens College
7. Institut FTMS
8. Institut Perdagangan Indah
9. Institut Perkim-Goon (twinning available)
10. Institute Bina Usahawan
11. Institute Professional Sterling
12. Institute Wawasan

The Chartered Institute of
Management Accountants

CIMA

Malaysia Division

*Build your future on solid ground...
Be a Chartered Management Accountant*

The CIMA qualification combines the field of management and accounting to give you the best financial qualification for business. Trained to manage, interpret and analyse financial data, you have a key-role to play in management's decision-making process.

With experience and acquired ability, Chartered Management Accountants often become financial controllers, finance directors, and yes, commonly the chief executive officers of large and small corporations throughout the world.

CIMA is internationally recognised in well over 100 countries and in Malaysia, the qualification is recognised by the Public Services Department as equivalent to an honours degree awarded by a Malaysian University. The Malaysian Institute of Accountants also

recognises CIMA as an approved body listed in Part II of the First Schedule of the Accountants Act 1967.

How do I become a CIMA student?

The minimum qualifications accepted for CIMA student registration are two GCE subjects at STPM/ A-Level (Grades A-E) supported by passes in three subjects at SPM/O-Level (Grades C and above). English Language and Mathematics must be among the subjects passed at either level.

Where can I study CIMA?

There are colleges in Kuala Lumpur, Penang and Kedah offering CIMA courses. CIMA can be studied full-time or part-time. In fact, CIMA is best pursued when you "earn as you learn" because your working experience enhances your theoretical knowledge.

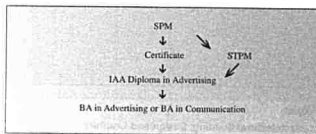
**For more information about being a
Chartered Management Accountant, call...
The Chartered Institute of Management
Accountants (CIMA) Malaysia Division
Tel: 03-705 1591 or Fax: 03-705 1594**

13. Intec College, Penang
14. Inti College (twinning available)
15. Kolej Agama Sultan Zainal Abidin
16. Kolej Aman
17. Kolej Antarabangsa (twinning available)
18. Kolej Tunku Abdul Rahman
19. Kolej Uniktek
20. Locke Academy
21. Mahkota College (twinning available)
22. Mara Institute of Technology —
for Bumiputeras only (twinning available)
23. Metropolitan College (twinning available)
24. MSC Premier College (twinning available)
25. P J Community College (twinning available)
26. Olympia Business School
27. Ranger College
28. Sedaya College (Degree Transfer Program)
29. Sekolah Pengurusan Suria Sdn Bhd
30. Sepang Institute of Technology (twinning available)
31. Stamford College (twinning available)
32. Sunway College (twinning available)
33. Systematic Group of Colleges
34. Wong Commercial Institute

Advertising

Qualifications awarded:

1. Certificate in Communication Studies
2. Diploma in Advertising (awarded by IAA, New York)
3. Bachelor of Arts in Advertising



Scope:

1. Certificate —
 - a) Advertising
 - b) Business Communication
 - c) Marketing
 - d) Presentation Skills
2. Diploma —
 - a) Advertising and Research
 - b) Communication Theory
 - c) Consumer Behaviour
 - d) Layout and Design
 - e) Marketing and Research
 - f) Media — Research, Strategy, Planning and Buying

Entry requirements:

1. Certificate —
SPM/O' levels, MCE or equivalent with a credit in English
2. Diploma —
 - a) Candidates at least 18 years old and possessing a minimum of STPM/A' levels or equivalent with a

- credit in English at SPM level
- b) Working students must possess at least one year's working experience

Duration:

1. Certificate — 1 year
2. Diploma — 2 years (P/T and F/T available)
3. Bachelor's degree — 1 year (twinning)

Fees:

1. Certificate in Communication Studies — RM1,000/subject
2. Diploma (F/T and P/T) — RM4,800
3. Bachelor's degree — RM15,000/year

Schools:

1. Artes College of Art and Design
2. Institute Advertising Communication Training (twinning with RMIT University, Australia)
3. Kuala Lumpur College of Art

Aesthetic

Qualifications awarded:

1. Certificate (CIBTAC and ITEC)
2. Diploma —
 - a) American Institute of Cosmetology, USA
 - b) CIBTAC, UK
 - c) CIDESCO International (Zurich) Diploma
 - d) Condeil D'Examination Federation De L'Esthetique Francaise, Paris
3. Postgraduate of ITEC
4. Honours Diploma of ITEC
5. Postgraduate Diploma of AAI (Aesthetic Academy International)

Scope:

1. Aestheticienne (London)
2. Anatomy, Physiology and Massage
3. Beauty Specialist
4. Beauty Therapy
5. Physical Therapy

Postgraduate Courses

1. Aromatherapy
2. Cosmetic Chemistry
3. Electrologists
4. Make-up
5. Manicure/Pedicure
6. Reflexology

Others

1. Bridal Make-up
2. Personal Grooming

Entry Requirements:

1. Candidates must be at least 17 years of age. They should present themselves for interview whenever possible so that the principal may have the opportunity of assessing their

aptitude.

Duration:

1. Certificate — 3 to 9 months (F/T)
2. Diploma — 6 to 18 months (P/T)
3. Postgraduate — 1 to 2 years

Fees:

1. Certificate — RM750-1,800
2. Diploma — RM2,000-6,000

Schools:

1. Aesthetic Academy International (AAI)
2. Beaubell Aesthetic Academy
3. Clara International Beauty Group
4. D'Esthetique Centre

'A' levels

Qualifications awarded:

1. 'A' levels
2. Australian Matriculation
3. Canadian Matriculation

Scope:

1. Accounting
2. Computer
3. Economics
4. Humanities
5. Languages
6. Law
7. Mathematics
8. Science

Entry Requirements:

1. SPM/MCE/SM3/O' levels with 5 passes including English and Mathematics
2. Students must be at least 16 years of age and above

Duration:

1. 'A' levels — 1 1/2 years
2. Australian Matriculation — 1 1/2 years
3. Canadian Matriculation — 8 months to 1 1/2 years

Fees:

1. 'A' levels — RM1,000-4,800
2. Australian Matriculation — RM3,500-9,000/semester
3. Canadian Matriculation — RM1,200/semester

Schools:

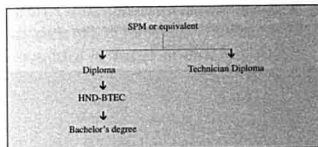
1. AMC, School of Business, Sabah
2. Bakti College
3. Distd College
4. HELP Institute
5. Institut Perkim-Goon
6. Institut Sejati
7. Institute Professional Sterling
8. Intec College, Penang

9. Inti College
10. Kolej Antarabangsa
11. Kolej Tunku Abdul Rahman
- 12. Kolej Unik**
13. Mahkota College
14. Methodist College Kuala Lumpur
15. MSC Premier College
- 16. Olympia Business School**
17. Prime College
18. Ranger College
19. Sepang Institute of Technology
20. Stamford College
21. Sunway College
22. Systematic Group of Colleges
23. Taylor's College

Architecture

Qualifications awarded:

1. Diploma in Architecture
2. Diploma in Building Technology
3. Diploma in Landscape Design
4. Diploma in Quantity Surveying
5. Technician Diploma in Architecture
6. Technician Diploma in Construction Management
7. Architectural Draughtman Course



Scope:

1. Architectural Building, Design and Graphics
2. Building Technology and Materials
3. Computer Programming and Data Processing
4. Environmental Studies
5. Management
6. Nature Studies
7. Quantity Surveying
8. Soil Studies

Entry Requirements:

1. SPM/SPMV/MCE or SM3 or equivalent is accepted
2. Applicants must be between 16-25 years of age

Duration:

1. Technician Diploma – 2 years part-time
2. Diploma – 2-3 years full-time

Fees:

1. Technician Diploma – RM450-870/term
2. Diploma – RM660-990/term

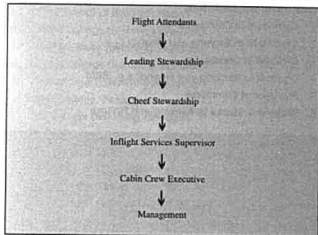
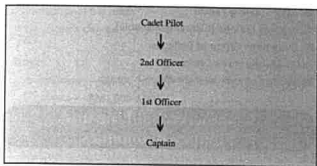
Schools:

1. Bedford Training Centre
2. Federal Institute of Technology
3. Institut Teknologi Pertama
4. Institut Teknologi Utama

Aviation

Qualifications awarded:

1. Pilot
2. Flight Steward/Stewardess
3. Aviation Engineering

**Scope:**

1. Pilot — flight training. A cadet pilot has to satisfy the required number of hours of flying and pass the necessary examination before he can be promoted
2. Flight Steward/Stewardess — passenger service
3. Aviation Engineering — technical services for avionics and power plant

Entry requirements:

1. Pilot —
 - a) SPM Grade 1 including Bahasa Malaysia, English, Mathematics and Physics
 - b) Higher qualifications majoring in Engineering subjects, Mathematics and Science would be an advantage
 - c) Fluent in English
 - d) Candidates must have perfect eyesight and colour vision
 - e) Candidates must be between 18-24 years old and must not be less than 5 feet 4 inches in height
2. Flight Steward/Stewardess —
 - a) SPM with at least a Grade 3

- b) Candidates must be between 18-27 years old
3. Aviation Engineering —
 - a) A degree in Aeronautical/Electronic/Mechanical Engineering
 - b) Candidates must be between 25-30 years old

Duration:

1. Pilot — depending on the number of required flying hours
2. Flight Steward/Stewardess — 2 1/2 to 3 months

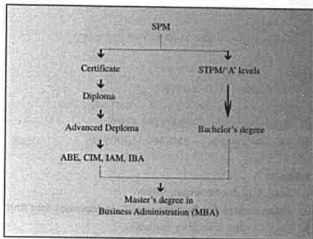
School:

1. Malaysian Airlines System

Business Studies/Business Administration

Qualifications awarded:

1. Certificate of Business Studies (CBS)
2. Diploma of Business Studies (DBS)
3. Diploma and Advanced Diploma of Business Administration
4. Professional qualifications e.g. ABE, CIM, IAM, IBA
5. Bachelor's degree in Business Administration

**Scope:**

1. Institute Administration Management (IAM)
 - a) Certificate
 - b) Diploma
 - c) Advanced Diploma
2. Association of Business Executives (ABE)
 - a) Certificate
 - b) Diploma
 - c) Advanced Diploma
3. Bachelor's degree
 - a) Local universities
 - b) American Degree Programmes
 - c) British Degree Programmes

Entry requirements:

1. Certificate — Completed SPM with 4 passes or equivalent, credit in English and must be above 18 years of age
2. Diploma —

- a) Mature student with experience
 - b) Certificate in Business studies
 - c) Private Secretarial Diploma
 - d) Very good passes in SPM or equivalent with credits in English and Maths
 - e) Proficient in English
3. Advanced Diploma —
 - a) STPM/A' levels or equivalent with 2 principal passes
 - b) LCCI passes in 4 subjects, 2 from Intermediate Level and 2 from Higher Level
 - c) Pitman Group and Higher Group Certificate
 - d) Mature students aged 21 years and above with 2 years of working experience
 4. Bachelor's degree (overseas) —
 - a) 3 Principal passes in STPM/A' levels or equivalent
 - b) English language proficiency e.g. TOEFL, IELTS or English Paper 1119
 5. Bachelor's degree (local) —
STPM or 'A' levels or equivalent

Duration:

1. Certificate — 6 months to 12 months
2. Diploma — 6 months to 2 years
3. Professional qualifications — 2 years
4. Bachelor's degree —
 - a) 3 years (local)
 - b) 1 year local and 2 years abroad (twinning)

Fees:

1. Certificate — RM1,000-2,300
2. Diploma and Higher Diploma — RM1,000-2,900
3. Advanced Diploma — RM1,000-5,000
4. Bachelor's degree — RM5,000-11,200/year

Schools:

1. AMC, School of Business, Sabah
2. **Asian Centre for Professional Development Sdn Bhd**
3. Bakti College (twinning available)
4. Bedford Training Centre
5. Binary Business School
6. Bintang Academy
7. Distd College
8. HELP Institute (twinning available)
9. Informatics College
10. Information Technology Training
11. Inpens College (twinning available)
12. Institut Perkim-Goon (twinning available)
13. Institut Sejati (twinning available)
14. Institut Wawasan (twinning available)
15. Institute Bina Usahawan
16. Institute Professional Sterling
17. Institute Sarjana (Transfer Degree)
18. Institute Usahawan Bumiputera
19. Intec College, Penang
20. Inti College
21. Jayadiri Institute of Technology
22. Kolej Antarabangsa (twinning available)
23. Kolej Tunku Abdul Rahman

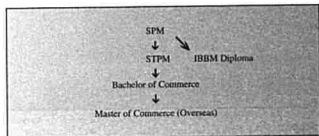
24. Kolej Uniket

25. Mahkota College (Degree Transfer Program)
 26. Mara Institute of Technology — for Bumiputeras only (twinning available)
 27. Metropolitan College (twinning available)
 28. MSC Premier College (twinning available)
 29. P J Community College (twinning available)
 30. PJ Tafe College
- #### 31. Olympia Business School
31. Ranger College
 32. Rima College Malaysia (twinning available)
 33. Sedaya College (twinning available)
 34. Stamford College (twinning available)
 35. STEP Training Centre
 36. Sunway College (twinning available)
 37. Systematic Group of Colleges
 38. TL Management Centre
 39. Wong Commercial Institute

Commerce/Banking and Finance/Economics

Qualifications awarded:

1. Certificate in Commerce
2. Certificate in Banking and Finance
3. Diploma in Commerce
4. Diploma in Banking and Finance e.g. IBBM
5. Bachelor of Commerce
6. Bachelor's degree in Banking and Finance



Scope:

1. Accounting
2. Banking
3. Finance
4. Human Resource Management
5. Information Systems
6. International Business
7. Legal Framework
8. Marketing
9. Public Relations

Entry requirements:

1. Certificate —
SPM or equivalent with credits in 3-4 subjects including Maths and English
2. Diploma —
 - a) A recognised Certificate
 - b) STPM/A' levels or equivalent with principal passes in at least 2 subjects (General Paper not included)

- c) Candidates must be proficient in English
- 3. Bachelor's degree —
 - a) Very good passes in STPM/A' levels
 - b) Candidates must be proficient in English
 - c) TOEFL/IELTS/English Paper 1119 accepted

Duration:

Commerce

- 1. Certificate — 6 months to 1 year
- 2. Diploma — 1 to 2 years
- 3. Bachelor's degree — 3 years

Banking and Finance

- 1. Certificate — 20 weeks
- 2. Diploma — 6 months
- 3. Bachelor's degree — 3 years

Fees:

- 1. Certificate — RM400-1,050
- 2. Diploma — RM1,000-4,000
- 3. Diploma in Banking and Commerce (IBBM) — RM500-1,100
- 4. Bachelor's degree — RM4,800-11,000/year

Schools:

- 1. AMC, School of Business, Sabah
- 2. Distd College (twinning available)
- 3. HELP Institute (twinning available)
- 4. Inpens College (twinning available)
- 5. Institut Sejati (twinning available)
- 6. Intec College, Penang
- 7. Inti College (twinning available)
- 8. **Kolej Agama Sultan Zainal Abidin**
- 9. Kolej Antarabangsa (twinning available)
- 10. Kolej Tunku Abdul Rahman
- 11. Metropolitan College (twinning available)
- 12. MSC Premier College (twinning available)
- 13. P J Community College (twinning available)
- 14. Prime College

15. Olympia Business School

- 16. Sedaya College (twinning available)
- 17. Sepang Institute of Technology (twinning available)
- 18. Sunway College (twinning available)
- 19. Systematic Group of Colleges

Dance/Ballet

Qualifications awarded:

- 1. Royal Academy of London (RAD)
- 2. Imperial Society of Teacher's of Dancing, London (ISTD)

Scope:

- 1. Aerobics
- 2. Ballet
- 3. Ballroom Dance
- 4. Jazz
- 5. Singing Class
- 6. Social Dance
- 7. Tap Dance
- 8. Tea Dance

Entry Requirements:

- 1. Please refer to respective dance schools

Duration:

- 1. RAD and ISTD Course — 3 months for each grade
- 2. Diploma — 3 years (F/T)
- 3. Other classes for adults — varies

Fees:

- 1. For Steps Schools of Dance and Art — RM30/wk – 90/month
- 2. For FAB — varies according to courses

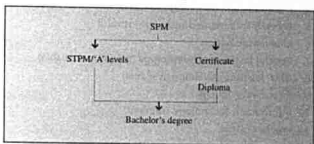
Schools:

- 1. Federal Academy of Ballet
- 2. Plaza Dance Academy
- 3. Step Schools of Dance and Art

Engineering/Technical Skills

Qualifications awarded:

- 1. Certificate in Engineering e.g. City and Guilds
- 2. Diploma in Technology/Engineering e.g. HND, BTEC
- 3. Bachelor's degree in Engineering



Scope:

- 1. Aerospace
- 2. Automotive
- 3. Building
- 4. Chemical
- 5. Civil
- 6. Electrical
- 7. Electromechanical
- 8. Electronic Engineering
- 9. Industrial
- 10. Manufacturing
- 11. Mechanical
- 12. Neurospace
- 13. Nuclear
- 14. Pneumatics — only Elmec Automation
- 15. Quantity Surveying
- 16. Telecommunications

Entry requirements:

- 1. Certificate —
 - a) SPM/SPMV/MCE 'O' levels/SM3 with credits in English, Mathematics and Physics
 - b) Applicants must be 16 and above
- 2. Diploma —
 - a) Certificate
 - b) STPM/A' levels or equivalent with 2 passes

3. Bachelor's degree —
 a) STPM/A' levels or equivalent with 3-5 passes
 b) Candidates must be proficient in English

Duration:

1. Certificate — 6 months to 2 years
2. Diploma — 1 to 3 years
3. Bachelor's degree —
 a) 3 to 4 years (local)
 b) 1 year local and 2 years overseas (twinning)

Fees:

1. Certificate — RM500-1,800
2. Diploma — RM2,400-7,000
3. Bachelor's degree —
 a) RM5,000-8,000/year (local)
 b) RM18,000 (overseas)

Schools:

1. Association of Consulting Engineers Malaysia (offers only Draughtsman courses)
2. Bedford Training Centre (Home Study Course)
3. BMC Institute
4. Distd College (twinning available)
5. Ecotech Training and Technical Institute
6. Elmec Automation
7. Federal Institute of Technology (twinning available)
8. HELP Institute (twinning available)
9. Informatics College
10. Information Technology Training
11. Impens College
12. Institut Bina Usahawan
13. Institut Megatech
14. Institut Teknologi dan Pengurusan Lebu Victoria
15. Institut Teknologi Midas
16. Institut Teknologi Setia
17. Institut Teknologi Utama
18. Institute Sejati (twinning available)
19. Institute Technology Pertama
20. Intec College, Penang
21. Inti College (twinning available)
22. Jayadiri Institute of Technology
23. **Johor Skills Development Centre**
24. Kolej Tunku Abdul Rahman
25. **Kolej Unitek**
26. Mahkota College
27. Mara Institute of Technology —
 for Bumiputeras only (twinning only)
28. Metropolitan College
29. Nanyang Institute of Electronics
30. P J Community College (twinning available)
31. PJ Tafe College
32. Prime College
33. Rima College Malaysia (twinning available)
34. Sedaya College (Degree Transfer Program)
35. Sepang Institute of Technology (twinning available)
36. Stamford College
37. Sunway College (twinning available)

38. Tuas Polytech
39. TWI Training and Certification Services South East Asia
40. Workers Institute of Technology

English

Qualifications awarded:

1. Certificate in Basic English
2. TOEFL
3. IELTS
4. Cambridge certificate
5. English for Business Communication

Scope:

1. General —
 a) Elementary
 b) Intermediate
 c) Advanced
2. English Paper 1119
3. TOEFL and IELTS

Entry Requirements:

1. SPM students with C3 in English
2. Students must be over 17 years old

Duration:

1. 10 weeks to 6 months (depending on course taken)
2. 'A' levels — (15 months)

Fees:

1. Certificate — RM80-290/ module/level
2. 'A' levels (RM5,600)
3. Intensive Course —
 a) RM900 (F/T)
 b) RM600 (P/T)
4. Language courses — RM600-1,200
5. IELTS and TOEFL — RM440 onwards
6. Business Communication — RM240-490

Schools:

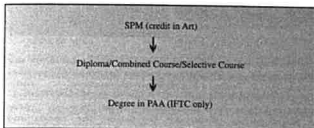
1. AMC, School of Business, Sabah
2. British Council
3. Distd College
4. ELS International Language Centre
5. Ernesco
6. HELP Institute
7. Impens College
8. Institut Perkim-Goon
9. Institute Professional Sterling
10. Institute Usahawan Bumiputera
11. Intec College, Penang
12. Inti College
13. Ipoh Learning and Training Institute
14. **Kolej Unitek**
15. Lang Education
16. Metropolitan College (twinning available)
17. PJ Tafe College
18. Prime College

19. Olympia Business School
20. Rima College Malaysia
21. SAL Group of Colleges
22. Sedaya College (Degree Transfer Program)
23. Sepang Institute of Technology
24. Stamford College
25. Sunway College
26. Systematic Group of Colleges
27. Taylor's College
28. The Language House
29. Young Men's Christian Association (YMCA)

Fashion Design

Qualifications awarded:

1. Diploma and Certificate in Fashion Designing and Dress Making
2. Degree Programme at the Paris American Academy, Paris France (IFTC only)



Scope:

1. Fashion Design
2. Figure Drawing
3. Colour Coordination
4. Pattern Drafting
5. Sewing Techniques
6. Computer Fashion Designing
7. Fabric and Merchandising
8. Cutting and Dressmaking
9. Textile Design

Entry requirements:

1. Students must have at least a credit in Art and certificates to substantiate qualifications
2. Fluent in English

Duration:

1. Diploma — 3 to 15 months (P/T and F/T available)
2. Bachelor's degree (PAA) — 1 year

Fees:

1. Diploma — RM600-7,800
2. Bachelor's degree (Not available)

Schools:

1. Ascot Academy of Fashion
2. Equator Academy of Art and Design
3. **Institute of Art and Design**
4. International Fashion Training Centre (IFTC)
5. **Lindy School of Fashion and Textile**
6. L.L.Chew Fashion Training Centre

7. New Austern Fashion Design

Films

Qualifications awarded:

1. Short film courses
2. Diploma Perfileman

Scope:

1. Acting
2. Animation
3. Cinematography
4. Directing
5. Editing
6. Production
7. Script writing
8. Voice and Sound Recording

Entry requirements:

1. Good passes in SPM

Duration:

1. Short term courses — 3 months
2. Diploma — 3 years

Fees:

1. Diploma — RM3,000-3,500/year

Schools:

1. Akademi Filem Malaysia
2. Akademi TV3

Floral Arrangement

Qualifications awarded:

1. Certificate

Scope:

1. Colour harmony
2. Commercial and festive designs
3. Marketing and sales
4. Preservation and fresh flower care
5. Professional management floral arrangement
6. Setting up and managing of a flower shop
7. Window display and designs

Entry requirements:

1. Candidates must be at least 16 years old and above

Duration:

1. Certificate — 6 months in-house training (P/T and F/T available)

Fees:

Minimum deposit — RM100

School:

PEPE Floral and Art Training Centre

L & G-INSTITUTE OF ART & DESIGN



SUPPORT FACILITIES:

- Students Accommodation
- Study/Bank Loans
- Reference Library
- Computer Labs
- Spacious Air-conditioned Studios & Lecture Halls
- Student Recreational Facilities
- IAD's Scholarship

We offer comprehensive courses in

- Visual Communication
- Textile & Fashion
- Interior Design

* 3-year Diploma at IAD

Malaysia today is one of the fastest growing economies in the world. In such a climate, Art & Design has an increasingly crucial and positive role to fulfil. Today's highly trained, creative individuals are tomorrow's professionals, instrumental in the development of design and its related industries. These professionals are required to effectively crystallise the needs and demands of an ever-growing sophisticated society such as Malaysia.

L&G INSTITUTE OF ART & DESIGN (IAD) is geared to meeting these urgent needs by training people to develop their talents, which will enable them to express their ideas creatively, whilst preparing them for a challenging and a fruitful career. It offers highly professional staff, modern facilities and a wide range of courses to provide for tomorrow's needs today.

IAD is a subsidiary of Land & General Berhad (L&G). IAD's mission complements L & G's diversified business activities. L & G is deeply committed to developing human resources, both to meet the demands of Vision 2020 as well as to provide educational training opportunities for students and workforce from Asian partner nations and Asia.

IAD students, on completion of their courses, are given preference in L & G's selection process for employment within the Group.

Diploma courses are accredited by the Birmingham Institute of Art & Design University of Central England. Students waiting to pursue a higher level of education in the United Kingdom are assured of a place at the University of Central England.

Name :

Address :

Course Interested :

Tel/Fax :

Please include RM1 stamp for postage of brochure & registration materials

Tel : 03-794 7535
: 03-793 8711

Fax: 03-794 7536

For further details:

L & G-INSTITUTE OF ART & DESIGN

(COLLEGE OF VISUAL ARTS SDN BHD - 100861 -H)

9-4, LORONG 4/137C, KM 8, JALAN KLANG LAMA

58000 KUALA LUMPUR



LAND & GENERAL BERHAD

Graphics Design

Qualifications awarded:

1. Certificate in Graphic Design
2. Diploma in Graphic Design
3. Bachelor's degree in Art (IAD only)
4. Other selective programmes e.g. Computer Art, etc

Scope:

1. Business Studies e.g. Business Art
2. Communication Studies
3. Computer Studies
4. Design Studies e.g. Graphic Design
5. Foundation Studies e.g. Layout and Lettering
6. Liberal Art e.g. History of Modern Art
7. Technological Studies e.g. Photography
8. Visual Communication

Entry requirements:

1. Certificate — Completed SPM or equivalent or at least 19 years of age
2. Diploma — Minimum academic requirement is a pass in STPM with a credit in Art; lesser qualifications may be considered if the candidate shows good artistic merit
3. For admission into IAD, applicants are required to have SPM qualifications with four credits; Art and English are pre-requisites; Bahasa Malaysia and Mathematics are advantageous.

Duration:

1. Certificate —
 - a) P/T — 2 years
 - b) F/T — 2 years
2. Diploma and Higher Diploma — F/T — 3 years
3. Selective programmes — 2 to 8 weeks

Fees:

1. Certificate —
 - a) P/T — RM350/month onwards
 - b) F/T — RM2,000 onwards
2. Diploma —
 - a) RM3,600-6,000
 - b) RM12,800-14,720 (if done overseas)
3. Professional qualifications — RM1,500-2,000/stage or level
4. Bachelor's degree — RM5,000-9,000/year

Schools:

1. ART Direction Graphic Design
2. Artes College of Art and Design
3. Central Academy of Art
4. Equator Academy of Art and Design (twinning available)
5. In House Computer Graphic Design Training Centre
6. **Institute of Art and Design (IAD)**
7. Intec College, Penang
8. Kuala Lumpur College of Art
9. MacAcademy (short computer courses for Art and Design)

10. Queen's Art Academy
11. Regent Art and Design Academy
12. SAITO Academy

Hair Styling

Qualifications awarded:

1. Francis Short courses
2. Diploma courses }
3. MLVK examinations }only at
4. World Federation Examination }Thomas and Guys

Scope:

1. Blow-dry Techniques
2. Colouring
3. Cutting Techniques
4. Fashion Perm
5. Usage of equipment

Entry requirements:

1. Candidates must be 17 years of age and above

Duration:

1. Short-term courses — 1 week to 4 months
2. Diploma — 24 to 28 weeks

Fees:

1. Short-term courses — RM200-3,000
2. Diploma — RM3,000-4,500
3. MLVK — RM100 (examination fee)
4. World Federation — 100 pounds (examination fee)

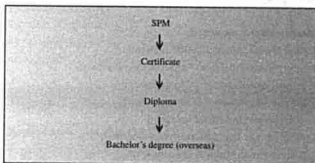
Schools:

1. Francis Hair and Styling Team — The Hair Professionals
2. Thomas and Guys Salon and School

Hospitality/Hotel Management

Qualifications awarded:

1. Certificate in Hospitality
2. Associate Diploma in Hospitality
3. Diploma in Hospitality
4. Advanced Diploma in Hospitality
5. Basic Certificate courses
6. Professional Chef Certificate
7. French National Diploma in Hotel and Catering Management



Scope:

1. Cellular Operations
2. Food and Beverage
3. Housekeeping
4. Reservation and Service
5. Restaurant Service
6. Table Setting
7. Telephone Services and Techniques

Entry requirements:

1. Candidates must be 18 years and above
2. Grade 1 in SPM/A' levels or its equivalent with 4 credits in Maths and English
3. Must be proficient in English

Diploma — Completion of certificate in Hotel and Catering Operations

Duration:

1. Basic certificate — 1 to 4 months
2. Certificate — 6 to 9 months
3. Diploma — 6 months to 2 1/2 years
4. Bachelor's degree — 1 to 2 years

Fees:

1. Basic certificate — RM500-3,000
2. Certificate — RM4,500-9,890
3. Diploma — RM6,500-9,000
4. Advanced Diploma — RM6,000-24,700 (if done overseas)
5. Degree — Please refer to respective colleges

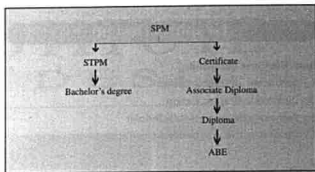
Schools:

1. Intec College, Penang
2. **Kolej Aman**
3. Mara Institute of Technology — for Bumiputeras only (twinning available)
4. Marco Polo Cooking Academy (offers only cooking classes)
5. P J Community College (twinning available)
6. Puteri Pan Pacific Hotel
7. **Olympia Business School (twinning available)**
8. Seni Masakan (Chef) Sdn Bhd (offers only cooking classes)
9. Stamford College
10. Systematic School of Hotel Management
11. Syuen Hotel and Catering Management Institute
12. Taylor's School of Hotel Management

Human Resources Management (HRM)

Qualifications awarded:

1. Certificate in Personnel Management
2. Certificate in Human Resource Development
3. Certificate in Security Management
4. Diploma in Personnel Management
5. Diploma in Industrial Relations
6. Diploma in Compensation Management
7. Associate of Business Executive, UK



8. Bachelor's degree (incorporated into major courses e.g. Business Management)

Scope:

1. Behaviour Science
2. Employment
3. Health, Safety and Environment
4. Organisational Behaviour
5. Personal Management
6. Training and Development

Entry requirements:

1. Certificate —
 - a) SPM/MCE 'O' levels with credits in at least 3 subjects
 - b) Mature candidates above 21 years with at least 2 years' relevant working experience
2. Associated Diploma —
 - a) Certificate in HRM
 - b) 2 principal passes in STPM/A' levels or its equivalent with 2 years' working experience
3. Diploma — Associate diploma in HRM
4. Bachelor's degree —
 - a) STPM/A' levels or its equivalent with a credit in English in SPM/O' levels or its equivalent

Duration:

1. Certificate — 6 months
2. Associate Diploma — 6 months
3. Diploma — 6 months
4. Bachelor's degree — 1 year local and 2 years abroad

Fees:

1. Certificate — RM1,530-1,700
2. Associate Diploma — RM1,665-1,850
3. Diploma — RM1,800-2,000
4. Bachelor's degree — RM10,000-11,000/year (abroad)

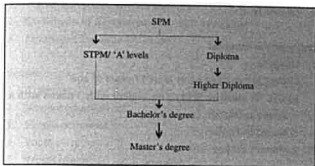
Schools:

1. Bedford Training Centre
2. Binary Business School
3. HELP Institute (twinning available)
4. Malaysian Institute of Personnel Management (only for courses 1-6)
5. MSC Premier College (twinning available)
6. P J Community College (twinning available)

Information Technology and Computer Science

Qualifications awarded:

1. Certificate in Information Technology
2. Diploma in Computing and Information Technology
3. NCC (National Computing Centre) and IDPM
4. Higher Diploma in Computing and Information Technology
5. Bachelor's degree in Computer Science
6. Bachelor's degree in Information Technology
7. Master of Science in Technology Management
8. Master of Science in Advanced Information Technology



Scope:

1. Artificial Intelligence
2. Computer systems
3. Management Information Systems
4. Programming
5. Software Engineering
6. System Analysis and Design

Entry requirements:

1. Certificate and Diploma —
 - a) SPM/MCE 'O' levels/SM3 with 4 credits including English and Maths
 - b) Candidates must be proficient in English
 - c) Candidates must be over 21 years of age and have at least 2 years' working experience relating to Data Processing
2. Bachelor's degree —
2 STPM Principal passes in Maths and Physics or its equivalent
3. Master's degree —
A relevant bachelor's degree in Information Technology and Computer Science

Duration:

1. Certificate — 2 to 6 months
2. Diploma — 6 to 18 months
3. Higher Diploma — 6 months to 2 years
4. Bachelor's degree —
 - a) 3 to 4 years
 - b) 1 year local and 2 years overseas (twinning)
5. Master's degree — 2 to 7 years

Fees:

1. Short-term courses — RM100-800
2. Certificate — RM900-1,000

3. Diploma — RM900-6,000
4. Higher Diploma — RM6,100-7,100
5. NCC — RM3,500
6. Bachelor's degree — RM9,000/year onwards
7. Master's degree — RM19,200-29,600

Schools:

1. AMC, School of Business, Sabah
2. Asia Pacific Institute of Information Technology
3. Bakti College (twinning available)
4. Bedford Training Centre
5. Binary Business School
6. Bintang Academy
7. BMC Institute
8. Distd College (twinning available)
9. HELP Institute (twinning available)
10. Informatics College
11. Information Technology Training
12. Inspens College (twinning available)
13. Institut FTMS
14. Institut Perdagangan Indah

15. Institut Perdagangan dan Teknik (short computer courses available only)

16. Institut Perkim-Goon
17. Institut Sejati (twinning available)
18. Institut Teknologi Pertama
19. Institute Bina Usahawan
20. Institute Professional Sterling
21. Intec College, Penang
22. Isomax Training Centre

23. Kolej Agama Sultan Zainal Abidin

24. Kolej Aman

25. Kolej Antarabangsa (twinning available)
26. Kolej Tunku Abdul Rahman (twinning available)
27. Locke Academy
28. Logica Centre
29. Mahkota College (twinning available)
30. Mantissa Technical Institute (short courses only)
31. Mara Institute of Technology —
for Bumiputera only (twinning available)
32. Metropolitan College (twinning available)
33. P J Community College (twinning available)
34. PJ Tafe College
35. Prime College (twinning available)

36. Olympia Business School (twinning available)

37. Rima College Malaysia (twinning available)
38. SAL Group of Colleges
39. Sedaya College (twinning available)
40. Sepang Institute of Technology (twinning available)
41. Stamford College
42. STEP Training Centre
43. Sunway College (twinning available)
44. Systematic Group of Colleges

Interior Design

Qualifications awarded:

1. Certificate in Interior Design

- Diploma in Interior Design
- Bachelor's degree in ARTS (IAD only)
- Other selective programmes e.g. Computer Art, etc.

Scope:

- Business Studies
- Design Studies e.g. Furniture
- Foundation Studies e.g. Drawing
- Liberal Art e.g. History of Architecture
- Technological Studies e.g. Lighting

Entry requirements:

- Certificate — Completed SPM or equivalent or at least 19 years of age
- Diploma — SPM with a pass in Art; lesser qualifications may be considered if candidates submit evidence of creative ability and artistic merit
- For admission into IAD, applicants are required to have SPM qualifications with four credits; Art and English are pre-requisites; Bahasa Malaysia and Mathematics are advantageous.

Duration:

- Certificate —
 - P/T — 2 years
 - F/T — 6 months-2 years
- Diploma — F/T — 6 months-3 years
- Bachelor's degree — 1 year
- Selective programmes — 2 to 8 weeks
- 10 months for courses with affiliated colleges in US

Fees:

- Certificate —
 - P/T — RM350 /month onwards
 - F/T — RM600-2,000 onwards
- Diploma F/T — RM1,200 -12,000

Schools:

- ART Direction Graphic Design
- Artes College of Art and Design
- Central Academy of Art
- Institute of Art and Design**
- Intec College, Penang
- Modern Institute of Interior Design

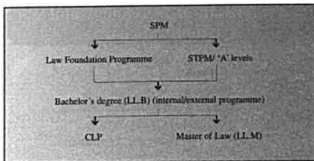
Law

Qualifications awarded:

- Diploma in Law (HELP)/Law Foundation Programme
- Bachelor of Law (LL.B)
- Certificate of Legal Practice (CLP)
- Master of Law (LL.M)

Scope:

- Commercial Law
- Company Law
- Constitutional Law
- Criminal Law



- English Legal System
- Family Law
- Land Law
- Law of Tort
- Law of Trust

Entry requirements:

- Diploma —
 - Candidates must be at least 17 years of age
 - GSE 'O' levels or SPM or equivalent with 3 passes with a credit in English
 - Fluent in English
- Bachelor's degree —
 - 2 principal passes in STPM/'A' levels or equivalent
 - A diploma in Law
 - Mature students over the age of 21 years without formal entry qualifications are welcome to apply

Duration:

- Law Foundation Programme and Diploma — 1 year/level
- Bachelor's degree (LL.B) —
 - 3 to 4 years (local university)
 - 1 year external programme done locally or 1 year overseas
- CLP — 9 months to 1 year
- Master's degree — 2 to 3 years

Fees:

- Law Foundation Programme/Diploma — RM5,000-11,000
- Bachelor's degree (LLB) —
 - RM2,500-4,000/year (external)
 - RM25,000 (overseas)
- CLP — RM3,000-4,000 (external programme)
- Master's degree — RM30,000/course

Schools:

- AMC, School of Business, Sabah
- Brickfields College (internal and external programmes)
- HELP Institute (twinning available)
- Impens College (twinning available)
- Institut Perkim-Goon (twinning available)
- Intec College, Penang
- Inti College (twinning available)
- Ipoh Learning and Training Institute
- Kolej Agama Sultan Zainal Abidin**
- Kolej Antarabangsa
- Kolej Uniket**
- Mara Institute of Technology — for Bumiputeras only

- (twinning only)
- Metropolitan College (twinning available)
 - PJ Tafe College
 - Prime College
 - Ranger College
 - Rima College Malaysia (twinning available)
 - Stamford College
 - Sunway College (twinning available)

Linguistics (French, German and Japanese)

Qualifications awarded:

- French Language Studies Diploma
- Certificate of German as a Foreign Language
- Japanese Language Certificate

Scope:

- Grammar
- Sentence formation
- Simple conversation
- Vocabulary
- Words usage

Entry requirements:

- French —
 - minimum 13 years of age
 - for non-beginners, an interview or written test to determine their level
- German —
 - Candidates must be over 16 years of age
 - Students with knowledge of German will be asked to take a test to determine their placement in the most suitable course
- Japanese —

Applicants can be students or working adults

Duration:

- French — 10 weeks of each extensive, semi-intensive and intensive courses
- German — 20 weeks for both elementary and intermediate stages (160 lessons)
- Japanese — 8-10 weeks

Fees:

- French — RM100-500
- German —
 - RM540
 - Examination (RM150-180)
- Japanese — RM450

Schools:

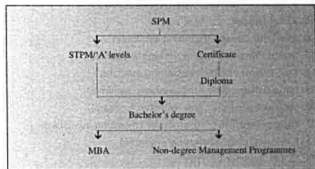
- French —
 - Alliance Francaise
 - Lang Education
 - Olympia Business School**
 - The Language House

- YMCA Kuala Lumpur
- German —
 - Goethe Institute
 - Lang Education
 - The Language House
 - YMCA Kuala Lumpur
 - Japanese —
 - The Language House
 - Inter-Cultural Japanese Language
 - Young Men's Christian Association (YMCA)
 - Intec College, Penang
 - Ernesco

Management/MBA

Qualifications awarded:

- Certificate in Management Studies
- Diploma in Management Studies
- Bachelor of Management Studies
- Master's degree in Business Administration (MBA)
- Non-degree Management Programme



Scope:

- Economic Analysis for Management
- Human Resources Management
- International Financial Management
- International Management
- Marketing Strategies

Entry requirements:

- MBA —
 - Relevant bachelor's degree's
 - A professional qualification that equates to a bachelor's degree
 - Minimum 2 years' relevant working experience
 - High level of proficiency in English

Duration:

- Certificate — 6 months
- Diploma — 6 months to 1 year
- Bachelor's degree —
 - 3 to 4 years local
 - 1 year local and 2 years overseas (twinning)
- Non-degree Management Programmes — 2 weeks to 6 months
- MBA — 2 to 3 years

Fees:

1. Certificate — RM1,000-4,000
2. Diploma — RM4,400
3. Bachelor's degree — RM5,500-11,000/year (abroad)
4. MBA — RM8,000-19,000/year
5. Non-degree Management Programme — RM2,000-9,800/year

Schools:

1. AMC, School of Business, Sabah
2. Asian Institute of Management
3. CFBT Management Development S/B
4. HELP Institute (twinning available)
5. Impens College
6. Institut Bina Usahawan
7. Institut Perkim-Goon
8. Institut Wawasan (twinning available)
9. Institute Professional Sterling
10. Institute Usahawan Bumiputera
11. Inti College (twinning available)

12. Kolej Agama Sultan Zainal Abidin**13. Kolej Aman**

14. Kolej Antarabangsa (twinning available)

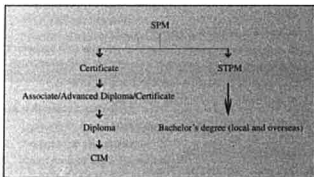
15. Kolej Uniktek

16. Mahkota College (twinning available)
17. Metropolitan College (twinning available)
18. MSC Premier College (twinning available)
19. Rima College Malaysia (twinning available)
20. Sedaya College (Degree Transfer Program)
21. Sepang Institute of Technology (twinning available)
22. Sunway College (twinning available)
23. TL Management Centre

Marketing

Qualifications awarded:

1. Certificate in Marketing
2. Associate Diploma in Marketing
3. Diploma in Marketing
4. Professional qualifications e.g. ABE, CIM
5. Bachelor's degree in Business (Marketing)

**Scope:**

1. Business Communications
2. International Market
3. Marketing Operation
4. Principles and Practices of Selling
5. Strategic Marketing

Entry requirements:

1. Certificate and Diploma —
 - a) Candidates must be at least 18 years of age and above
 - b) SPM/SM3/O' levels with credits in at least 3 subjects
 - c) Mature candidates above 21 years with at least 2 years' working experience
2. Bachelor's degree/CIM —
 - STPM/A' levels passes in 2 subjects excluding General Paper

Duration:

1. Certificate — 6 months to 1 year
2. Associate Diploma — 6 months to 1 year
3. Diploma — 6 months to 1 year
4. Professional qualifications — 2 years
5. Bachelor's degree — 3 years

Fees:

1. Certificate — RM1,050-1,350
2. Associate Diploma — RM1,000-1,600
3. Diploma — RM1,000-2,000
4. Bachelor's degree — RM5,000-11,000/year

Schools:

1. AMC, School of Business, Sabah
2. Bakti College (twinning with overseas university available)
3. Bedford Training Centre
4. Binary Business School
5. HELP Institute (twinning available)
6. Institut Perkim-Goon
7. Institute Bina Usahawan
8. Institute Professional Sterling
9. Inti College (twinning available)
10. Jayadiri Institute of Technology

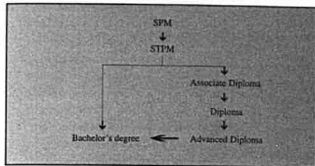
11. Kolej Agama Sultan Zainal Abidin**12. Kolej Aman**

13. Kolej Antarabangsa
14. Locke Academy
15. Mahkota College (twinning available)
16. Mara Institute of Technology — for Bumiputerans only (twinning available)
17. Metropolitan College (twinning available)
18. MSC Premier College (twinning available)
19. P J Community College
20. Olympia Business School
21. Ranger College
22. Rima College Malaysia
23. Sedaya College (Degree Transfer Program)
24. Stamford College
25. Sunway College
26. Systematic Group of Colleges

Mass Communication

Qualifications awarded:

1. Associate Diploma in Mass Communication
2. Diploma in Journalism
3. Diploma in Mass Communication
4. Advanced Diploma in Mass Communication



- Bachelor's degree of Science, Mass Communication
- Bachelor's degree of Arts, Mass Communication

Scope:

- Advertising
- Business Communications
- Economics
- Law
- Marketing
- Public Relations
- Workshop — Business and Mass Communication

Entry requirements:

- Associate Diploma —
 - Certificate in Business Studies
 - Certificate in Marketing
 - SPM/O' levels/SM3 or its equivalent with a credit in Bahasa Melayu, Chinese language or English
- Diploma —
 - Associate Diploma in Mass Communication
 - Advanced Certificate in Marketing
- Bachelor's degree —

STPM/A' levels or its equivalent with 2 principal passes not including General Paper, Home Studies, Religious Studies

Duration:

- Associate Diploma — 6 months to 1 year
- Diploma — 1 to 2 years
- Bachelor's degree —
 - 3 to 4 years (local)
 - 1 year local and 2 years abroad

Fees:

- Associate Diploma — RM990-1,250
- Diploma — RM1,000-1,350
- Advanced Diploma — RM1,100-1,450
- Bachelor's degree — RM5,000-9,000/year

Schools:

- Akademi Kewartawanan dan Informasi Taima
- Han Chiang Academy of Journalism Sdn Bhd
- HELP Institute (twinning available)
- Inti College (twinning available)
- Kolej Tunku Abdul Rahman
- Mahkota College (twinning available)
- Mara Institute of Technology — for Bumiputeras only (twinning available)
- Metropolitan College (twinning available)

9. Olympia Business School

- Rima College Malaysia (twinning available)
- Sedaya College (twinning available)
- Stamford College (Diploma in Public Relations)
- Sunway College (twinning available)

Medicine

Qualifications awarded:

- Bachelor of Medicine
- Bachelor's degree in Surgery
- Bachelor's degree in Obstetrics

Entry requirements:

- Australian Matriculation
- Canadian Pre-University
- GCE 'O' level English Language 1119
- STPM/A' levels with very good passes in Biology, Chemistry and Physics

Duration:

- 5-6 years (twinning programme with Ireland)
- 4 1/2 years (F/T in India)

Fees:

- Pre-clinical in Ireland — IEP 18,000/year
- Clinical done locally — RM47,000/year
- India F/T — RM260,000 (for 4 1/2 years)

Schools:

- Gaya Semarak Sdn Bhd (local representative affiliated with Jawaharlal Nehru Medical College (India), Karnataka University, Dharwad and Rajiv Gandhi University of Health Science, Bangalore)
- International Medical College (twinning with Ireland)
- Penang Medical College (twinning with Ireland)

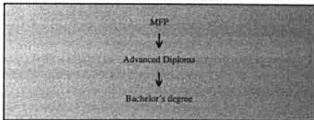
Music

Qualifications awarded:

- Music Foundation Programme (MFP)
- Advanced Diploma in Music
- Bachelor of Arts in Music
- Bachelor of Music
- Bachelor of Music Education
- Bachelor of Music Teaching

Scope:

- Fundamental of keyboard work and improvisation
- Instrumental studies
- Music theory



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THE AKADEMI MUZIK S.I.M.
AND
THE UNIVERSITY OF WESTERN
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Bachelor of Music Teaching (BMusT)

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Admission Office,
Akademi Muzik S.I.M.
18-20, 18A-20A, Jalan 19/36,
46300 Petaling Jaya,
Selangor Darul Ehsan, Malaysia
(03) 755 3819, 756 6202,
Fax: (03) 756 0805
(Other Diploma Courses available)

Office Hour:
10am to 4pm Tuesday to Friday
9am to 1pm Saturday



- Recitals
- Sight playing

Entry requirements:

- MFP —
 - Candidates must be at least 17 years old and should obtain at least a Yamaha Grade 6 or ABRSM Grade 7 in both Practical and Theory
- Advanced Diploma —
 - Academic — 5 credits in SPM or equivalent and 2 principal passes in STPM or equivalent (passes exclude General Paper)
 - Music — at least Grade 8 ABRSM in Practical and Theory, or Yamaha Grade 5 (Performance and Fundamentals) or its equivalent
 - Special Admissions — candidates above 21 years old; those who are exceptionally talented but without the above qualifications are eligible to apply
 - All candidates have to prepare a programme of approximately 15 minutes consisting of 2-3 pieces covering contrasting styles; candidates will be tested on sight reading and aural as well

Duration:

- MFP — 10 months (F/T and P/T available)
- Certificate — 2 years
- Advanced Diploma — 3 years (F/T)
- Bachelor's degree — 3 years (2 years local and 1 year overseas)

Fees:

- MFP — RM2,500/semester
- Advanced Diploma — RM8,000/semester
- Bachelor's degree — RM10,000-30,000 year

Schools:

- Akademi Muzik S.I.M.
- International College of Music
- Sedaya College (Degree Transfer Program)
- Yamaha Music School

Nursing

Qualifications awarded:

- Assistant Nurse Certificate
- Diploma in Nursing
- Bachelor of Health

Scope:

Please refer to respective nurses training schools

Entry Requirements:

- Candidates must be good in English
- SPM or equivalent with credits in Bahasa Malaysia, Maths, Science and two other subjects
- Mature candidates can be considered

Duration:

- Certificate — 2 years (F/T)
- Diploma — 3 years (F/T)
- Bachelor of Health — 1 year (P/T)

Fees:

- Certificate — RM3,940
- Diploma — RM5,880
- Bachelor's degree — RM12,500

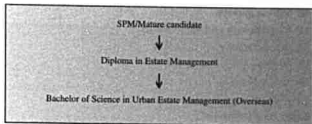
Schools:

- Assunta Hospital
- Pantai College of Nursing, Kuala Lumpur
- Kolej Agama Sultan Zainal Abidin**

Real Estate

Qualifications awarded:

- Diploma in Estate Management



Scope:

- Accounting
- Land Economics
- Law
- Marketing
- Property Management
- Property Taxation

Entry requirements:

- Diploma —
 - SPM/O' levels with 3 credits preferably English
 - STPM/A' levels with 3 principal passes preferably English and Maths
 - TOEFL/IELTS qualifications

Duration:

- Diploma — 2 years (F/T)
- Bachelor's degree — 1 year (overseas)

Fees:

- Diploma — RM3,290-3,490
- Bachelor's degree — Temporarily not available

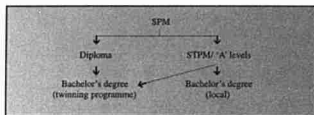
Schools:

- G Institute of Real Estate
- SK Brothers Realty

Science

Qualifications awarded:

- Diploma in Science (affiliated with overseas university)
- Bachelor of Science (local and overseas)



Scope:

1. Actuarial Science
2. Biochemistry
3. Biology
4. Biomedical
5. Biotechnology
6. Earth Science
7. Environmental Science
8. Food Science and Nutrition
9. Healthcare
10. Marine Biology
11. Microbiology and Immunology
12. Oceanography
13. Physics
14. Sports Science

Entry requirements:

1. Diploma —
 - a) SPM/SM3/MCE 'O' levels with passes in 4 subjects or equivalent
 - b) Candidates must be proficient in English
2. Bachelor's degree —
 - a) STPM/'A' levels or equivalent with passes in 2-3 principal subjects

Duration:

1. Diploma — 6 months to 1 year (P/T and F/T)
2. Bachelor's degree —
 - a) 3 to 4 years (local)
 - b) 1 year local and 2 years overseas

Fees:

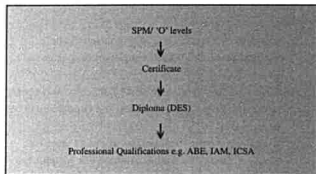
1. Diploma — RM1,500
2. Bachelor's degree — RM5,000-9,000/year

Schools:

1. HELP Institute (twinning available)
2. Institut Sejati (twinning available)
3. Inti College (twinning available)
4. Kolej Tunku Abdul Rahman
5. **Kolej Unitek**
6. Mara Institute of Technology — for Bumiputeras only (twinning available)
7. Metropolitan College (twinning available)
8. P J Community College (twinning available)
9. Prime College
10. Rima College Malaysia (twinning available)
11. Sedaya College (Degree Transfer Program)
12. Sepang Institute of Technology (twinning available)
13. Sunway College (twinning available)

Qualifications awarded:

1. Private Secretarial Certificate (PSC)
2. Diploma in Secretarial Studies
3. Diploma in Executive Secretaryship (DES)



Scope:

1. Business and Finance
2. Human Resources Management
3. ICSA — 4 levels
4. Marketing
5. Office Automation
6. Office System and Technology
7. Public Relations
8. Shorthand
9. Typing

Entry requirements:

1. Completed SPM/'O' levels or equivalent
2. DES —
 - a) Completed PSC
 - b) Mature students with one year's experience
3. ICSA —
 - a) SPM/'O' levels or equivalent with 5 credits including English, Maths and Science
 - b) STPM/'A' levels with 2 principal passes

Duration:

1. Certificate — 1 year (P/T and F/T available)
2. Diploma — 1 year (P/T and F/T available)
3. DES — 5 to 8 months
4. Professional qualifications — 2-2 1/2 years

Fees:

1. Certificate — RM1,500-3,300
2. Diploma — RM1,500-3,300
3. DES — RM1,000-3,600
4. Professional qualifications — RM1,000-1,500/level/stage

Schools:

1. AMC, School of Business, Sabah
2. **Asian Centre for Professional Development Sdn Bhd**
3. Bedford Girls College
4. Bintang Academy
5. Inpens College
6. Institut Perkim-Goon

- Institute Bina Usahawan
- Mara Institute of Technology — for Bumiputeras only (twinning available)
- PJ Tafe College
- 10. Olympia Business School**
- Rima College Malaysia
- SAL Group of Colleges
- Stamford College
- STEP Training Centre
- Sunway College
- Systematic Group of Colleges

Teaching

Qualifications awarded:

- Pre-school Teachers-Training Course
- Bachelor of Education (affiliated with Universiti Pertanian Malaysia)
- Postgraduate Diploma of Education

Entry requirements:

- Pre-school — SPM holders
- Bachelor's degree — STPM
- Diploma — Degree holders

Duration:

- Pre-school — 6 months to 2 years

- Bachelor's degree — twinning programme with Universiti Pertanian Malaysia
- Diploma — 11 months to 1 1/2 years

School:

Perdana College of Education

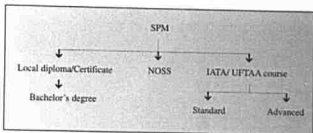
Tourism

Qualifications awarded:

- Travel and Tourism certificates
- Travel and Tourism Diploma
- IATA/UFTAA Diploma
- National Occupational Skills Standard Programmes (NOSS)

Scope:

- Air Transport
- Airfares and Ticketing



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Part-time or Full-time Course for SPM Holders

☆ Diploma of Education

For Degree Holders—Part-time or Full-time

☆ Bachelor of Education/B.Ed.

A Twinning Programme with the University Pertanian Malaysia

FOR FURTHER INFORMATION, PLEASE CONTACT THE COLLEGE DIRECTLY.
(CEO & PRINCIPAL: DATUK HAJI AZMI JUNID)

3. Business and Incentive Travels
4. Congress, Conferences and Conventions
5. Customer Service
6. Foreign Languages courses
7. Marketing
8. Tour/Travel programmes
9. Tourism Management Studies
10. Travel Geography

Entry requirements:

1. Form 5 (SPM) and able to converse in English

Duration:

1. Certificate — 3 months to 6 months
2. Diploma — 6 months to 1 year
3. NOSS Programmes — 15 months
4. Bachelor's degree — 1 year local and 2 years abroad

Fees:

1. Local — RM5,600-6,200
2. IATA/UFTAA — RM3,500
3. Bachelor's degree — RM10,000-11,000/year (abroad)

Schools:

1. Abacus Distribution System (Malaysia) Sdn Bhd
2. Airline Training Centre
3. AMC, School of Business, Sabah
- 4. Kolej Aman**
5. Mahkota College
6. Mara Institute of Technology —
for Bumiputeras only (twinning available)
7. MSC Premier College (twinning available)
- 8. Olympia Business School**
(twinning available)
9. Reliance Travel and Tours Agency
10. SF Tourism Agency
11. Travex Institute of Tourism

PUBLIC INSTITUTIONS OF HIGHER LEARNING

- 1) Universiti Islam Antarabangsa (UIA)
P.O. Box 70, Jalan Sulatan
46700 Petaling Jaya
Selangor
- 2) Universiti Kebangsaan Malaysia (UKM)
The Registrar
43600 Bangi
Selangor
- 3) Universiti Malaya (UM)
The Principal Assistant Registrar
Public Relations Officer
59100 Kuala Lumpur
- 4) Universiti Malaysia Sabah (UMS)
The Registrar
P.O. Box 2073
88999 Kota Kinabalu
Sabah
- 5) Universiti Malaysia Sarawak (UNIMAS)
The Registrar
94300 Kota Samarahan
Sarawak
- 6) Universiti Pertanian Malaysia (UPM)
The Registrar
43400 Serdang
Selangor
- 7) Universiti Sains Malaysia (USM)
Main Campus
Minden
11800 Penang

School of Medical Science/Universiti Hospital
Universiti Sains Malaysia
15990 Kubang Kerian
Kelantan

Perak Branch Campus
Universiti Sains Malaysia
Seri Iskandar
31750 Tronoh
Perak
- 8) Universiti Teknologi Malaysia (UTM)
The Registrar
P.O. Box 791
80990 Johor Bahru
Johor

- 9) Universiti Utara Malaysia (UUM)
The Registrar
Sintok
06010 Jitra
Kedah

UNIVERSITY FEES

Universiti Islam Antarabangsa (UIA)	RM 1,600 - 1,700/year (including lodging at campus and related fees)
Universiti Kebangsaan Malaysia (UKM)	RM 1,900 - 2,500/semester (including exam fees)
Universiti Malaya (UM)	Master degree RM 1,000 - 1,600/session RM 400 (examination and re-examination fees) Doctorate degree RM 900/session RM 500 (examination and re-examination fees) Teaching materials fund/ Notes fee RM 250 - 2,500
Universiti Malaysia Sabah (UMS)	RM 500 - 1,500 (estimated cost for various diploma and undergraduate courses)
Universiti Malaysia Sarawak (UNIMAS)	RM 1,000 - 1,500/semester
Universiti Pertanian Malaysia (UPM)	RM 550 - 850/semester (excluding exam fees) RM 476 - 952/semester (lodgings at hostel)
Universiti Sains Malaysia (USM)	RM 500 - 1,500 (estimated cost for various diploma and undergraduate courses)
Universiti Teknologi Malaysia (UTM)	RM 550 - 700/semester (excluding exam fees)
Universiti Utara Malaysia (UUM)	RM 800 - 1,000/semester

FACULTY	QUALIFICATIONS	DURATION (YEARS)	UNIVERSITIES	BASIC ENTRY REQUIREMENTS
MATRICULATION (UM Matriculation is for Bumiputeras only)				
Academy of Islam	Preparatory course	2	UM	1 year for candidates who took STPM/HSC/STP examinations or equivalent; 2 years for candidates who have passed SPM/SPMV or equivalent examinations with at least 4 Science subjects
Art and Social Science	Foundation English Programme	2	UM	Same as above
Centre for Foundation Studies in Science	1) Foundation Studies in Science	1 or 2	UM, UKM	Same as above
	2) Pre-accounting	2	UM	Same as above
	3) Preparatory course in Teaching of English as a Second Language	2	UM	Same as above
	4) Special Preparatory Programme (Japanese)	2	UM	Same as above
Centre for Matriculation Studies	1) Accountancy Matriculation	2	UPM, UUM	SPM qualifications with at least credits in Bahasa Malaysia, English and Mathematics
	2) Physics Science Matriculation	2 (SPM)/ 1 (STPM)	UPM, UMS	1 year for candidates who took STPM/HSC/STP examinations or equivalent; 2 years for candidates who took SPM or equivalent with credits in at least 4 subjects including Bahasa Malaysia, English, Mathematics, and Physics
	3) Science Matriculation	2 (SPM)/ 1 (STPM)	UPM, USM	1 year for candidates who took STPM/HSC/STP examinations or equivalent; 2 years for candidates who took SPM or equivalent with credits in at least 6 subjects including Bahasa Malaysia, Mathematics and in two Science subjects
	4) TESL Matriculation	2	UPM	SPM qualifications with at least a Grade A2 in English and 5 other credits including Bahasa Malaysia
DIPLOMA				
Agriculture	Diploma in Agriculture	6 semesters	UPM	Grade 1 or 2 in SPM/SPMV or equivalent with credits in Bahasa Malaysia and Mathematics and 4 Science subjects or subjects related to course chosen by candidates
Forestry	Diploma in Forestry	6 semesters	UPM	Same as above
Human Ecology	Diploma in Human Development	6 semesters	UPM	Same as above
Marine Science and Fishery Sains dan Pengajian Alam Sekitar	Diploma in Fishery	6 semesters	UPM	Same as above
	Diploma in Computer Science	6 semesters	UPM	Same as above
Veterinary Science	Diploma in	7	UPM	Same as above

	Veterinary Science	semesters		
Computer Science and Information Technology	Diploma in Computer Science	3 — 5	UTM	Grade 1 or 2 in SPM/SPMV or equivalent with credits in Bahasa Malaysia and Mathematics and 4 Science subjects or subjects related to course chosen by candidates preferably Chemistry and Physics
Engineering	1) Architecture	3		
Environmental Design	2) Diploma in Engineering	3		
	3) Quantity Surveying	3		
	4) Diploma in Town and Regional Planning	3		
Other Diploma courses	1) Diploma Air Traffic Control	3		
	2) Diploma Land Survey	3		
	3) Diploma Penilaian	3		
	4) Diploma Technology Management	3		
Science	Diploma in Laboratory Technology	3	USM	Grade 1 or 2 in SPM/SPMV or equivalent with credits in Bahasa Malaysia and
Medical Science	1) Diploma in Medical Laboratory Technology	3		Mathematics and 4 Science subjects or subjects related to course chosen by candidates
	2) Diploma in Nursing	3		

FIRST DEGREE COURSES:

ARTS

Academy of Islam	Bachelor in Islamic Studies (Honours)	3 — 6	UM, UKM, UIA	SPM or equivalent with credits in Bahasa Malaysia and English and STPM or equivalent with 3 principal passes including Pengajian Am and Syariah or Usuluddin; candidates must be proficient in Arabic Language and Literature
Applied and Creative Arts	Bachelor of Arts (Honours)	4	UMIMAS*	STPM or equivalent with passes in Pengajian Am and subjects relevant to the course taken e.g. Art
Arts and Social Science/Humanities	1) Bachelor of Arts (Honours)	3 — 4	UM, UKM, UPM, UMS, UNIMAS, USM	STPM or equivalent with passes in Pengajian Am and subjects relevant to the course taken e.g. Malay Literature
	2) Bachelor of Arts (English Language Studies) — Honours	3 — 4	UKM, UPM, USM	SPM or equivalent with a credit in English and a pass in English 1119 or STPM or equivalent with at least a principal pass in English Literature
	3) Bachelor of Arts (Translation and Interpretation) — Honours	3	USM	SPM or equivalent with a credit in Bahasa Malaysia and STPM or equivalent — two good principal passes or one good principal pass with at least two other Grade R subjects; with a pass in Pengajian Am
	4) Bachelor of Arts in Education (Honours)	3	USM	STPM or equivalent with passes in Pengajian Am and subjects relevant to the course taken
	5) Bachelor of Communication (Hons)	3	USM	Same as (4)
	6) Bachelor of Social Science (Honours)	3	USM	Same as (4)
Business Management	1) Bachelor of Accounting (Honours)	3 — 5	UM, UKM, UUM, UPM, UTM, UIA,	STPM or equivalent—a good principal pass in Accounts, Economics, Geography, Maths or any Science subjects with at least two

				other Grade R subjects with a pass in Pengajian Am or two good principal passes including Economics and any Science subject with a pass in Pengajian Am or A recognized Diploma or a Matriculation certificate related to the degree from any recognised institution
	2) Bachelor of Accounting with Education	4	UPM	Same as (1)
	3) Bachelor of Business Administration (Honours)	3—5	UM, UKM, UUM, UPM, UTM, UMS, UIA	Same as (1)
	4) Bachelor in Business Administration for Executive (Honours)	3	UKM	Same as (1)
	5) Bachelor in Business Administration through Distance Learning	3	UKM	Same as (1)
	6) Bachelor of Human Resources Management (Honours)	4	UUM, UNIMAS	SPM or equivalent — a credit in Mathematics and a pass in English and STPM or equivalent with a pass in Accounting, Economics or Mathematics
	7) Bachelor in International Business Management (Honours)	4	UUM	Same as (1)
	8) Bachelor of Management (Honours)	3	USM	Same as (1)
	9) Bachelor of Tourism Management (Honours)	4	UUM	Same as (1)
Economics and Administration	Bachelor of Economics (Honours)	4	UM, UKM, UUM, UPM, UMS, UIA, UNIMAS	STPM or equivalent—a good principal pass in Economics, any Science subject or Accounts, Geography or Maths or with at least two other Grade R subjects with a pass in Pengajian Am or Two good principal passes including Economics and any Science subject with a pass in Pengajian Am or A recognised Diploma or a Matriculation certificate related to the degree from any recognised institution
Education	1) Bachelor of Education (Honours)	4	UM, UPM* UMS, USM	SPM or equivalent with a credit in Bahasa Malaysia and STPM or equivalent—two good principal passes or one good principal pass with at least two other Grade R subjects; with a pass in Pengajian Am.
	2) Bachelor of Education (Special Education) —Honours	3	UKM	Same-as (1)
	3) Bachelor of Education in TESL (Honours)	3	UKM, UPM, UNIMAS	SPM or equivalent with a credit in Bahasa Malaysia and English; STPM or equivalent—a good principal pass in English Literature
	4) Sarjana Muda Teknologi serta Pendidikan	5	UTM	STPM or equivalent— two good principal passes or one good principal pass with at least two other Grade R subjects related to course taken; with a pass in Pengajian Am
Human Sciences	Bachelor of	4	UIA*	STPM or equivalent with 3 principal passes

	Human Sciences			and candidates must be proficient in Arabic Language and Literature
Law	1) Bachelor of Laws — LL.B(Hons)	4	UM, UKM, UIA	STPM or equivalent with passes in Pengajian Am and subjects relevant to the course taken
	2) Bachelor of Laws (Shari'ah) — LL.B(Shari'ah)	4	UIA	STPM or equivalent with 3 principal passes and candidates must be proficient in Arabic Language and Literature
Syariah	Sarjana Muda Syariah (Honours)	4	UM	STPM or equivalent with passes in Pengajian Am, Syariah or Usuluddin and proficient in Arabic Language and Literature
Usuluddin	Sarjana Muda Usuluddin (Honours)	4	UM	STPM or equivalent

SCIENCE

Alam Bina	Sarjana Muda Perancangan Bandar and Wilayah	5	UTM	STPM or equivalent—two good principal passes or one good principal pass with at least two other Grade R subjects related to course taken e.g. Chemistry, Maths and Physics; with a pass in Pengajian Am
Allied Health Sciences	1) Bachelor of Audiology (Honours)	4	UKM	SPM with credit in Bahasa Malaysia and STPM with passes in Pengajian Am and in subjects relevant to the programme of study
	2) Bachelor of Optometry (Honours)	4	UKM, UNIMAS	Same as (1)
	3) Bachelor of Science (Honours) in Dietetics	4	UKM	Same as (1)
	4) Bachelor of Science (Honours) in Nutrition	4	UKM	Same as (1)
	5) Bachelor of Speech Sciences (Honours)	4	UKM	Same as (1)
Centre for Distance Learning	1) Bachelor of Arts (Communication/ Psychology)	6 — 16 semesters	UKM	SPM with credit in Bahasa Malaysia and STPM with passes in Pengajian Am and in subjects relevant to the programme of study
	2) Bachelor of Business Administration			
	3) Bachelor of Science (Mathematical Science)			
	4) Bachelor of Science (Mathematical Science with Education)			
	1) Bachelor of Arts	4 — 5	USM	STPM with at least a Grade E in two subjects and a pass in Pengajian Am
2) Bachelor of Education				
3) Bachelor of Engineering				
4) Bachelor of Science				
5) Bachelor of Social Science				
Cognitive Sciences and Human Development	Bachelor of Science (Hons)	4	UNIMAS*	STPM or equivalent—good principal passes in Science subjects related to course taken; with a pass in Pengajian Am
Computer Science and Information Technology	1) Bachelor of Computer and Information Engineering	4 — 5	UTM, UIA, UNIMAS	STPM or equivalent—good principal passes in Science subjects related to course taken e.g. Chemistry, Mathematics and Physics with a pass in Pengajian Am

	2) Bachelor of Computer Science/Information Technology (Honours)	3—4	UM, UKM, UUM, UPM, UNIMAS, USM	STPM or equivalent—two good principal passes or one good principal pass with at least two other Grade R subjects with a pass in Pengajian Am; SPM—a good pass in Mathematics or A recognized Diploma or a Matriculation certificate related to the degree from any recognised institution.
Computer Science and Information Technology	1) Bachelor of Computer Science/Information Technology (Honours)	3—4	UM, UKM, UUM, UPM, UNIMAS, USM	STPM or equivalent—two good principal passes or one good principal pass with at least two other Grade R subjects with a pass in Pengajian Am; SPM—a good pass in Mathematics or A recognized Diploma or a Matriculation certificate related to the degree from any recognised institution.
	2) Bachelor of Computer and Information Engineering	4—5	UTM, UIA, UNIMAS	STPM or equivalent—good principal passes in Science subjects related to course taken e.g. Chemistry, Mathematics and Physics with a pass in Pengajian Am
Dentistry	Bachelor of Dental Surgeon (Honours)	5	UM, UNIMAS	STPM or equivalent—three good principal passes e.g. Biology and Chemistry; with a pass in Pengajian Am or Diploma in Science with good passing grades from a recognised institution
Development Science	Bachelor of Development Science (Honours)	3	UKM	SPM with credit in Bahasa Malaysia and STPM with passes in Pengajian and in subjects relevant to the programme of study
Engineering	1) Bachelor of Architecture	4	UM, USM	STPM or equivalent—two good principal passes or one good principal pass with at least two other Grade R subjects related to course taken e.g. Chemistry, Maths, and Physics; with a pass in Pengajian Am
	2) Bachelor of Engineering (Honours)	4—5	UM, UKM, UTM*, UIA, UPM, UMS, UNIMAS, USM	Same as (1)
Life Sciences	Bachelor of Science (Honours)	4	UKM*	STPM or equivalent—good principal passes in Science subjects related to course taken e.g. Biology, Chemistry and Mathematics; with a pass in Pengajian Am
Mathematical Science	Bachelor of Science (Honours)	4	UKM	STPM or equivalent—good principal passes in Science subjects related to course taken; with a pass in Pengajian Am
Medicine	1) Bachelor of Medicine (Honours)	5	UM, UKM, UNIMAS, USM	STPM or equivalent—three good principal passes; with a pass in Pengajian Am or Diploma in Science with good passing grades from a recognised institution
	2) Bachelor of Pharmacy	4	UM, UKM, USM	Same as (2)
	3) Bachelor of Science (Bio—Medical)	4	UM, UKM, UPM	Same as (2)
	4) Bachelor of Science (Nursing)	3	UM, UNIMAS	STPM or equivalent—good principal passes in Science subjects related to course taken

	5) Bachelor of Surgery (Honours)	5	UM, UKM	e.g. Biology and Chemistry with a pass in Pengajian Am; and SPM or equivalent with credits in at least 6 subjects including Bahasa Malaysia, Mathematics and in two Science subjects or equivalent with credits in Biology and Chemistry
	6) Bachelor of Veterinary Medicine (Honours)	4—5	UPM	STPM or equivalent—good principal passes in Science subjects related to course taken e.g. Biology, Chemistry and Mathematics; with a pass in Pengajian Am
Physical and Applied Sciences	1) Bachelor of Science (Honours)	3—4	UKM* USM UPM*	STPM or equivalent—good principal passes in Science subjects related to course taken e.g. Biology, Chemistry and Physics; with a pass in Pengajian Am
	2) Bachelor of Technology (Honours)	3	USM	Same as (1)
Science — (includes all Sciences)	1) Bachelor of Science (Honours)	4—5	UM, UTM, UPM*, UMS, UNIMAS, USM	SPM or equivalent with credits in Bahasa Malaysia and Maths and other Science subjects e.g. Biology, Chemistry and Physics and STPM or equivalent—good principal passes in Science subjects related to course taken e.g. Biology, Chemistry, Maths and Physics or Economics; with a pass in Pengajian Am
	2) Bachelor of Science and Computer with Education	5	UTM	STPM or equivalent—good principal passes in Science subjects related to course taken e.g. Mathematics and Physics; with a pass in Pengajian Am
	3) Bachelor of Science in Education (Honours)	3—5	UM, UKM, UPM, UTM, USM	Same as (1)
	4) Bachelor of Science in Housing, Building and Planning (Honours)	3	USM	STPM or equivalent—good principal passes in Science subjects related to course taken e.g. Mathematics and Physics; with a pass in Pengajian Am
Science and Natural Resources	Bachelor of Science (Honours)	4	UKM*, UNIMAS*	STPM or equivalent—good principal passes in Science subjects related to course taken e.g. Biology, Chemistry and Mathematics; with a pass in Pengajian Am
Sports Centre	Bachelor of Science (Sports)	4	UM	SPM with credit in Bahasa Malaysia and STPM with passes in Pengajian and in subjects relevant to the programme of study
Ukur and Harta Tanah	Sarjana Muda Ukur	5	UTM	STPM or equivalent—two good principal passes or one good principal pass with at least two other Grade R subjects related to course taken e.g. Chemistry, Maths, and Physics; with a pass in Pengajian Am

HIGHER DEGREE COURSES:

ARTS				
Arts and Social Science/ Humanities	1) Diploma in Police Science	1	UKM	Only open to military and police personnel
	2) Diploma in Psychology	2	UKM	An honours degree or equivalent with

	(Counselling)	semesters		several years teaching experience in related field
	3) Diploma in Publishing Studies	1	UM	Diploma in Publishing Studies or equivalent
	4) Diploma in Social Studies	5 — 10 semesters	UKM	Same as (2)
	5) Diploma in Sociology and Anthropology	2 semesters	UKM	Same as (2)
	6) Diploma in Strategic and Defence/Security Studies	1	UM, UKM	Same as (1)
	7) Diploma in Strategic Studies	1	UM	Same as (1)
	8) Master of Arts	2 — 5	UM, UKM, UMS, UNIMAS	An honours degree or equivalent
	9) Master of Arts (English Language Studies)	2	UKM	Same as (2)
	10) Master of Philosophy	2	UKM	A Bachelor's degree or equivalent
	11) Master of Publishing Studies	1 — 2	UM	Same as (3)
	12) Doctor of Letters	Published work	UM	Master of Arts or a higher degree or Doctor of Philosophy
	13) Doctor of Philosophy in Arts	3 — 5 (9 — 18 semesters)	UM, UKM, UMS, UNIMAS	A Master's degree or equivalent or A Bachelor's degree with several years experience in related field
Applied and Creative Arts	1) Master of Arts	4 — 8 semesters	UNIMAS*	A good first degree with Honours in Arts or equivalent
	2) Doctor of Philosophy in Arts	6 — 14 semesters	UNIMAS*	A Master's degree in Arts, Science or equivalent
Business Management	1) Advanced Diploma in Human Resource Management	1 1/2 — 3	UKM	A Bachelor degree or equivalent with experience in related field
	2) Master of Accounting		UM, UKM, UUM	A Bachelor degree in Accounting or An honours degree or equivalent with several years experience in related field
	3) Master of Business Administration	4 — 6 semesters	UM, UPM, UUM, UKM, UMS	An honours degree or equivalent
	4) Master of Business Administration for Executive	1 1/2 — 3	UKM	A Bachelor degree or equivalent
	5) Master of Management	2 — 3	UPM	Same as (4)
	6) Doctor of Philosophy in Business Administration	2 — 8 semesters (Thesis)	UM, UKM, UUM, UPM, UMS	A Master's degree with two years experience or/and an honours degree with several years experience in related field
Centre for Distance Learning	Diploma in Education	4 semesters	UKM	A Bachelor degree or equivalent
Centre for Graduate Studies	1) Diploma in Logistic Science	3 semesters	UKM	A Bachelor's degree or equivalent
	2) Postgraduate Diploma in Industrial Safety Management	2 — 10 semesters	UKM	A Bachelor's degree or equivalent with experience in related field
	3) Master of Arts (Clinical Psychology)	2 — 10 semesters	UKM	Same as (3)
	4) Master of Environmental Management	2 — 10 semesters	UKM	A good Bachelor's degree with honours or equivalent
Economics and Administration	1) Diploma in Public Administration	1	UM	An honours degree or A pass degree with 3 years experience in related field

	2) Postgraduate Diploma in Economics	4 semesters	UKM	Bachelor degree in Economics or equivalent honours degree
	3) Master of Economics	2 — 4 semesters	UM, UKM, UUM, UIA, UMS	An honours degree or equivalent with experience in related field
	4) Master of Public Administration	4 — 6 semesters	UM	An honours degree or equivalent or Pass degree and a Diploma in Public Administration with 3 years working experience
	5) Doctor of Economics	Published work	UM	Master of Economics or Master of Arts in Economics or Bachelor of Economics or Accounting and a Master's degree or higher degree or Doctor of Philosophy in Economics
	6) Doctor of Philosophy in Economics	2 — 7 (Thesis)	UM, UKM, UUM, UMS	A Master's degree or equivalent or a Bachelor degree with at least 7 years experience in related field
Education	1) Diploma in Education	1	UM, UKM, UIA	A Bachelor's degree or equivalent
	2) Master of Education	2 — 6 semesters	UM, UKM, UIA, UMS	An honours degree or equivalent and Diploma in Education with experience
	3) Doctor of Education	Published work	UM	A Master's degree or higher degree with a Diploma in Education and a Bachelor's degree or Bachelor of Science with Education and a Master's degree or higher degree or Master of Education or Doctor of Philosophy in Education
	4) Doctor of Philosophy in Education	12 — 14 semesters (Thesis)	UM, UKM, UMS	A Master's degree or equivalent or A Bachelor's degree with several years teaching experience in related field
Institute of Advanced Studies	1) Master of Biotechnology	4 — 6 semesters	UM	An honours degree in a related field
	2) Master of Philosophy	1 — 2	UM	An honours degree or equivalent
	3) Master in Technology (Material Science)	4 semesters to 5 years	UM	An honours degree or A degree with research experience or An advanced diploma equivalent to a degree and 3 years experience
Institute of Malay World and Civilisation	1) Master of Letters	2 — 10 semesters	UKM	A good Bachelor's degree with honours or equivalent
	2) Doctor of Philosophy	6 — 14 semesters	UKM	A Master's degree or equivalent in Malay Studies or other related field
Islamic Studies	1) Postgraduate Diploma in Islamic Studies	2 — 4 semesters	UKM, UIA	A good Bachelor degree or equivalent
	2) Master in Islamic Studies	2 — 6 semesters	UKM, UIA	A good Bachelor degree in Islamic Studies or equivalent
	3) Doctor of Philosophy in Islamic Studies	6 — 12 semesters	UM, UKM	A Master's degree in Islamic Studies or equivalent
Language Centre	1) Diploma in Advanced Translation	1	UM	Diploma in Translation
	2) Diploma in Applied Linguistics	1	UM	A degree and SPM or equivalent with 2 years teaching experience in language teaching/research
	3) Diploma in Bahasa Malaysia	1	UM	A degree and a credit in Bahasa Malaysia at SPM or 2 years Bahasa Malaysia in a university or equivalent

	4) Diploma in Conference Interpretation	1	UM	A degree or SPM/equivalent and 5 years experience in interpretation and/or translation work
	5) Diploma in English as a Second Language	1	UM	A degree with 3 years teaching experience or Without a degree but with SPM or equivalent; are teachers with the Government of Malaysia and 5 years teaching experience with 2 years in English
	6) Diploma in French	2	UM	A degree and 3 years teaching experience; candidates must passed French Language at SPM/equivalent or 2 years French Language course at ITM, any university or Alliance Francais
	7) Diploma in International Interpretation	1	UM	Diploma in Conference Interpretation
	8) Diploma in Language and Culture	1	UM	A degree and SPM equivalent and passed 2 years in any language or Certificate of Language Proficiency/equivalent
	9) Diploma in Translation	1	UM	A degree or SPM/equivalent and 5 years experience in interpretation and/ or translation work
	10) Master of Arts	2 — 6 semesters	UKM	A good Bachelor's degree in related field with several years experience
	11) Master of English as a Second Language	3 — 4 semesters	UM	An honours degree in related field/ equivalent or An honours degree with 2 years working experience or A degree with 5 years experience in related field
	12) Master of Modern Language Studies	3 — 4 semesters	UM	An honours in related field or An honours degree with 2 years experience in related field or A Bachelor's degree with 5 years experience in related field
	13) Doctor Of Philosophy	1	UM, UKM	A Master's degree or equivalent or a Bachelor's degree with several years experience in related field
	14) Doctor of Philosophy (English Language Studies)	3 — 5 (Thesis)	UKM	A Master's degree or equivalent or A Bachelor's degree with several years teaching experience in related field
Law	1) Master of Comparative Law	4 semesters to 5 years	UM, UIA	An honours degree or equivalent and have passed in at least two courses in law at undergraduate level
	2) Master of Law	2 — 3	UM	A good Bachelor degree in Law with several years experience
	3) Doctor of Law	Published work	UM	Bachelor of Law (Honours) and Master of Law or a higher degree in Law or Bachelor's degree in Law (7 years) or Doctor of Philosophy in Law (5 years)
	4) Doctor of Philosophy in Law	1(Thesis)	UM, UIA	A Master's degree or equivalent or A Bachelor degree with at least 7 years experience in related field
Syariah	1) Diploma in Law and Administration of Islamic Judiciary	2 — 4 semesters	UIA	A good Bachelor's degree or equivalent preferably in Islamic Studies or equivalent
	2) Postgraduate Diploma in Syariah Law and Practice	3 — 4 semesters	UKM, UIA	Same as (1)
	3) Sarjana Syariah	4 — 6 semesters	UM	An honours degree or equivalent

Usuluddin	Sarjana Usuluddin	4 — 6 semesters	UM	An Bachelor's degree in Usuluddin (Honours) or equivalent
SCIENCE				
Allied Health Sciences	1) Master of Health Science	2 — 6 semesters	UKM	A Bachelor's degree in Health Science or equivalent with working experience
	2) Doctor of Philosophy	2 — 6 semesters	UKM	A Master's degree or equivalent with working experience in related field
Cognitive Science and Human Development	2) Doctor of Philosophy in Science	3 — 15 semesters	UNIMAS*	A Master's degree or equivalent in related field
	1) Master of Science	9 — 18 semesters	UNIMAS*	A Bachelor's degree in Behavioural Sciences or equivalent with at least a Second Class Honours
Computer Science and Information Technology	1) Diploma in Computer Science	1 — 2	UM	A degree with a credit in Additional Maths at SPM level
	2) Master of Computer Science/Advanced Information Technology	2 — 6 semesters	UM, UKM, UUM, UNIMAS	A Bachelor degree with honours in Computer Science
	3) Master in Library and Information Science	3 — 5 semesters	UM, UIA	An honours degree or equivalent
	4) Doctor of Philosophy in Information Technology	Published work	UM, UKM, UNIMAS	A Master's degree or equivalent with working experience in related field
Dentistry	1) Master of Clinical Science	3	UM	Bachelor's degree in Dental Surgery and 2 years clinical experience in dentistry
	2) Master of Community Dentistry	1	UM	Bachelor's degree in Dental Surgery and 2 years clinical experience in dentistry
	3) Master of Dental Science	1 — 2	UM	Bachelor's degree in Dental Surgery or any Bachelor degree of Science (Honours) in related field
	4) Doctor of Dental Science	Published work	UM	A Master's degree or equivalent with working experience in related field
Development Science	1) Master in Development Science	1 1/2 — 3	UKM	Bachelor's degree in Development Science or any Bachelor's degree of Science (Honours) in related field
	2) Master in Philosophy	2 — 10 semesters	UKM	Same as (1)
	3) Doctor of Philosophy	Published work	UKM	A Master's degree or equivalent with working experience in related field
Engineering	1) Master of Engineering	2 — 3	UM, UKM, UNIMAS	Bachelor of Engineering (Honours) or equivalent with relevant experience
	2) Master of Engineering Science	2 — 3	UM, UKM	Same as (1)
	3) Doctor of Science in Engineering	Published work	UM	A Bachelor of Engineering and a Master's Degree or a higher degree in Engineering or A Bachelor's degree in Engineering and a Master of Engineering Science or Doctor of Philosophy In Engineering
	4) Doctor of Philosophy in Engineering	9 — 18 semesters	UM, UKM, UNIMAS	A Master's degree or equivalent or A Bachelor's degree with several years experience in related field
Human Science	Master of Human Sciences	2 — 3	UIA	Bachelor degree In Human Sciences or equivalent
Interpretation	Certificate of Court Interpretation	1 semester	UM	Pass SPM/MCE with a credit in Bahasa Malaysia and proficient in another language

Languages	1) Certificate of Proficiency in Languages (Foreign languages)	3	UM	MCE or equivalent
	2) Certificate of Proficiency in Languages for Specific Purposes (English, French and German)	1	UM	UM certificate of Proficiency in the relevant languages
	3) Advanced Certificate of Proficiency in Languages (Foreign languages)	1	UM	Same as (2)
Life Sciences	1) Master of Science	1 — 2	UKM*	A Bachelor's degree with honours or equivalent with working experience
	2) Master of Science (Conservation Biology)	1	UKM	A Bachelor's degree with honours or equivalent with working experience
	3) Doctor of Philosophy (Thesis)	(Thesis)	UKM*	A Master's degree or equivalent with working experience in related field
Mathematical Science	1) Master of Science	2 — 6 semesters	UKM	A Bachelor's degree with honours or equivalent with working experience
	2) Doctor of Philosophy (Thesis)	6 — 10 semesters (Thesis)	UKM	A Master's degree or equivalent with working experience in related field
Medicine	1) Master of Bio - Medical Science	3 — 15 semesters	UNIMAS	Bachelor degree with honours in Bio - medical Science or related field
	2) Master of Medical Science	1 — 2	UM, UKM*	Bachelor of Medicine and Bachelor of Surgery or Bachelor of Dental Surgery or equivalent or Bachelor of Science with honours or equivalent or Bachelor of Veterinary Science with experience
	3) Master of Medicine (Anaesthesiology)	4 — 7	UM, UKM	Bachelor of Medicine and Bachelor of Surgery; Registered for medical practice; 1 year clinical experience
	4) Master of Medicine (Family Medicine)	4 — 7	UM, UKM	Same as (3)
	5) Master of Medicine (Internal Medicine)	4 — 7	UM, UKM	Same as (3)
	6) Master of Medicine (Paediatrics)	4 — 7	UM, UKM	Same as (3)
	7) Master of Medicine (Psychiatry)	4 — 7	UM, UKM	Same as (3)
	8) Master of Medicine (Radiology)	4 — 7	UM, UKM	Same as (3)
	9) Master of Obstetric and Gynaecology	4 — 7	UM, UKM	Same as (3)
	10) Master of Pathology	4 — 7	UM, UKM*	Same as (3)
	11) Master of Public Science/Community Medicine	1 — 2	UM, UKM	Same as (3)
	12) Master of Surgery (General Surgery)	4 — 7	UM, UKM	Same as (3)
	13) Master of Surgery (Ophthalmology)	4 — 7	UM, UKM	Same as (3)
	14) Master of Surgery (Orthopaedics)	4 — 7	UM, UKM	Same as (3)
	15) Master of Surgery (Otorhinolaryngology)	4 — 7	UM, UKM	Same as (3)
	16) Master of Veterinary Medicine	2 — 4	UPM	Bachelor of Veterinary Science with experience
	17) Doctorate in Medical Science	2 — 5	UKM	A Master of Science degree or equivalent with relevant experience in related field

	18) Doctor of Medicine	2 — 5	UM, UKM	A graduate of at least two years standing in Medicine and Surgery or equivalent
	19) Doctor of Philosophy (for UNIMAS — Ph.D in Bio - medical Science)	9 — 18 semesters	UM,UKM* UNIMAS	Same as (17)
Physical and Applied Sciences	1) Master of Science	1 — 2	UKM*	A Bachelor's degree with honours or equivalent with working experience
	2) Doctor of Philosophy	(Thesis)	UKM*	A Master's degree or equivalent with working experience in related field
Science (includes all Sciences)	1) Master of Science	1 — 2	UM, UPM* UMS UM	A Bachelor's degree with honours or equivalent with working experience
	2) Doctor of Science	Published work		Bachelor of Science/Science with Education/Agricultural Science and a Master's degree or higher degree in Science or Agriculture or Master of Science/Agricultural Science or Doctor of Philosophy in Science/Agricultural or Bachelor of Medicine and Surgery/Medical Science and a higher degree or equivalent or a Doctor of Philosophy in Medicine
	3) Doctor of Philosophy in Science	(Thesis)	UM, UPM, UMS	A Master's degree or equivalent with working experience in related field
Science and Natural Resources	1) Master of Science	1 — 2	UKM*, UNIMAS	A Bachelor's degree with honours or equivalent with working experience
	2) Doctor of Philosophy in Science	9 — 18 semesters	UKM*, UNIMAS	A Master's degree or equivalent with working experience in related field
Translation	Professional Certificate in Translation (Intensive)	8 weeks	UM	Advanced Language Proficiency Certificate or Certificate of Proficiency in Languages for Specific Purposes with a credit in Bahasa Malaysia at SPM and experience or equivalent

*Universiti Pertanian Malaysia (UPM)

- Bachelor of Education (Agricultural Science)
- Bachelor of Education (Domestic Science)
- Bachelor of Education (Guidance and Counselling)
- Bachelor of Education (Physical Education)
- Bachelor of Education (Teaching Bahasa Malaysia as a First Language)
- Bachelor of Science (Agricultural Business)
- Bachelor of Science (Biotechnology)
- Bachelor of Science (Environment)
- Bachelor of Science (Honours)
- Bachelor of Science (Marine Science)
- Bachelor of Science and Food Technology
- Bachelor of Science in Agriculture
- Bachelor of Science in Community Health and Dietary
- Bachelor of Science in Fishery
- Bachelor of Science in Forestry
- Bachelor of Science in Horticulture
- Bachelor of Science in Human Development

18. Bachelor Sastera (Bahasa Melayu/Bahasa Moden)

19. Master of Agriculture Science

*Universiti Kebangsaan Malaysia (UKM)

Faculty of Life Sciences - Specialisation

- Biochemistry
- Botany
- Food Science
- Food Science with Management
- Genetics
- Microbiology
- Zoology

Faculty of Medicine - Doctor of Philosophy in

- Anatomy
- In any field of Medicine
- Medical Biochemistry

4. Medical Physiology
5. Pharmacology
6. Public Health

Master of Medical Science in

1. Anatomy
2. Biochemistry
3. Microbiology
4. Parasitology
5. Pharmacology
6. Physiology
7. Public Health

Master of Pathology in

1. Haematology
2. Histopathology
3. Forensic Medicine
4. Chemical Pathology
5. Microbiology and Parasitology

Faculty of Physical and Applied Science - Specialisation

1. Chemistry
2. Geology
3. Material Science
4. Nuclear Science
5. Physics

Faculty of Science and Natural Resources - Specialisation

1. Environmental Science

2. Material Science

Universiti Islam Antarabangsa (UIA)

Faculty of Human Sciences - Specialisation

1. Arabic Language and Literature
2. Communications
3. English Language and Literature
4. History and Civilisation
5. Philosophy
6. Political Science
7. Psychology
8. Sociology and Anthropology

Universiti Malaysia Sarawak (UNIMAS)

Faculty of Cognitive Sciences and Human Development -

1. Applied Education
2. Cognitive Psychology
3. Human Resource Development
4. TESL

Faculty of Applied and Creative Arts -

1. Arts and Management
2. Cinematography
3. Design
4. Drama and Theater
5. Fine Arts

Training, AWOPS Training, ETOPS Rules

ENGINEERING TRAINING

- Basic and Aircraft Type courses
- Licensed Aircraft Maintenance Engineers
- Workshop Engineers/Technicians/Mechanics
- Bachelor Degree in Mechanical Engineering (Aircraft Maintenance) /Electrical Engineering(Avionics) /IT/Management Technology (Airlines Management)



AIRFREIGHT TRAINERS

- Airfreight skills/Advance Airfreight skills.
- Dangerous Goods Regulations.
- Special loads handling.
- Certificate in Airfreight Management.
- Diploma in Airfreight Management.

(2) TOURISM STUDIES

- Basic and Advanced Fares and Ticketing
- Certificate in Hospitality
- Certificate in Tourist Guide
- Malaysian Certificate of Travel Trade

- Degree in Tourism Studies

(3) HUMAN POTENTIAL DEVELOPMENT

- Over 30 Knowledge, Skills, Attitude Training Programmes e.g. Corporate War Games, Interpersonal Skills, Discovering Your Inner Self, Total Customer Satisfaction

(4) SERVICES TRAINING



- Specialised training in "soft" areas for frontliners e.g. Grooming and Etiquette, Enhancing Your Professional Image, Impression Making Practices and Courtesy Techniques, Telephone Techniques and Courtesies

(5) INFORMATION TECHNOLOGY

- Various Systems Training programmes e.g. Lotus Smartsuits. Most of Malaysia Airlines Academy programmes enjoy HRDC "Approved Training Programme" (ATP) status

**Malaysian Association of
Certified Public Accountants**
No. 15, Jalan Medan Tuanku
50300 Kuala Lumpur
Tel: 03-2989622

**Malaysian Association of The Institute of
Chartered Secretaries and Administrators**
12, Jalan Telawi 3
Bangsar Baru
59100 Kuala Lumpur
Tel: 03-2829276

**Malaysian British Educational Cooperation
Services (MABECS)**
No. 9, 2nd Floor
Jalan Barat
46200 Petaling Jaya
Selangor
Tel: 03-7567655

Malaysian Institute of Accountants
Dewan Akauntan
2, Level 4
Jalan Tun Sambanthan 3
Brickfields
50470 Kuala Lumpur
Tel: 03-2745055

Malaysian Institute of Management (MIM)
227, Jalan Ampang
50450 Kuala Lumpur
Tel: 03-2645255

or

3rd Floor, Kompleks Mutiara
125, Jalan Anson
10400 Penang
Tel: 04-2290307

or

Suite 3.6, Level 3
Menara Pelangi
Jalan Kuning, Taman Pelangi
80400 Johor Bahru
Johor
Tel: 07-3349934/3349935

**Malaysian Institute of
Personnel Management (MIPM)**
No. 3, Jalan Timur
Section 9

46060 Petaling Jaya
Selangor
Tel: 03-7556536

**Malaysian Insurance Institute
5, Jalan Sri Semantan Satu
Damansara Heights
50490 Kuala Lumpur
Tel: 03-2544234**
(Please refer to profile on pg. 295)

Mantissa Technical Institute
66B, Block Crystal
Jalan 1/19
46000 Petaling Jaya
Selangor
Tel: 03-7936480

Marco Polo Cooking Academy
122A, Jalan Imbi
55100 Kuala Lumpur
Tel: 03-2415507

Methodist College Kuala Lumpur
Off Jalan Tun Sambanthan 4
Brickfields
50470 Kuala Lumpur
Tel: 03-2741851

Metropolitan College
1, Jalan Subang Utama
47500 Subang Jaya
Petaling Jaya
Selangor
Tel: 03-7344711

Modern Institute of Interior Design
65-67, 2nd Floor
Jalan Petaling
50000 Kuala Lumpur
Tel: 03-2381616

or

1, (1st Floor), Jalan 8/1E
46050 Petaling Jaya
Selangor

MSC Premier College
5, Jalan 5/6C
Off Jalan Pahang Barat
Pekeliling Business Centre
53000 Kuala Lumpur
Tel: 03-4236504/4236509

MSC - Syme Business School

No. 1 and 3

Jalan 65C

Off Jalan Pahang Barat

Pekeliling Business Centre

53000 Kuala Lumpur

Tel: 03-4236504

Nanyang Institute of Electronics

No. 608D, Jalan Hang Kasturi

50050 Kuala Lumpur

Tel: 03-2387662

or

No. 103, 3rd, 4th and 5th Floor

Wisma B.W.T.

Jalan Petaling

50000 Kuala Lumpur

New Austern Fashion Design School

No. 434-2 (3rd Floor)

Jalan Tuanku Abdul Rahman

50100 Kuala Lumpur

Tel: 03-4418613

Olympia Business School**300, Wisma Muisan****Jalan Raja Laut****50350 Kuala Lumpur****Tel: 03-2933868***(Please refer to profile on pg. 300)***Pantai College of Nursing**

Hospital Pantai Berhad

No. 8, Jalan Bukit Pantai

59100 Kuala Lumpur

Tel: 03-2825077

Penang Medical College

c/o Nationwide Professional

Suite 9.04, 9th Floor

Wisma Stephens

Jalan Raja Chulan

50200 Kuala Lumpur

Tel: 03-2486388

PE PE Floral and Art Design Training Centre

No. 95 (Back Portion)

Jalan Bukit Bintang

55100 Kuala Lumpur

Tel: 03-2482405

or

160B, Jalan Tun H.S.Lee

50000 Kuala Lumpur

Personal Development Leadership

c/o Management Corporation (M) Sdn Bhd

No. 35 and 37

Jalan 2/114A

Taman Indrahana

Off Jalan Kuchai Lama

58100 Kuala Lumpur

Tel: 03-7838655

PJ Community College

No. 21, Jalan Barat

46200 Petaling Jaya

Selangor

Tel: 03-7558611

or

P.O.Box 624

Jalan Sultan

46770 Petaling Jaya

Selangor

PJ Tafe College

Jalan 223C

Section 51A

46100 Petaling Jaya

P.O.Box 22

46700 Petaling Jaya

Selangor

Tel: 03-2010266

Plaza Dance Academy

50A, Jalan SS 19/1D

47500 Subang Jaya

Selangor

Tel: 03-7321289

Prime College

10, Jalan 1/137B

Jalan Klang Lama

58000 Kuala Lumpur

Tel: 03-7811660

Pusat Latihan YBK

Jalan Perusahaan 6

Kawasan Perusahaan 6

Bandar Baru

45000 Kuala Selangor

Selangor

Tel: 03-8893367

Name:

OLYMPIA BUSINESS SCHOOL

Address:

300, Wisma Muisan
Jalan Raja Laut
50350 Kuala Lumpur

Tel:

03-2933868

Fax:

03-2945369

Established:

1971

FACILITIES

- 2 computer laboratory with 45 computers LAN network
- Library
- Hotel mock-up room (bar, bedroom, dining)
- Model Office for Secretaries

COURSES OFFERED

School of Accounting

- Chartered Association of Certified Accountants (ACCA) (UK)
- Chartered Institute of Management Accountants (CIMA) (UK)
- Certified Diploma in Accounting and Finance (CDAF)
- LCCI Diploma in Accounting and Finance
- Institute of Chartered Secretaries and Administrators (ICSA)

School of Banking

- Certificate/Diploma in Banking and Finance

School of Secretarial Science

- LCCI Private Secretarial Certificate (UK)
- Oxford County College (UK) Joint

- Diploma in Private Secretaryship
- Diploma in Executive Secretaryship

School of Computer Information Science

- Certificate/Diploma/Advanced/Graduate Diploma in Information Systems
- City and Guilds (C & G) (UK)
- Institute of Data Processing Management (IDPM)
- NCC course (UK)
- Computer Programming Languages
- Computer Software Packages

School of Language Studies

- Languages - English, Bahasa Malaysia, French
- Intensive certificates
- Diploma in Proficiency/Intermediate/Advanced

School of Business and Marketing

- Institute of Administrative Management (IAM) (UK)
- Chartered Institute of Marketing (CIM) (UK)/Cyprus Institute of Marketing
- Association of Business Executives (ABE) (UK)
- Certificate in Business Studies
- Associate Diploma in Business Studies (ADBS)
- Diploma/Advance Diploma in Business Administration
- Diploma in Marketing

School of Mass Communication

- LCCI Diploma in Marketing
- LCCI Diploma in Advertising
- LCCI Diploma in Public Relations
- Diploma In Mass Communication
- Certificate in Business Communication

School of Tourism and Hospitality Management

- Certificate in Tourism and Hospitality Studies
- Diploma/Associate Diploma in Hospitality Management
- Diploma/Associate Diploma in Tourism Management
- Advance Diploma in Tourism and Hospitality Management

School of Extension Studies

- Executive Development Studies
- Post graduate Diploma in Corporate Management and Strategic Planning
- Advance Diploma/Master in Business Administration

School of Foundation Studies

- GCE 'A' Levels (AEB/Oxford)
- Access Programmes

Course Highlights

- Established in 1971, Olympia Business School has evolved into a pace-setter in the field of private

education, providing prestigious and internationally recognised qualifications.

- A dedicated and qualified team of lecturers with a dynamic and systematic approach to teaching
- Lecture and tutorial notes and, where applicable, hand outs, past year examination questions and selected reading material for easy reference.
- Regular progress tests for Student Evaluation.
- Up-to-date library resources and references.
- Parents receive regular academic progress reports on full time students.
- Study related activities including field trips, educational visits and membership to college societies (where applicable).
- Individual attention and special guidance for weak students.
- Academic and Personal Counselling.
- Scholarship Schemes, Best Students Awards and Book Prize Schemes for outstanding students.
- Convenient time slots for part-time students to attend evening classes.



Puteri Pan Pacific Hospitality Institute

'The Kotaraya' P.O.Box 293

80730 Johor Bahru

Johor

Tel: 07-2233333

Queen's Art Academy

3rd Floor, Lot 2650

3rd Mile, Central Park

Rock Road

93200 Kuching

Sarawak

Tel: 082-236505

Ranger College

13 - 15, Jalan Banda Kaba

75000 Melaka

Tel: 06-2840784/2835533

Regional Office**Middlesex University**

Suite 2.10

Wisma HLA

Jalan Raja Chulan

50200 Kuala Lumpur

Tel: 03-2018479

Rima College Kuala Lumpur

54, Jalan Ampang

50450 Kuala Lumpur

Tel: 03-2322055

or

Rima College Petaling Jaya

1, Jalan Sultan

46200 Petaling Jaya

Selangor

Tel: 03-7572635

or

Rima College Johor Bahru

62A, Jalan Yahya Awal

80100 Johor Bahru

Johor

Tel: 09-2230733/2236973

or

Rima College Penang

52A, Penang Road

10000 Penang

Tel: 04-2630366/2630762

SAITO Academy

School of Graphic Design

2 and 4, Jalan 52/18

PJ New Town

46200 Petaling Jaya

Selangor

Tel: 03-7547211

or

School of Interior Design

Kompleks Pernas Sogo

7th Floor

190, Jalan Tuanku Abdul Rahman

50100 Kuala Lumpur

SAL Group of Colleges

No. 10, Jalan Pudu

55100 Kuala Lumpur

Tel: 03-2384529

or

Lot 3.02 Wisma Padi Corp

Jalan Kemajuan 5517/1A

11 Jalan Kee Ann

75100 Melaka

Tel: 06-2832686

or

1C, Jalan Gereja

80100 Johor Bahru

Tel: 07-2244560/2230787

Sedaya College

17, Jalan 19/29

46300 Petaling Jaya

Selangor

Tel: 03-7577830

Seni Masakan (CHEF) Sdn Bhd

360-2, 2nd Floor

Jalan Pudu

55100 Kuala Lumpur

Tel: 03-2418780

Sepang Institute of Technology

Admissions Office

5th Floor, Klang Parade

2112 Jalan Meru

41050 Klang

Selangor

Tel: 03-3430628

SF Tourism Academy Sdn Bhd
61A, Jalan Sultan
50000 Kuala Lumpur
Tel: 03-2303522/2327804

S.K. Borthers Realty
Wisma S.K. Brothers
33,35 and 37
Jalan 3/108C
Taman Sungei Besi
57100 Kuala Lumpur
Tel: 03-7807629

Stamford College
1st Floor
Wisma IJM Annexe
Jalan Yong Shook Lin
46050 Petaling Jaya
Selangor
Tel: 03-7551563

STEP Training Centre
38, Jalan 19/3
46300 Petaling Jaya
Selangor
Tel: 03-7545819/7561031

STEP School of Dance and Art
83, 6th Floor
Jalan Sultan
50000 Kuala Lumpur
Tel: 03-2327743

**Sultan Zainal Abidin Islamic College
(KUSZA)
Gong Badak
21300 Kuala Terengganu
Terengganu
(Ref: Admission Unit)
Tel: 09-6664466/6664570
(Please refer to profile on pg. 304)**

Sunway College
No. 5, Jalan Kolej
Bandar Sunway
46150 Petaling Jaya
Selangor
Tel: 03-7358622

Systematic Professional Centre
Bangunan Systematic
33-35, Jalan Hang Lekiu
50100 Kuala Lumpur
Tel: 03-2322536

**Syuen Hotel and
Catering Management Sdn Bhd**
2, Laluan Rokam 13
Off Jalan Rokam
Pekan Razaki
31350 Ipoh
Perak
Tel: 05-3131219

**Tadika Sri Montessori Sdn Bhd
(formerly known as
London Montessori Centre (M) Sdn Bhd)**
52A, Jalan SS 22/25
Damansara Jaya
47400 Petaling Jaya
Selangor
Tel: 03-7179531/7196323

**The Centre for Instructor and
Advanced Skill Training (CIAST)**
Jalan Petani 19/1
P.O. Box 7012
Section 19
40900 Shah Alam
Selangor
Tel: 03-5415736/5415739

Name:

TADIKA SRI MONTESSORI SDN BHD

(formerly known as London Montessori Centre (M)
Sdn Bhd)

Address:

52A, Jalan SS 22/25
Damansara Jaya
47400 Petaling Jaya
Selangor D.E.

Tel:

03-7179531/7196323

Fax:

03-7179343

Types of Studies:

Full-time (F/T), Part-time(P/T), Correspondence

C O U R S E S O F F E R E D

- Early Childhood Teaching Diploma (F/T, P/T and correspondence)
- Early Childhood Teaching Certificate (F/T, P/T and correspondence)
- Nursery Foundation Teaching Diploma (P/T and correspondence)
- Special Education Needs Diploma (P/T and correspondence)
- Montessori English Language Teaching Certificate (Correspondence)
- Trainer's course (Correspondence)

Name:

**SULTAN ZAINAL ABIDIN ISLAMIC
COLLEGE (KUSZA)**

Address:

Gong Badak
21300 Kuala Terengganu
Terengganu
(Ref: Admission Unit)

Tel:

09-6664466/6664570

Fax:

09-6662566

A Brief Introduction:

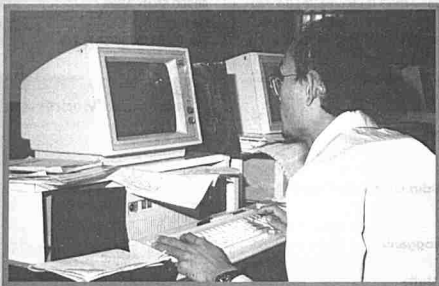
The Sultan Zainal Abidin Islamic
College (KUSZA) was established in
January 1980, and is the first centre
for Islamic higher learning in
Terengganu.

KUSZA's philosophy

"To create a righteous Muslim
generation through knowledge, faith
and virtuosity"

FACILITIES

- Hostels
- Football fields
- Tennis courts
- Sepak takraw courts
- Gymnasium with indoor sports facilities
- Cafeteria
- Computer laboratory
- Language laboratory
- Nursing laboratory
- Industrial technology workshop
- Theatre/Audio visual room



COURSES OFFERED

Diploma Programmes Offered

PROGRAMMES OF STUDIES	TOTAL SEMESTERS	INTAKE PER YEAR
Diploma in Islamic Studies (Syariah)	6	1
Diploma in Islamic Studies (Usuluddin)	6	1
Diploma in Islamic Studies (Language and Arabic Literature)	6	1
Diploma in Islamic Studies (Dakwah)	6	1
Diploma in Islamic Studies (Al-Quran and Al-Sunnah)	6	1
Diploma in International Trade	6	1
Diploma in Marketing	6	1
Diploma in Finance	6	2
Diploma in Accountancy	6	2
Diploma in Personnel Management	6	1
Diploma in Banking Studies	6	1
Diploma in Insurance Studies	6	1
Diploma in Industrial Technology	8	2
Diploma in Arabic Language with Education	6	1
Diploma in Law	6	1
Diploma in Nursing	6	2
Diploma in Information Technology	6	2

Certificate Programmes Offered

PROGRAMMES OF STUDIES	DURATION	INTAKE PER YEAR
Certificate in Computer Analysis	6 months	2
Certificate in Islamic Studies	1 year	1
Certificate in Falak Syarie	3 months	2
Certificate in Intensive Arabic and English Languages	3 months	1
Certificate in Intensive English and Mathematics	3 months	1
Certificate in Arabic Language	3 months	1
Certificate in English Language	3 months	1
English for Specific Purposes	3 months	1
The Test of English as a Foreign Language (TOEFL)	3 months	1

Admission requirements for Diploma and Certificate Programmes

Must at least be 17 years old, with Sijil Pelajaran Malaysia (SPM) or General Certificate of Education (GCE 'O' levels) qualification.

Language of Instruction

The languages at Kusza are in Bahasa Malaysia, Arabic and English.

The Language House

40, Jalan 19/3
46300 Petaling Jaya
Selangor
Tel: 03-7550412

TL Management Centre

40, Jalan Bangsar
59200 Kuala Lumpur
Tel: 03-2836959

or

56A-C, Jalan SS 2/72
47300 Petaling Jaya
Selangor
Tel: 03-7557467/7581887

or

354-B, Jalan Dato Kramat
10150 Penang
Tel: 04-2293412/2294472

Travex Institute of Tourism

46A-C, Jalan Silang
50050 Kuala Lumpur
Tel: 03-2322673

Tuas Polytech

5th Floor
No. 119, Jalan 7/91
Tama Shamelin Perkasa, Cheras

56100 Kuala Lumpur

Tel: 03-9816394

Tun Tan Cheng Lock College of Nursing

Assunta Hospital
Jalan Templer
46990 Petaling Jaya
Selangor
Tel: 03-7923433/7923302

Wong Commercial Institute

1A 2 and 3, Jalan Kapar
41400 Klang
Selangor
Tel: 03-3421733

Workers Institute of Technology

Jalan Banting Pandamaran
42000 Port Klang
Selangor
Tel: 03-3688859

**Yamaha Academy of Arts and Music
(Yamaha Music School)**

Lot 8, Jalan Perbandaran
47301 Kelana Jaya
Selangor
Tel: 03-7030900

**Young Men's Christian Association
Language Centre**

95, Jalan Padang Belia
50470 Kuala Lumpur
Tel: 03-2741439

STUDYING ABROAD

AN OVERVIEW

Studying abroad can be the most exhilarating experience of your student years. You get to meet and compete with youngsters from other parts of the world. You become both an observer of life in a foreign land as well as one of its participants. You learn about independence and survival, about freedom and responsibility, and you also learn what it means to struggle against the odds and win.

The glamour of studying abroad, however, has one unavoidable drawback – its formidable cost. It would cost you thousands of ringgit for just a year's study abroad. The total amount for a three – or four-year course in a foreign college or university can be staggering!

Therefore, the first and most important thing you need to do is to ask yourself 4 questions:

1. What do I really want to study/be?
2. Is the course leading to my career choice available at a local college/university?
3. Is that college/university well-established and internationally recognised?
4. Can my parents afford to send me abroad?

If your answers to Questions 2 and 3 above are 'Yes', save your parents a lot of money by opting to study locally. If your answers are 'No',

then of course you should further your studies abroad, provided your family has the funds.

What you then have to do is to make several inquiries and plan carefully. You need to find out, for instance, if you are academically qualified to take a particular course and what regulations you have to follow. The information below and on subsequent pages of this chapter should put you on the right track.

Find out more about your course.

1. Read the information provided in this chapter to identify which countries offer the course you are interested in.
2. Read Chapter 3 of this book and list some of the institutions in the country of your choice that offer the same course.
3. After reading Chapters 3 and 8, you should have a fairly good idea of the following with regards to two or more colleges/universities:
 - Course duration;
 - Admission requirements;
 - Application procedures;
 - Tuition fees;
 - Cost of living expenses;
 - Currency exchange rate – between the ringgit and the currency in question;

- Approximate cost per year and for the total period of the course;
- Academic year intake dates.

Find out about recognised qualifications.

Do you wish to work for the Malaysian Government after your studies? If this is the case, bear in mind that your degree, diploma or certificate must be recognised by the Malaysian Public Services Department. So, before you decide which institution to apply to, contact the Public Services Department:

Jabatan Perkhidmatan Awam

Bahagian Latihan
Kompleks JPA, Blok B, Aras 2
Jalan Tun Ismail
50510 Kuala Lumpur

You could also check with a Malaysian Directory listing recognised qualifications.

Make a decision.

Armed with the above information, weigh the pros and cons of the institutions you are considering and then make a decision. For example, you might want to choose a place because of its cheaper tuition fees, its shorter course duration or its excellent academic track record. You might want to make more than one choice and apply to two or three institutions, in case your most preferred institution turns you down.

Fill out your application form.

When you make your application to enrol in a foreign educational institution, you will be required to submit certain documents as well. Most universities and colleges, in whichever country they are, require more or less the following:

- a copy of the transcript of your secondary school academic record;
- a copy of the transcript of your tertiary academic record (if you are applying for a Master's degree programme or a doctorate course of study);
- a document stating that you have an acceptable standard of proficiency in the English Language;
- information about your working experience (if any) and what you intend to do after your course (your career);

- information on how you are going to support yourself financially as an international student.

Find out about scholarships and loans.

If your STPM results or other equivalent high school or matriculation results are good, you could seek financial assistance. Check out the following:

- Federal scholarships and loans awarded by the Ministry of Education and the Public Services Department;
- State scholarships and loans provided by State Foundations and State Governments for Malaysians born in their states;
- Private sector scholarships and loans provided by Associations, Banks, Companies, Cooperatives, etc.;
- Mara scholarships and loans provided for Bumiputras.

Post your application form.

Post your application form or forms with all relevant documents attached early to ensure they arrive at the institutions concerned within the stipulated period. If for some reason you are short of time, despatch your application by courier service even though it is expensive.

Learn while you wait for a reply.

While waiting for a reply, why not spend your time wisely? You can prepare for your course by:

- reading up on your career choice;
- reading about the country you wish to study in, so you get an understanding of its people, government and way of life;
- learning to use a computer;
- developing study skills.

There are many books on the market that offer invaluable guidance on how to excel in your studies, how to be an achiever and how to sort out your priorities and be effective. Indeed, they are not only relevant to students, whatever their intended field of study, but also to everyone who is interested in improving himself or herself.

Act upon the acceptance letter.

If your application has been accepted, you will receive a letter of offer from your institution and up-to-date information on the total cost of your course. As is usually the case, you may be required to forward payment of fees for the first semester before you can be enrolled as a student. Upon

receipt of the fees, your institution will send you a document. This document has to be produced when you apply for a student visa to get entry into the country concerned.

Prepare for your overseas stay.

This is going to be a very busy period of your life. There are so many things to do in so many places. Map out everything that needs to be done, when and where.

Before you swing into action, take note of the following:

1. Passport

You must have a passport to travel overseas. If you already hold a passport, check its expiry date. Most countries require passports to be valid for more than six months before the holders are allowed entry.

2. Student Visa

To apply for a student visa, you need the following:

- proof that you have been accepted as a student in an educational institution overseas;
- documented proof of your level of English language proficiency, that is, a score or grade on a recognised test;
- proof that you can meet the costs of your overseas education;
- a medical examination report to show you are in good health;
- a document to show that you intend to return home after completion of your studies;

3. Ticket

Contact a Student Travel Bureau to find out the cheapest fares. When travelling, think of both cost and convenience. Try to travel during the week rather than the weekend, so that you can be met at the other end by a representative of the bureau, if you are using the bureau's services.

Reserve your ticket as early as possible and collect it at least a week before your departure. Give the bureau your contact number so that you can be informed should there be a delay or change in flight schedule.

4. International Student Identity Card (ISIC)

It is worth your while to apply for this card. With

it, you become a member of the International Student Travel Fraternity and are eligible for money-saving discounts throughout the world. To become an ISIC holder, contact the MSL Travel Sdn Bhd Student Travel Centre in Kuala Lumpur, Petaling Jaya or Penang.

5. Money

You are advised not to carry large amounts of cash to your destination, only enough for incidental expenses. Take with you a bank draft and/or traveller's cheques and if you want to, credit cards.

6. Baggage Allowance

Most airlines give you a baggage allowance of 20 kg for travel by economy and are not fussy about the number of baggage items you check in. You are also allowed one hand luggage item to carry with you onto the plane. Other airlines, however, such as American airlines, state you can have only 2 pieces of luggage and these cannot exceed a certain size and weight. So, before you go shopping for luggage, check out your airline's requirements.

Please note that there will be excess baggage charges, so pack only the essentials, for example, jeans, shirts, skirts, blouses, underwear, shoes, one or two items of formal attire such as a suit/evening dress/national costume (this is necessary for formal functions) and perhaps sports equipment.

When in doubt, check out.

Should you have any problems, there are organisations and agencies that can help you, such as the following:

- Centres which provide advice and services with regards to study in their countries, for example, The British Council and Education Australia;
- Embassies and High Commissions, regarding immigration requirements and visa applications;
- Student Travel Bureaus, for advice on accommodation, fares, visa applications, student cards, etc.

Catch that plane.

A day before your departure, make a list of what you should have with you. Make photostat copies of necessary documents in case you misplace the originals. Your list might look like this:

- passport;
- ticket;
- money;
- bank draft/traveller's cheques;
- identity card or copy;
- international driver's licence;
- a copy of your medical report;
- the address of the Malaysian Embassy in the host country;
- 3 pieces of luggage with name tags and destination address;
- 1 hand luggage with name tag and destination address;
- keys for luggage.

There have been occasions when students have missed their planes for various reasons, ranging from traffic jams, losing their way to last-minute packing. This can be a horrible experience, especially for a first-timer abroad. Just abide by the airline's directive: be at the airport two hours before departure time, or one hour if you are travelling to Singapore to catch your connecting flight.

At the airport, the procedure for checking in is quite simple:

1. Check the information board for the number of the check-in counter.
2. Pass your luggage through the X-ray machine on your way to the counter, making sure the security personnel have affixed a security label on each piece of luggage that you want checked in.
3. Hand over your ticket and passport to the officer at the counter and place your baggage on the baggage ramp to be weighed. Pay the airport tax if this was not included in your airfare.
4. Make sure you get back your ticket and passport as well as a boarding pass and identification tags for your luggage.
5. Check your boarding pass to see which departure gate you should go to. Say your goodbyes early and enter the departure hall. Show your boarding pass to the security personnel waiting at the entrance to the departure hall.
6. At the immigration checkpoint, hand over your passport to be stamped.
7. Pass your hand luggage/handbag through the X-ray machine at the entrance to your departure gate. Walk through the detector doorway and allow for body checks by security

personnel.

8. Check your boarding pass for your seat number and wait in the waiting lounge for ground staff to announce that the aircraft is ready for boarding.
9. On the plane, complete the disembarkation form distributed to passengers. You may also have to fill out a customs declaration form.
10. When you arrive in your host country, hand over both your passport and disembarkation form to Immigration. After you have been cleared, get a trolley (you may have to pay for one) and go to the luggage carousel to pick up your luggage. Head for the public area outside the arrival hall. This is where you meet your friend/a representative assigned to take care of you or where you can get a taxi.

You've arrived in your host country. May your stay in it be an enriching and fulfilling one.

AUSTRALIA

Australia's Educational Attractions

Among the various factors that have attracted and continue to attract Malaysian students to Australia are the following:

- its lesser costs:
 - the airfares are relatively inexpensive because of Australia's proximity to Malaysia;
 - living cost is lower than in North America or the United Kingdom;
 - tuition fees are comparable to/cheaper than those in North America and Europe;
- the simple application procedures;
- the high quality of education offered by the universities coupled with wide recognition of many Australian degrees by our Malaysian Government and the private sector;
- the large Malaysian and Asian population in major Australian places like Perth, Melbourne and Sydney;
- the efficient network of support for students needing help during their studies in Australia;
- the opportunity granted to foreign students to find part-time employment during the semesters and full-time employment during vacations; the condition attached is that the earnings should form only a supplement and not be the means by which they pay their tuition fees;
- the country's peaceful environment.

Tertiary Education in Australia

Tertiary education in Australia is provided by universities, Technical and Further Education (TAFE) colleges and institutes, private colleges offering special studies courses and private business colleges.

1. Universities

Universities in Australia are financed by the government and are self-accredited institutions. They provide a comprehensive range of courses, including architecture, the arts, business, economics, education, law, medicine, music and science. Many are flexible and will accept a student's degree from another university for credit or as a prerequisite when he/she wants to pursue another degree or a higher degree.

Many universities also conduct courses termed 'Foundation Studies' which are intended to help bridge the gap between students' academic capabilities and the requirements of undergraduate programmes in Australia. The standard of the programmes are equivalent to the Year 12 matriculation programmes.

Awards

The courses offered lead to the following awards:

Doctoral degree (Ph.D.): the highest level of education achieved at university, attained through research and, depending on the subject, coursework as well; the duration is a minimum of 3 years;

Master's degree: attained through full-time research (18 months – 2 years) or coursework (1 year – 18 months) which could include a minor thesis as well or a combination of research and coursework;

Postgraduate or Graduate diploma: attained through an intensive study programme aimed at helping graduate students acquire vocational qualifications; the duration is usually 1 year;

Graduate certificate: attained after a full-time course of study during which graduate students develop the professional knowledge and skills acquired in their undergraduate years; the duration is 6 months;

Bachelor's degree: attained after full-time study of between 3 and 6 years, depending on the course of study. In most cases, students need to study an extra year to attain an honours degree;

Diploma: attained after an undergraduate course of full-time study of 3 years' duration; most of the courses offered are vocational;

Associate diploma: attained after an undergraduate course of study of usually 2 years' duration;

Diploma (new) and Advanced diploma (new): the new diploma is equivalent to the associate diploma and the new advanced diploma is equivalent to the existing diploma.

2. Technical and Further Education (TAFE) Colleges

TAFE is the largest educational sector offering tertiary education opportunities in Australia. It provides students with the alternative route towards achieving their ambitions through professional courses, para-professional courses, post-trade and trade courses. These courses are more job-focussed than those in universities. They range from those lasting just several hours to full-time courses that are given credits when applying thereafter for university degree studies.

You can choose from many fields of study, such as accounting, architecture, building studies, business administration, computer studies, engineering and hotel and tourism. TAFE also provides matriculation courses which are equivalent to Year 12 and English Language Intensive Courses for Overseas Students (ELICOS).

Awards

The courses of study lead to the following awards:

Graduate certificate: courses are limited;

Bachelor's degree: courses are limited;

Diploma/Advanced diploma (new): attained after full-time study of 3 years; this diploma is a passport to many types of professions and is a credit if you want to pursue a bachelor's degree at a university;

Associate diploma/Diploma (new): attained

after full-time study of 2 years; the courses provided stress the development of skills in fields of study such as architecture, electronics, science and management;

Advanced certificate: attained after full-time study of 2 years; the courses provided stress the development of skills in programmes such as office management, industrial supervision;

Certificate/Certificate I-IV (new): as in advanced certificate, above.

3. *Private Special Studies Colleges*

These offer special studies in several areas such as beauty therapy, business studies and farm management.

4. *Private Business Colleges*

Courses provided are vocationally oriented and include those in the commercial and secretarial fields.

Subjects include audio-visual, bookkeeping, data processing, marketing, typing and tourism.

Entry Requirements

The institution you apply to is the body that will determine whether or not you are suited for the level of study you have chosen, e.g. a degree, an advanced diploma, a diploma, etc. It will not only examine the content of the programme you underwent at home but also whether the subjects you studied are relevant to the intended course. For example, you have achieved excellent scores in your examination for all subjects except physics and you want to do a course in engineering. The institution may still admit you into the engineering course but require you first to do preliminary studies in physics.

Generally, your suitability as a candidate for a course of study will be assessed on the following grounds:

1. your academic qualifications – whether you have the minimum entry qualifications and whether the subjects you sat for in your last examination are relevant to the intended course of study; therefore you should provide the following:
 - a certified transcript of the studies you have completed;
 - a certified transcript of the results of the examination;

- information about the grading system;
2. your proficiency in English – a good command of the language is essential for foreign students to be able to follow lectures, do assignments, etc.; (see below for required scores for undergraduate and TAFE programmes)
 3. whether or not you intend to study full-time and will be in Australia solely for the purpose of study;
 4. whether you can meet the costs of your entire stay in Australia;
 5. whether you are of good character and in good health.

Entry into Postgraduate Courses

Minimum academic qualification – universities require the following:

- a good first degree;
- proven ability to do research or working experience.

Some postgraduate programmes also require students to pass the Graduate Management Admission Test (GMAT) or the Graduate Record Examination (GRE).

Entry into Undergraduate Courses

Minimum academic qualification – the Australian high school matriculation (Year 12) or overseas equivalents such as the STPM in appropriate subjects or 3 passes at GCE A level in appropriate subjects. Students without any of these qualifications have another alternative – they can undertake a preparatory Foundation Studies programme in Australia.

English Language proficiency – minimum score/grade required is as follows:

- 6.5 in the IELTS or
- 550 in TOEFL or
- 11 in English as a Second Language in the South Australian Matriculation exam or
- C in the English 1119 paper (for Malaysians) or
- C in the General Paper, GCE 'A' level.

Entry into Diploma Courses

Minimum academic qualification – completion of Year 12 of Australian secondary education or an overseas equivalent of it;

English language proficiency.

Training, AWOPS Training, ETOPS Rules

ENGINEERING TRAINING

- Basic and Aircraft Type courses
- Licensed Aircraft Maintenance Engineers
- Workshop Engineers/Technicians/Mechanics
- Bachelor Degree in Mechanical Engineering (Aircraft Maintenance) /Electrical Engineering(Avionics) /IT/Management Technology (Airlines Management)



AIRFREIGHT TRAINERS

- Airfreight skills/Advance Airfreight skills.
- Dangerous Goods Regulations.
- Special loads handling.
- Certificate in Airfreight Management.
- Diploma in Airfreight Management.

(2) TOURISM STUDIES

- Basic and Advanced Fares and Ticketing
- Certificate in Hospitality
- Certificate in Tourist Guide
- Malaysian Certificate of Travel Trade

- Degree in Tourism Studies

(3) HUMAN POTENTIAL DEVELOPMENT

- Over 30 Knowledge, Skills, Attitude Training Programmes e.g. Corporate War Games, Interpersonal Skills, Discovering Your Inner Self, Total Customer Satisfaction

(4) SERVICES TRAINING



- Specialised training in "soft" areas for frontliners e.g. Grooming and Etiquette, Enhancing Your Professional Image, Impression Making Practices and Courtesy Techniques, Telephone Techniques and Courtesies

(5) INFORMATION TECHNOLOGY

- Various Systems Training programmes e.g. Lotus Smartsuits. Most of Malaysia Airlines Academy programmes enjoy HRDC "Approved Training Programme" (ATP) status

**Malaysian Association of
Certified Public Accountants**
No. 15, Jalan Medan Tuanku
50300 Kuala Lumpur
Tel: 03-2989622

**Malaysian Association of The Institute of
Chartered Secretaries and Administrators**
12, Jalan Telawi 3
Bangsar Baru
59100 Kuala Lumpur
Tel: 03-2829276

**Malaysian British Educational Cooperation
Services (MABECS)**
No. 9, 2nd Floor
Jalan Barat
46200 Petaling Jaya
Selangor
Tel: 03-7567655

Malaysian Institute of Accountants
Dewan Akauntan
2, Level 4
Jalan Tun Sambanthan 3
Brickfields
50470 Kuala Lumpur
Tel: 03-2745055

Malaysian Institute of Management (MIM)
227, Jalan Ampang
50450 Kuala Lumpur
Tel: 03-2645255

or

3rd Floor, Kompleks Mutiara
125, Jalan Anson
10400 Penang
Tel: 04-2290307

or

Suite 3.6, Level 3
Menara Pelangi
Jalan Kuning, Taman Pelangi
80400 Johor Bahru
Johor
Tel: 07-3349934/3349935

**Malaysian Institute of
Personnel Management (MIPM)**
No. 3, Jalan Timur
Section 9

46060 Petaling Jaya
Selangor
Tel: 03-7556536

**Malaysian Insurance Institute
5, Jalan Sri Semantan Satu
Damansara Heights
50490 Kuala Lumpur
Tel: 03-2544234**
(Please refer to profile on pg. 295)

Mantissa Technical Institute
66B, Block Crystal
Jalan 1/19
46000 Petaling Jaya
Selangor
Tel: 03-7936480

Marco Polo Cooking Academy
122A, Jalan Imbi
55100 Kuala Lumpur
Tel: 03-2415507

Methodist College Kuala Lumpur
Off Jalan Tun Sambanthan 4
Brickfields
50470 Kuala Lumpur
Tel: 03-2741851

Metropolitan College
1, Jalan Subang Utama
47500 Subang Jaya
Petaling Jaya
Selangor
Tel: 03-7344711

Modern Institute of Interior Design
65-67, 2nd Floor
Jalan Petaling
50000 Kuala Lumpur
Tel: 03-2381616

or

1, (1st Floor), Jalan 8/1E
46050 Petaling Jaya
Selangor

MSC Premier College
5, Jalan 5/6C
Off Jalan Pahang Barat
Pekeliling Business Centre
53000 Kuala Lumpur
Tel: 03-4236504/4236509

MSC - Syme Business School
No. 1 and 3
Jalan 65C
Off Jalan Pahang Barat
Pekeliling Business Centre
53000 Kuala Lumpur
Tel: 03-4236504

Nanyang Institute of Electronics
No. 608D, Jalan Hang Kasturi
50050 Kuala Lumpur
Tel: 03-2387662

or

No. 103, 3rd, 4th and 5th Floor
Wisma B.W.T.
Jalan Petaling
50000 Kuala Lumpur

New Austern Fashion Design School
No. 434-2 (3rd Floor)
Jalan Tuanku Abdul Rahman
50100 Kuala Lumpur
Tel: 03-4418613

Olympia Business School
300, Wisma Muisan
Jalan Raja Laut
50350 Kuala Lumpur
Tel: 03-2933868

(Please refer to profile on pg. 300)

Pantai College of Nursing
Hospital Pantai Berhad
No. 8, Jalan Bukit Pantai
59100 Kuala Lumpur
Tel: 03-2825077

Penang Medical College
c/o Nationwide Professional
Suite 9.04, 9th Floor
Wisma Stephens
Jalan Raja Chulan
50200 Kuala Lumpur
Tel: 03-2486388

PE PE Floral and Art Design Training Centre
No. 95 (Back Portion)
Jalan Bukit Bintang
55100 Kuala Lumpur
Tel: 03-2482405

or

160B, Jalan Tun H.S.Lee
50000 Kuala Lumpur

Personal Development Leadership
c/o Management Corporation (M) Sdn Bhd
No. 35 and 37
Jalan 2/114A
Taman Indrahana
Off Jalan Kuchai Lama
58100 Kuala Lumpur
Tel: 03-7838655

PJ Community College
No. 21, Jalan Barat
46200 Petaling Jaya
Selangor
Tel: 03-7558611

or

P.O.Box 624
Jalan Sultan
46770 Petaling Jaya
Selangor

PJ Tafe College
Jalan 223C
Section 51A
46100 Petaling Jaya
P.O.Box 22
46700 Petaling Jaya
Selangor
Tel: 03-2010266

Plaza Dance Academy
50A, Jalan SS 19/1D
47500 Subang Jaya
Selangor
Tel: 03-7321289

Prime College
10, Jalan 1/137B
Jalan Klang Lama
58000 Kuala Lumpur
Tel: 03-7811660

Pusat Latihan YBK
Jalan Perusahaan 6
Kawasan Perusahaan
Bandar Baru
45000 Kuala Selangor
Selangor
Tel: 03-8893367

Name:

OLYMPIA BUSINESS SCHOOL

Address:

300, Wisma Muisan
Jalan Raja Laut
50350 Kuala Lumpur

Tel:

03-2933868

Fax:

03-2945369

Established:

1971

FACILITIES

- 2 computer laboratory with 45 computers LAN network
- Library
- Hotel mock-up room (bar, bedroom, dining)
- Model Office for Secretaries

COURSES OFFERED

School of Accounting

- Chartered Association of Certified Accountants (ACCA) (UK)
- Chartered Institute of Management Accountants (CIMA) (UK)
- Certified Diploma in Accounting and Finance (CDAF)
- LCCI Diploma in Accounting and Finance
- Institute of Chartered Secretaries and Administrators (ICSA)

School of Banking

- Certificate/Diploma in Banking and Finance

School of Secretarial Science

- LCCI Private Secretarial Certificate (UK)
- Oxford County College (UK) Joint

- Diploma in Private Secretaryship
- Diploma in Executive Secretaryship

School of Computer Information Science

- Certificate/Diploma/Advanced/Graduate Diploma in Information Systems
- City and Guilds (C & G) (UK)
- Institute of Data Processing Management (IDPM)
- NCC course (UK)
- Computer Programming Languages
- Computer Software Packages

School of Language Studies

- Languages - English, Bahasa Malaysia, French
- Intensive certificates
- Diploma in Proficiency/Intermediate/Advanced

School of Business and Marketing

- Institute of Administrative Management (IAM) (UK)
- Chartered Institute of Marketing (CIM) (UK)/Cyprus Institute of Marketing
- Association of Business Executives (ABE) (UK)
- Certificate in Business Studies
- Associate Diploma in Business Studies (ADBS)
- Diploma/Advance Diploma in Business Administration
- Diploma in Marketing

School of Mass Communication

- LCCI Diploma in Marketing
- LCCI Diploma in Advertising
- LCCI Diploma in Public Relations
- Diploma In Mass Communication
- Certificate in Business Communication

School of Tourism and Hospitality Management

- Certificate in Tourism and Hospitality Studies
- Diploma/Associate Diploma in Hospitality Management
- Diploma/Associate Diploma in Tourism Management
- Advance Diploma in Tourism and Hospitality Management

School of Extension Studies

- Executive Development Studies
- Post graduate Diploma in Corporate Management and Strategic Planning
- Advance Diploma/Master in Business Administration

School of Foundation Studies

- GCE 'A' Levels (AEB/Oxford)
- Access Programmes

Course Highlights

- Established in 1971, Olympia Business School has evolved into a pace-setter in the field of private

education, providing prestigious and internationally recognised qualifications.

- A dedicated and qualified team of lecturers with a dynamic and systematic approach to teaching
- Lecture and tutorial notes and, where applicable, hand outs, past year examination questions and selected reading material for easy reference.
- Regular progress tests for Student Evaluation.
- Up-to-date library resources and references.
- Parents receive regular academic progress reports on full time students.
- Study related activities including field trips, educational visits and membership to college societies (where applicable).
- Individual attention and special guidance for weak students.
- Academic and Personal Counselling.
- Scholarship Schemes, Best Students Awards and Book Prize Schemes for outstanding students.
- Convenient time slots for part-time students to attend evening classes.



Puteri Pan Pacific Hospitality Institute

'The Kotaraya' P.O.Box 293

80730 Johor Bahru

Johor

Tel: 07-2233333

Queen's Art Academy

3rd Floor, Lot 2650

3rd Mile, Central Park

Rock Road

93200 Kuching

Sarawak

Tel: 082-236505

Ranger College

13 - 15, Jalan Banda Kaba

75000 Melaka

Tel: 06-2840784/2835533

Regional Office**Middlesex University**

Suite 2.10

Wisma HLA

Jalan Raja Chulan

50200 Kuala Lumpur

Tel: 03-2018479

Rima College Kuala Lumpur

54, Jalan Ampang

50450 Kuala Lumpur

Tel: 03-2322055

or

Rima College Petaling Jaya

1, Jalan Sultan

46200 Petaling Jaya

Selangor

Tel: 03-7572635

or

Rima College Johor Bahru

62A, Jalan Yahya Awal

80100 Johor Bahru

Johor

Tel: 09-2230733/2236973

or

Rima College Penang

52A, Penang Road

10000 Penang

Tel: 04-2630366/2630762

SAITO Academy

School of Graphic Design

2 and 4, Jalan 52/18

PJ New Town

46200 Petaling Jaya

Selangor

Tel: 03-7547211

or

School of Interior Design

Kompleks Pernas Sogo

7th Floor

190, Jalan Tuanku Abdul Rahman

50100 Kuala Lumpur

SAL Group of Colleges

No. 10, Jalan Pudu

55100 Kuala Lumpur

Tel: 03-2384529

or

Lot 3.02 Wisma Padi Corp

Jalan Kemajuan SS17/1A

11 Jalan Kee Ann

75100 Melaka

Tel: 06-2832686

or

1C, Jalan Gereja

80100 Johor Bahru

Tel: 07-2244560/2230787

Sedaya College

17, Jalan 19/29

46300 Petaling Jaya

Selangor

Tel: 03-7577830

Seni Masakan (CHEF) Sdn Bhd

360-2, 2nd Floor

Jalan Pudu

55100 Kuala Lumpur

Tel: 03-2418780

Sepang Institute of Technology

Admissions Office

5th Floor, Klang Parade

2112 Jalan Meru

41050 Klang

Selangor

Tel: 03-3430628

SF Tourism Academy Sdn Bhd
61A, Jalan Sultan
50000 Kuala Lumpur
Tel: 03-2303522/2327804

S.K. Borthers Realty
Wisma S.K. Brothers
33,35 and 37
Jalan 3/108C
Taman Sungei Besi
57100 Kuala Lumpur
Tel: 03-7807629

Stamford College
1st Floor
Wisma IJM Annexe
Jalan Yong Shook Lin
46050 Petaling Jaya
Selangor
Tel: 03-7551563

STEP Training Centre
38, Jalan 19/3
46300 Petaling Jaya
Selangor
Tel: 03-7545819/7561031

STEP School of Dance and Art
83, 6th Floor
Jalan Sultan
50000 Kuala Lumpur
Tel: 03-2327743

Sultan Zainal Abidin Islamic College
(KUSZA)
Gong Badak
21300 Kuala Terengganu
Terengganu
(Ref: Admission Unit)
Tel: 09-6664466/6664570
(Please refer to profile on pg. 304)

Sunway College
No. 5, Jalan Kolej
Bandar Sunway
46150 Petaling Jaya
Selangor
Tel: 03-7358622

Systematic Professional Centre
Bangunan Systematic
33-35, Jalan Hang Lekiu
50100 Kuala Lumpur
Tel: 03-2322536

Syuen Hotel and
Catering Management Sdn Bhd
2, Laluan Rokam 13
Off Jalan Rokam
Pekan Razaki
31350 Ipoh
Perak
Tel: 05-3131219

Tadika Sri Montessori Sdn Bhd
(formerly known as
London Montessori Centre (M) Sdn Bhd)
52A, Jalan SS 22/25
Damansara Jaya
47400 Petaling Jaya
Selangor
Tel: 03-7179531/7196323

The Centre for Instructor and
Advanced Skill Training (CIAST)
Jalan Petani 19/1
P.O. Box 7012
Section 19
40900 Shah Alam
Selangor
Tel: 03-5415736/5415739

Name:

TADIKA SRI MONTESSORI SDN BHD

(formerly known as London Montessori Centre (M)
Sdn Bhd)

Address:

52A, Jalan SS 22/25
Damansara Jaya
47400 Petaling Jaya
Selangor D.E.

Tel:

03-7179531/7196323

Fax:

03-7179343

Types of Studies:

Full-time (F/T), Part-time (P/T), Correspondence

C O U R S E S O F F E R E D

- Early Childhood Teaching Diploma (F/T, P/T and correspondence)
- Early Childhood Teaching Certificate (F/T, P/T and correspondence)
- Nursery Foundation Teaching Diploma (P/T and correspondence)
- Special Education Needs Diploma (P/T and correspondence)
- Montessori English Language Teaching Certificate (Correspondence)
- Trainer's course (Correspondence)

Name:

**SULTAN ZAINAL ABIDIN ISLAMIC
COLLEGE (KUSZA)**

Address:

Gong Badak
21300 Kuala Terengganu
Terengganu

(Ref: Admission Unit)

Tel:

09-6664466/6664570

Fax:

09-6662566

A Brief Introduction:

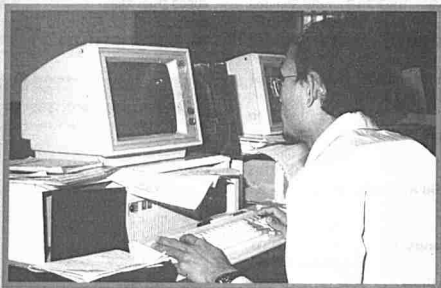
The Sultan Zainal Abidin Islamic
College (KUSZA) was established in
January 1980, and is the first centre
for Islamic higher learning in
Terengganu.

KUSZA's philosophy

"To create a righteous Muslim
generation through knowledge, faith
and virtuosity"

FACILITIES

- Hostels
- Football fields
- Tennis courts
- Sepak takraw courts
- Gymnasium with indoor sports facilities
- Cafeteria
- Computer laboratory
- Language laboratory
- Nursing laboratory
- Industrial technology workshop
- Theatre/Audio visual room



COURSES OFFERED

Diploma Programmes Offered

PROGRAMMES OF STUDIES	TOTAL SEMESTERS	INTAKE PER YEAR
Diploma in Islamic Studies (Syariah)	6	1
Diploma in Islamic Studies (Usuluddin)	6	1
Diploma in Islamic Studies (Language and Arabic Literature)	6	1
Diploma in Islamic Studies (Dakwah)	6	1
Diploma in Islamic Studies (Al-Quran and Al-Sunnah)	6	1
Diploma in International Trade	6	1
Diploma in Marketing	6	1
Diploma in Finance	6	2
Diploma in Accountancy	6	2
Diploma in Personnel Management	6	1
Diploma in Banking Studies	6	1
Diploma in Insurance Studies	6	1
Diploma in Industrial Technology	8	2
Diploma in Arabic Language with Education	6	1
Diploma in Law	6	1
Diploma in Nursing	6	2
Diploma in Information Technology	6	2

Certificate Programmes Offered

PROGRAMMES OF STUDIES	DURATION	INTAKE PER YEAR
Certificate in Computer Analysis	6 months	2
Certificate in Islamic Studies	1 year	1
Certificate in Falak Syarie	3 months	2
Certificate in Intensive Arabic and English Languages	3 months	1
Certificate in Intensive English and Mathematics	3 months	1
Certificate in Arabic Language	3 months	1
Certificate in English Language	3 months	1
English for Specific Purposes	3 months	1
The Test of English as a Foreign Language (TOEFL)	3 months	1

Admission requirements for Diploma and Certificate Programmes

Must at least be 17 years old, with Sijil Pelajaran Malaysia (SPM) or General Certificate of Education (GCE 'O' levels) qualification.

Language of Instruction

The languages at Kusza are in Bahasa Malaysia, Arabic and English.

The Language House

40, Jalan 19/3
46300 Petaling Jaya
Selangor
Tel: 03-7550412

TL Management Centre

40, Jalan Bangsar
59200 Kuala Lumpur
Tel: 03-2836959

or

56A-C, Jalan SS 2/72
47300 Petaling Jaya
Selangor
Tel: 03-7557467/7581887

or

354-B, Jalan Dato Kramat
10150 Penang
Tel: 04-2293412/2294472

Travex Institute of Tourism

46A-C, Jalan Silang
50050 Kuala Lumpur
Tel: 03-2322673

Tuas Polytech

5th Floor
No. 119, Jalan 7/91
Tama Shamelin Perkasa, Cheras

56100 Kuala Lumpur

Tel: 03-9816394

Tun Tan Cheng Lock College of Nursing

Assunta Hospital
Jalan Templer
46990 Petaling Jaya
Selangor
Tel: 03-7923433/7923302

Wong Commercial Institute

1A 2 and 3, Jalan Kapar
41400 Klang
Selangor
Tel: 03-3421733

Workers Institute of Technology

Jalan Banting Pandamaran
42000 Port Klang
Selangor
Tel: 03-3688859

**Yamaha Academy of Arts and Music
(Yamaha Music School)**

Lot 8, Jalan Perbandaran
47301 Kelana Jaya
Selangor
Tel: 03-7030900

**Young Men's Christian Association
Language Centre**

95, Jalan Padang Belia
50470 Kuala Lumpur
Tel: 03-2741439

STUDYING ABROAD

AN OVERVIEW

Studying abroad can be the most exhilarating experience of your student years. You get to meet and compete with youngsters from other parts of the world. You become both an observer of life in a foreign land as well as one of its participants. You learn about independence and survival, about freedom and responsibility, and you also learn what it means to struggle against the odds and win.

The glamour of studying abroad, however, has one unavoidable drawback – its formidable cost. It would cost you thousands of ringgit for just a year's study abroad. The total amount for a three – or four-year course in a foreign college or university can be staggering!

Therefore, the first and most important thing you need to do is to ask yourself 4 questions:

1. What do I really want to study/be?
2. Is the course leading to my career choice available at a local college/university?
3. Is that college/university well-established and internationally recognised?
4. Can my parents afford to send me abroad?

If your answers to Questions 2 and 3 above are 'Yes', save your parents a lot of money by opting to study locally. If your answers are 'No',

then of course you should further your studies abroad, provided your family has the funds.

What you then have to do is to make several inquiries and plan carefully. You need to find out, for instance, if you are academically qualified to take a particular course and what regulations you have to follow. The information below and on subsequent pages of this chapter should put you on the right track.

Find out more about your course.

1. Read the information provided in this chapter to identify which countries offer the course you are interested in.
2. Read Chapter 3 of this book and list some of the institutions in the country of your choice that offer the same course.
3. After reading Chapters 3 and 8, you should have a fairly good idea of the following with regards to two or more colleges/universities:
 - Course duration;
 - Admission requirements;
 - Application procedures;
 - Tuition fees;
 - Cost of living expenses;
 - Currency exchange rate – between the ringgit and the currency in question;

- Approximate cost per year and for the total period of the course;
- Academic year intake dates.

Find out about recognised qualifications.

Do you wish to work for the Malaysian Government after your studies? If this is the case, bear in mind that your degree, diploma or certificate must be recognised by the Malaysian Public Services Department. So, before you decide which institution to apply to, contact the Public Services Department:

Jabatan Perkhidmatan Awam

Bahagian Latihan
Kompleks JPA, Blok B, Aras 2
Jalan Tun Ismail
50510 Kuala Lumpur

You could also check with a Malaysian Directory listing recognised qualifications.

Make a decision.

Armed with the above information, weigh the pros and cons of the institutions you are considering and then make a decision. For example, you might want to choose a place because of its cheaper tuition fees, its shorter course duration or its excellent academic track record. You might want to make more than one choice and apply to two or three institutions, in case your most preferred institution turns you down.

Fill out your application form.

When you make your application to enrol in a foreign educational institution, you will be required to submit certain documents as well. Most universities and colleges, in whichever country they are, require more or less the following:

- a copy of the transcript of your secondary school academic record;
- a copy of the transcript of your tertiary academic record (if you are applying for a Master's degree programme or a doctorate course of study);
- a document stating that you have an acceptable standard of proficiency in the English Language;
- information about your working experience (if any) and what you intend to do after your course (your career);

- information on how you are going to support yourself financially as an international student.

Find out about scholarships and loans.

If your STPM results or other equivalent high school or matriculation results are good, you could seek financial assistance. Check out the following:

- Federal scholarships and loans awarded by the Ministry of Education and the Public Services Department;
- State scholarships and loans provided by State Foundations and State Governments for Malaysians born in their states;
- Private sector scholarships and loans provided by Associations, Banks, Companies, Cooperatives, etc.;
- Mara scholarships and loans provided for Bumiputras.

Post your application form.

Post your application form or forms with all relevant documents attached early to ensure they arrive at the institutions concerned within the stipulated period. If for some reason you are short of time, despatch your application by courier service even though it is expensive.

Learn while you wait for a reply.

While waiting for a reply, why not spend your time wisely? You can prepare for your course by:

- reading up on your career choice;
- reading about the country you wish to study in, so you get an understanding of its people, government and way of life;
- learning to use a computer;
- developing study skills.

There are many books on the market that offer invaluable guidance on how to excel in your studies, how to be an achiever and how to sort out your priorities and be effective. Indeed, they are not only relevant to students, whatever their intended field of study, but also to everyone who is interested in improving himself or herself.

Act upon the acceptance letter.

If your application has been accepted, you will receive a letter of offer from your institution and up-to-date information on the total cost of your course. As is usually the case, you may be required to forward payment of fees for the first semester before you can be enrolled as a student. Upon

receipt of the fees, your institution will send you a document. This document has to be produced when you apply for a student visa to get entry into the country concerned.

Prepare for your overseas stay.

This is going to be a very busy period of your life. There are so many things to do in so many places. Map out everything that needs to be done, when and where.

Before you swing into action, take note of the following:

1. Passport

You must have a passport to travel overseas. If you already hold a passport, check its expiry date. Most countries require passports to be valid for more than six months before the holders are allowed entry.

2. Student Visa

To apply for a student visa, you need the following:

- proof that you have been accepted as a student in an educational institution overseas;
- documented proof of your level of English language proficiency, that is, a score or grade on a recognised test;
- proof that you can meet the costs of your overseas education;
- a medical examination report to show you are in good health;
- a document to show that you intend to return home after completion of your studies;

3. Ticket

Contact a Student Travel Bureau to find out the cheapest fares. When travelling, think of both cost and convenience. Try to travel during the week rather than the weekend, so that you can be met at the other end by a representative of the bureau, if you are using the bureau's services.

Reserve your ticket as early as possible and collect it at least a week before your departure. Give the bureau your contact number so that you can be informed should there be a delay or change in flight schedule.

4. International Student Identity Card (ISIC)

It is worth your while to apply for this card. With

it, you become a member of the International Student Travel Fraternity and are eligible for money-saving discounts throughout the world. To become an ISIC holder, contact the MSL Travel Sdn Bhd Student Travel Centre in Kuala Lumpur, Petaling Jaya or Penang.

5. Money

You are advised not to carry large amounts of cash to your destination, only enough for incidental expenses. Take with you a bank draft and/or traveller's cheques and if you want to, credit cards.

6. Baggage Allowance

Most airlines give you a baggage allowance of 20 kg for travel by economy and are not fussy about the number of baggage items you check in. You are also allowed one hand luggage item to carry with you onto the plane. Other airlines, however, such as American airlines, state you can have only 2 pieces of luggage and these cannot exceed a certain size and weight. So, before you go shopping for luggage, check out your airline's requirements.

Please note that there will be excess baggage charges, so pack only the essentials, for example, jeans, shirts, skirts, blouses, underwear, shoes, one or two items of formal attire such as a suit/evening dress/national costume (this is necessary for formal functions) and perhaps sports equipment.

When in doubt, check out.

Should you have any problems, there are organisations and agencies that can help you, such as the following:

- Centres which provide advice and services with regards to study in their countries, for example, The British Council and Education Australia;
- Embassies and High Commissions, regarding immigration requirements and visa applications;
- Student Travel Bureaus, for advice on accommodation, fares, visa applications, student cards, etc.

Catch that plane.

A day before your departure, make a list of what you should have with you. Make photostat copies of necessary documents in case you misplace the originals. Your list might look like this:

- passport;
- ticket;
- money;
- bank draft/traveller's cheques;
- identity card or copy;
- international driver's licence;
- a copy of your medical report;
- the address of the Malaysian Embassy in the host country;
- 3 pieces of luggage with name tags and destination address;
- 1 hand luggage with name tag and destination address;
- keys for luggage.

There have been occasions when students have missed their planes for various reasons, ranging from traffic jams, losing their way to last-minute packing. This can be a horrible experience, especially for a first-timer abroad. Just abide by the airline's directive: be at the airport two hours before departure time, or one hour if you are travelling to Singapore to catch your connecting flight.

At the airport, the procedure for checking in is quite simple:

1. Check the information board for the number of the check-in counter.
2. Pass your luggage through the X-ray machine on your way to the counter, making sure the security personnel have affixed a security label on each piece of luggage that you want checked in.
3. Hand over your ticket and passport to the officer at the counter and place your baggage on the baggage ramp to be weighed. Pay the airport tax if this was not included in your airfare.
4. Make sure you get back your ticket and passport as well as a boarding pass and identification tags for your luggage.
5. Check your boarding pass to see which departure gate you should go to. Say your goodbyes early and enter the departure hall. Show your boarding pass to the security personnel waiting at the entrance to the departure hall.
6. At the immigration checkpoint, hand over your passport to be stamped.
7. Pass your hand luggage/handbag through the X-ray machine at the entrance to your departure gate. Walk through the detector doorway and allow for body checks by security

personnel.

8. Check your boarding pass for your seat number and wait in the waiting lounge for ground staff to announce that the aircraft is ready for boarding.
9. On the plane, complete the disembarkation form distributed to passengers. You may also have to fill out a customs declaration form.
10. When you arrive in your host country, hand over both your passport and disembarkation form to Immigration. After you have been cleared, get a trolley (you may have to pay for one) and go to the luggage carousel to pick up your luggage. Head for the public area outside the arrival hall. This is where you meet your friend/a representative assigned to take care of you or where you can get a taxi.

You've arrived in your host country. May your stay in it be an enriching and fulfilling one.

AUSTRALIA

Australia's Educational Attractions

Among the various factors that have attracted and continue to attract Malaysian students to Australia are the following:

- its lesser costs:
 - the airfares are relatively inexpensive because of Australia's proximity to Malaysia;
 - living cost is lower than in North America or the United Kingdom;
 - tuition fees are comparable to/cheaper than those in North America and Europe;
- the simple application procedures;
- the high quality of education offered by the universities coupled with wide recognition of many Australian degrees by our Malaysian Government and the private sector;
- the large Malaysian and Asian population in major Australian places like Perth, Melbourne and Sydney;
- the efficient network of support for students needing help during their studies in Australia;
- the opportunity granted to foreign students to find part-time employment during the semesters and full-time employment during vacations; the condition attached is that the earnings should form only a supplement and not be the means by which they pay their tuition fees;
- the country's peaceful environment.

Tertiary Education in Australia

Tertiary education in Australia is provided by universities, Technical and Further Education (TAFE) colleges and institutes, private colleges offering special studies courses and private business colleges.

1. Universities

Universities in Australia are financed by the government and are self-accredited institutions. They provide a comprehensive range of courses, including architecture, the arts, business, economics, education, law, medicine, music and science. Many are flexible and will accept a student's degree from another university for credit or as a prerequisite when he/she wants to pursue another degree or a higher degree.

Many universities also conduct courses termed 'Foundation Studies' which are intended to help bridge the gap between students' academic capabilities and the requirements of undergraduate programmes in Australia. The standard of the programmes are equivalent to the Year 12 matriculation programmes.

Awards

The courses offered lead to the following awards:

Doctoral degree (Ph.D): the highest level of education achieved at university, attained through research and, depending on the subject, coursework as well; the duration is a minimum of 3 years;

Master's degree: attained through full-time research (18 months – 2 years) or coursework (1 year – 18 months) which could include a minor thesis as well or a combination of research and coursework;

Postgraduate or Graduate diploma: attained through an intensive study programme aimed at helping graduate students acquire vocational qualifications; the duration is usually 1 year;

Graduate certificate: attained after a full-time course of study during which graduate students develop the professional knowledge and skills acquired in their undergraduate years; the duration is 6 months;

Bachelor's degree: attained after full-time study of between 3 and 6 years, depending on the course of study. In most cases, students need to study an extra year to attain an honours degree;

Diploma: attained after an undergraduate course of full-time study of 3 years' duration; most of the courses offered are vocational;

Associate diploma: attained after an undergraduate course of study of usually 2 years' duration;

Diploma (new) and Advanced diploma (new): the new diploma is equivalent to the associate diploma and the new advanced diploma is equivalent to the existing diploma.

2. Technical and Further Education (TAFE) Colleges

TAFE is the largest educational sector offering tertiary education opportunities in Australia. It provides students with the alternative route towards achieving their ambitions through professional courses, para-professional courses, post-trade and trade courses. These courses are more job-focussed than those in universities. They range from those lasting just several hours to full-time courses that are given credits when applying thereafter for university degree studies.

You can choose from many fields of study, such as accounting, architecture, building studies, business administration, computer studies, engineering and hotel and tourism. TAFE also provides matriculation courses which are equivalent to Year 12 and English Language Intensive Courses for Overseas Students (ELICOS).

Awards

The courses of study lead to the following awards:

Graduate certificate: courses are limited;

Bachelor's degree: courses are limited;

Diploma/Advanced diploma (new): attained after full-time study of 3 years; this diploma is a passport to many types of professions and is a credit if you want to pursue a bachelor's degree at a university;

Associate diploma/Diploma (new): attained

after full-time study of 2 years; the courses provided stress the development of skills in fields of study such as architecture, electronics, science and management;

Advanced certificate: attained after full-time study of 2 years; the courses provided stress the development of skills in programmes such as office management, industrial supervision;

Certificate/Certificate I-IV (new): as in advanced certificate, above.

3. Private Special Studies Colleges

These offer special studies in several areas such as beauty therapy, business studies and farm management.

4. Private Business Colleges

Courses provided are vocationally oriented and include those in the commercial and secretarial fields.

Subjects include audio-visual, bookkeeping, data processing, marketing, typing and tourism.

Entry Requirements

The institution you apply to is the body that will determine whether or not you are suited for the level of study you have chosen, e.g. a degree, an advanced diploma, a diploma, etc. It will not only examine the content of the programme you underwent at home but also whether the subjects you studied are relevant to the intended course. For example, you have achieved excellent scores in your examination for all subjects except physics and you want to do a course in engineering. The institution may still admit you into the engineering course but require you first to do preliminary studies in physics.

Generally, your suitability as a candidate for a course of study will be assessed on the following grounds:

1. your academic qualifications – whether you have the minimum entry qualifications and whether the subjects you sat for in your last examination are relevant to the intended course of study; therefore you should provide the following:
 - a certified transcript of the studies you have completed;
 - a certified transcript of the results of the examination;

- information about the grading system;
2. your proficiency in English – a good command of the language is essential for foreign students to be able to follow lectures, do assignments, etc.; (see below for required scores for undergraduate and TAFE programmes)
 3. whether or not you intend to study full-time and will be in Australia solely for the purpose of study;
 4. whether you can meet the costs of your entire stay in Australia;
 5. whether you are of good character and in good health.

Entry into Postgraduate Courses

Minimum academic qualification – universities require the following:

- a good first degree;
- proven ability to do research or working experience.

Some postgraduate programmes also require students to pass the Graduate Management Admission Test (GMAT) or the Graduate Record Examination (GRE).

Entry into Undergraduate Courses

Minimum academic qualification – the Australian high school matriculation (Year 12) or overseas equivalents such as the STPM in appropriate subjects or 3 passes at GCE A level in appropriate subjects. Students without any of these qualifications have another alternative – they can undertake a preparatory Foundation Studies programme in Australia.

English Language proficiency – minimum score/grade required is as follows:

- 6.5 in the IELTS or
- 550 in TOEFL or
- 11 in English as a Second Language in the South Australian Matriculation exam or
- C in the English 1119 paper (for Malaysians) or
- C in the General Paper, GCE 'A' level.

Entry into Diploma Courses

Minimum academic qualification – completion of Year 12 of Australian secondary education or an overseas equivalent of it;

English language proficiency.

Entry into 'Advanced Certificate' And Certificate Courses

This depends on your academic qualifications and the course objective itself. Hence, there are various minimum entry requirements such as the following:

- completion of Year 10 or 11 of Australian secondary education or an overseas equivalent or
- combination of school work and post-school experience;
- English language proficiency.

Entry into Foundation Studies

Minimum academic qualification – a certified transcript of academic achievement up to Form 5;

English language proficiency – a minimum score/grade required is as follows:

- 550+ (with no band less than 5.0) in TOEFL or
- C in GCE 'O' level or
- C in 1119 English or
- CS in SPM.

Entry into TAFE Courses

Minimum academic qualification – SPM with 4 passes in relevant subjects;

English language proficiency – minimum score/grade required is as follows:

- 5 in IELTS or
- 500 in TOEFL.

English Language Upgrading

As indicated in the entry requirements for undergraduate, diploma and certificate courses, a good command of English is required at every level of study and students have to provide an acceptable score from IELTS, TOEFL or their equivalent. To meet the needs of foreign students, many institutions conduct English Language upgrading programmes before the commencement of students' intended courses of study.

IELTS

For information on IELTS, you can contact any IDP office. It is advisable that you take the IELTS before applying for admission to an institution.

ELICOS

Should you choose to attend an ELICOS programme, you are not required to provide an IELTS score. The ELICOS institution will assess your level and determine the level at which you should undertake English language studies. ELICOS runs courses throughout the year, usually at the beginning of each month. The duration of the courses depends very much on the needs and ability of the students.

Twinning Programmes

There are several on-going twinning programmes between Malaysian colleges/institutes of higher learning and Australian universities, colleges and polytechnics. These allow Malaysian students to do part of their course here in Malaysia and then to proceed to Australia to complete the remaining part. Twinning programmes have become very popular because they save on costs.

Academic Year

- Universities observe either the semester system or the term system.

Semesters : March – June and July – November

Terms : March – May, June – August and
September – October

- Ph.D and master's students doing research can make alternative arrangements with their supervisor as to when to begin their programme.
- Undergraduate and master's students doing coursework enrol at the beginning of the year; for some courses of study, enrolment takes place also in July.
- Students doing foundation studies' have 2 sessions per year to choose from, with the first session beginning in February and ending in December and the second, in July and ending in May of the following year.
- TAFE colleges observe the semester system and their academic year runs from early March to late November.
- ELICOS programmes run throughout the year, usually at the beginning of each month. The duration of each programme depends on the needs and ability of the students.

Application Procedures

Most of the courses commence in March and some in the middle of the year. Submit your application between May and October and not later than early December.

Apply for admission to a course of study either directly to the institution of your choice or through IDP Education Australia (IDP). IDP is a one-stop centre endorsed by the Australian government. It offers comprehensive information on study opportunities in Australia through its overseas offices. These offices also provide other services such as counselling, visa application and enrolment processing, etc. Below is the address and contact number of the local IDP office:

IDP Education Australia

6th Floor (West Block)
Wisma Selangor Dredging
142-C Jalan Ampang
50450 Kuala Lumpur
Tel : 03-262 3755
Fax : 03-262 2078

Read through your application form and fulfil its requirements, which would include submission of the following:

- academic record/transcript of the courses you have taken and the grades obtained;
- score on an English language proficiency test;
- information on your career intentions and working experience, if any;
- statement that you will be self-supporting.

For application of a student visa, submit to the Australian High Commission your visa application form together with the following:

- acceptance letter from the institution – Letter of Offer;
- proof of financial capacity to meet all costs;
- a medical report;
- indication of intention to return home after completion of studies.

Assessment

Each institution has its own assessment methods, which may be similar to or different from others.

University coursework and TAFE institutions

Their assessment methods may differ. You may be required to sit for an examination towards the end of the academic year or at the end of each semester. Alternatively, your institution may carry out continuous assessment through essays, tests and presentations or have both continuous assessment as well as end-of-semester and end-of-year examinations.

Postgraduate research programme

Assessment of your thesis would be made by a committee; you might be required to take an oral examination to defend your thesis.

Scholarships

If your STPM/GCE 'A' level or matriculation results have been outstanding, you may be eligible for a university scholarship or a scholarship to study at a TAFE college. Australia has several funding programmes for overseas students. These are as follows:

1. *the Australian Sponsored Training Scholarships (ASTAS) for students from certain developing nations:*

- scholarships are for postgraduate, undergraduate courses, short courses and practical attachments at institutions;
- nomination for the scholarship is by the student's own government and this is for courses of study pertinent to the needs of the country;
- ASTAS pays for/provides a return airfare, an establishment allowance, a fortnightly stipend and tuition fees;

2. *the Australian Development Cooperation Scholarships (ADCOS) for students from certain developing nations:*

- scholarships are given directly to students for postgraduate, undergraduate and TAFE courses;
- criteria for selection is based on academic merit;
- ADCOS pays for/provides a return airfare, an establishment allowance, a fortnightly stipend and tuition fees;

3. *Overseas Postgraduate Research Scholarships (OPRS):*

- scholarships (about 33 each year) are offered to Ph.D and master's degree students, for them to carry out research in fields of Australian national interest;
- students request for OPRS forms when they send in their application forms for admission into an Australian institution;
- OPRS pays for tuition fees.

4. Commonwealth Scholarship and Fellowship Plan (CSFP):

- application is open to any field of study;
- those interested have to apply through their own universities;
- the scholarship covers airfare, tuition fees, health care, establishment allowance and fortnightly stipend.

5. Individual university scholarships:

- postgraduate scholarships – doctorate and master's degrees by research students;
- amount given depends on the university, with some providing tuition fees and a stipend, and others providing less.

6. Scholarships given by organisations:

These could be foundations, development agencies, private companies, etc. e.g. Rotary Foundation. You need to check out what scholarships are available and whether or not your academic performance merits these.

Expenses

As a foreign student, you are charged the full cost of your course of study and administrative costs and you have to meet your own living expenses which will include accommodation, travel and food.

Tuition Fees

How much you have to pay depends on which course you take and which institution you are at. But the cost, on average, compares favourably with those of equivalent courses in Britain and the United States of America.

An approximation of costs is as follows:

English courses	A\$1,900 – A\$2,300 per week course
Secretarial and Professional courses	A\$1,500 for a 10-week course
Business studies	A\$6,500 per year
TAFE	A\$7,000 – A\$9,000 per year

Cost of Living

For singles, the cost is between A\$6,000 – A\$11,000 per year and this would cover

accommodation, clothes, entertainment, food, health, transport and other miscellaneous items.

NEW ZEALAND

New Zealand is a country with much to offer students apart from higher education qualifications of an international standard. The people are relaxed and friendly and it is a comfortable place to live in – with the bonus of magnificent physical surroundings in its mountains, forests, lakes and beaches. For students who enjoy the outdoors, in particular, it offers a wealth of activities and new experiences.

Tertiary Education in New Zealand

Since the time of the Colombo Plan partnership thirty years ago, Malaysians have been travelling to New Zealand for their higher education. New Zealand tertiary institutions take quality assurance very seriously indeed. The universities have an Academic Audit Unit within the Vice-Chancellors' Committee and the work of polytechnics, colleges of education and private tertiary colleges is monitored by the New Zealand Qualifications Authority (NZQA). New Zealand higher education qualifications attract international recognition and respect.

As well as this, the New Zealand government has instituted a Code of Practice for the Recruitment, Welfare and Support of International Students to which individual institutions are encouraged to subscribe.

Higher education courses for academic, professional and vocational qualifications are provided in universities, polytechnics, colleges of education and private training institutions.

1. Universities

There are seven state-funded universities offering undergraduate and postgraduate degrees. All of them except Lincoln offer a full range of arts and science subjects and most of them specialise in certain areas of study. Five, for example, offer law studies; the University of Otago specialises in medicine, dentistry and other health sciences; Canterbury, in forestry and engineering and fine arts; and Lincoln, in agriculture, horticulture and related subject areas. Teacher training courses are also available at some of them, in some cases run jointly with a teacher education college.

First (undergraduate) degrees require three years of study. At most universities, the course is

organised into units or modules, each unit being a one-year course in a particular subject. The courses are progressive in that students must complete a first level unit to go on to a second level course (in the same subject); likewise, a second level is prerequisite for third level study. Nine units make up the degree and at least one subject must be taken up to third level as a major.

Awards

A postgraduate diploma is awarded usually after one year of study after the first degree and a Master's degree after two years. Master's degrees involve a piece of original research or a taught programme or a combination of both.

A Ph.D is awarded after three years full-time research and study.

Entry Requirements

Entry requirements are basically the same for all universities though some may stipulate high grades where competition for places is strong. For Malaysian students the standard requirements are the following:

Wanganui Regional Community Polytechnic

Courses:

1. Bachelor of Computer Graphic Design
2. Honours Computer Graphic Design
3. Postgraduate Diploma in Computer Graphic Design
4. Master of Computer Graphic Design
 - Sculpture
 - Photography
 - Painting
 - Printmaking
 - Glass
 - Ceramics
 - Museum Studies
 - Digital Graphic Design
 - Time-based Media

Private Bag 3020, Wanganui, New Zealand.
Tel: 06-345 0997 Fax: 06-345 2263
E-Mail: infoline@Wanganui.ac.nz

Minimum academic qualification:

- STPM – 3 passes at Principal level with one at Grade C or above, all obtained at the same sitting (but not including the General Paper) or
- A level – 3 passes with at least one at Grade C or
- Canadian High School Graduation Diploma – an average of 60% in 6 subjects or
- Australian State Examinations that give entry to Australian universities;
- English language proficiency – a score/grade of at least 6.0 in IELTS and 550 in TOEFL.

New Zealand universities have always had a flexible and generous policy towards the admission of mature students.

Academic Year

All the universities except Canterbury operate a two-semester system with examinations held twice a year; in particular cases, students can enrol to begin their studies at the beginning of either semester.

Further Information

Full details about each university, the courses it offers, entry requirements and fees are contained in a university calendar which is available from the New Zealand Education Service at the New Zealand High Commission in Kuala Lumpur.

2. Polytechnics and Institutes of Technology

There are 25 state-funded polytechnics throughout the country that provide education and training at levels from introductory course up to degree. Within the broader disciplines such as Agriculture, Fishing and Marine Studies, Forestry, Tourism and Hospitality, there are literally hundreds of different subjects.

The polytechnics have strong and established international links with many countries of the world and are developing twinning arrangements to enable overseas students to begin their studies at home.

Entry Requirements

For degree courses the entry requirements are the same as for universities. For Diploma courses such as the Diploma in Business Studies and the Diploma in Engineering, the standard requirements are as follows:

Minimum academic qualification:

- SPM plus one year of further study and English 1119;
- A level – 3 passes or 2 passes and two GCSE level passes or 2 passes better than C and D plus a GCSE pass.

Many polytechnic courses have open entry and provide English language classes.

3. Colleges of Education

There are 6 establishments that offer teacher training: 4 state-funded colleges of education, Massey University College of Education in Palmerston North and a School of Education at the University of Waikato at Hamilton. They offer not only general teacher training for primary and secondary schools but also specialised courses in early childhood education and courses specialising in the education of children with physical or intellectual handicaps. There are also courses in information technology, librarianship, TEFL, social work and bilingual education.

Courses offered are those for training new teachers and for enabling qualified teachers to specialise or gain further professional qualification and knowledge.

Awards

The main qualifications offered are a Diploma of Education, after 3 years of study, and a Bachelor of Education degree, after 3 or 4 years. Secondary school training consists of a one-year diploma course for graduates. Practising teachers can study for a Higher Diploma of Teaching and an Advanced Diploma of Teaching.

Entry Requirements

For degree courses the entry requirements are the same as those for university degrees.

For the Teaching Diploma for primary and early childhood education the entry qualification for students under 20 years of age must be equivalent to the New Zealand sixth form certificate. If you are over 20, you are not required to have any formal secondary school qualification but you must show that you have had some relevant work experience and that you can cope with the level of study.

To enrol for a Teaching Diploma for

secondary school teaching you must have at least a Bachelor's degree or its equivalent.

For both courses you must prove your competence in English by having a minimum score of 6.5 in IELTS.

Academic Year

The academic year for Colleges of Education differs from that for the universities to coincide with the school holidays. The school year is normally from 1st February to the first week of December and is divided into four terms.

4. Private Tertiary Institutions

There are many private tertiary institutions in New Zealand and they offer classes which are smaller than those in universities or polytechnics so you get more individual attention.

Awards

The courses available at these institutions range from certificate to postgraduate degree. They deal with a variety of subjects. The courses are accredited by the New Zealand Qualifications Authority (NZQA) to ensure that they meet internationally accepted standards.

Entry Requirements

For entry to undergraduate and postgraduate degree courses the requirements are the same as for universities, including competence in written and spoken English to a specified level. Most colleges provide Foundation (Access) courses for those who are not quite up to entry standard.

Academic Year

The structure of the academic year in these colleges varies: some follow the two-semester pattern, some the trimester and still others the traditional New Zealand pattern – three terms, beginning in March and ending with examinations in November.

5. Private Training Establishments

There are also a number of small private training establishments whose courses can be as short as 1 or 2 weeks or as long as two years. They specialise in vocational studies like air traffic control and

aviation, computing, English and travel and tourism. Some of them are located in smaller towns like Rotorua and Queenstown where you have the advantage of enjoying recreational activities in rural surroundings.

You should ensure that the establishment you apply to is registered and the course approved or accredited by the New Zealand Qualifications Authority.

Application Procedures

There is no central agency to handle your application but there are several ways to apply; such as the following:

- write directly to the institution you are interested in;
- contact the New Zealand Education Centre in Kuala Lumpur or its agents in several branches in Malaysia;
- write directly to New Zealand Education International Limited, P.O. Box 10-500, Wellington, New Zealand.

With your application, send as much supporting documentation as you can: transcripts, testimonials, scores from English language tests, etc. The institution you have applied to will let you know about all the requirements for entry to the course you want.

Application to universities can be made from 1st May of the year before you wish to begin your course. In the majority of cases, where the institution operates the two-semester system, there is also an entry date in July. Contact the institution itself for details about this.

Visa Requirements

If your course is going to last more than 3 months, you will need a student visa for which there are the following preconditions:

- when you are accepted for a course of study, the institution will write to you with an official 'offer of a place' and a written assurance that there is accommodation available for you; you cannot apply for a visa without these;
- you must be enrolled on an approved course; if your application has been made on the basis of information from official sources, you should not have to worry about this.
- you must show that you have sufficient funds to support yourself during your course and to

return to Malaysia at the end of it.

- if your course is for less than a year, you will also need medical clearance and character references.

For your student visa to remain valid you are required to attend your classes regularly and make satisfactory progress in your studies. Applications for student visas should be made to the New Zealand High Commission in Kuala Lumpur.

Financial Aid

The New Zealand government has no scholarship schemes that apply to students from Malaysia so you should follow up any local sources of financial aid such as Federal, State and the corporate sector for scholarships, loans, Education Saving Schemes, etc.

Expenses

In general, the cost of tertiary education in New Zealand compares favourably with other English-speaking countries.

Tuition Fees

Information about tuition fees will be given to you by the institution you apply to but here is a general guide:

For undergraduate courses (universities):

	NZ\$ (per year)
Agriculture/ Horticulture	14,000 – 18,500
Arts/Humanities/ Social Sciences	9,600 – 14,800
Commerce/ Business Administration	9,600 – 12,500
Engineering	16,000 – 17,500
Law	10,250 – 11,000
Science	14,000 – 16,150

For polytechnic courses:

	NZ\$ (per year)
Arts	9,600 – 15,500
Commerce	7,900 – 15,500
Engineering/Technology	10,500 – 15,500
Health Studies	9,000 – 15,700
Science	11,800 – 14,800

- Tuition fees for a 12-week English language course will cost you between NZ\$3,200 and NZ\$5,400 depending on where you do it.

Cost of Living

As a general indication, it will cost you from about NZ\$8,000 to NZ\$10,000 per year for food, clothing, transport, entertainment and accommodation. Remember to take inflation and changes in exchange rates into account when calculating your budget.

If you stay in a hall of residence on campus, you can expect to pay around NZ\$5,000 per year and this includes your food. These residences are usually closed during the three holiday periods. You can also rent a house or flat with other students, where you will have to do your own cooking and cleaning, for between NZ\$80 and NZ\$150 per week depending on location.

Alternatively, you can opt for a homestay. This is where you will best encounter the New Zealanders' well-deserved reputation for hospitality as you will be treated like a member of the family. You will get two meals a day, sometimes three, and it will cost between NZ\$120 to NZ\$160 per week. Homestay-living is an excellent way to find out about New Zealand's culture and lifestyle and what makes the people 'tick'.

All New Zealand educational institutions have a student welfare service that will help you find accommodation.

Although New Zealand has a comprehensive and advanced health care system, you are strongly advised to take out full health care insurance before you begin your studies. Application forms can be obtained from the New Zealand Education Centre.

Generally speaking, you will not be allowed to work while you are in New Zealand. However, if your course is of more than a year's duration, you may be allowed to work during the long summer holiday with an endorsement from the Immigration Service. Postgraduate students can also vary their study permits to work for up to 8 hours per week, with the support of their university or college.

Useful Addresses

For up-to-date information about tertiary institutions and their courses, about living in New Zealand and for help with your applications, you can contact the following:

The New Zealand Education Centre

(at the New Zealand High Commission)

21st Floor, Menara IMC

8 Jalan Sultan Ismail

50250 Kuala Lumpur

Tel: 03-238 4612

A.N.Z.G.A.M.

Suite 705, 7th Floor

Penang Chinese Town Hall

22 Pitt Street

Penang

Tel: 04-262 4539

Kiwi Student Centre

Lot 38, 2nd Floor, Block D

Luyang Commercial Centre

Jalan Damai

88300 Kota Kinabalu

Sabah

Tel: 088-211 966

Kiwi Student Centre

21 2nd Floor

Jalan Green Hill

93100 Kuching

Sarawak

Tel: 082-414 441

UNITED KINGDOM

Because of historical links, Britain has for many years been a destination of choice for Malaysians seeking higher education abroad. Although its popularity has in recent years been affected by rising costs, there has since been a levelling out of fees and living costs internationally so that the traditional reasons for studying in Britain still hold good. They are as follows:

- the standard of education is assured to be among the highest; standards are monitored by a range of statutory bodies, from the City and Guilds of London Institute at the lower level to the Higher Education Quality Council at degree level;
- British qualifications are widely accepted in Malaysia by both public and private sector employers;
- application procedures are simple and there is no quota system;
- Malaysian secondary qualifications are accepted as equivalent for entry to courses of study;
- students are eligible for FREE medical and dental care;

- all institutions that accept overseas students have a special office or department to look after students' interests, where they can go for advice and help.

Aside from these more practical considerations, Britain is a country steeped in history and culture, where you can meet and study with people from all over the world.

Tertiary Education in UK

The British education system resembles the Malaysian. Six years of primary schooling are followed by 5 of secondary and 2 years of pre-university. The range of opportunities at tertiary level is very wide so that students who only complete 5 years of secondary schooling can still proceed to some form of further education. Tertiary education is available in the following types of institutions:-

1. Universities

There are 91 universities that award their own degrees in a range of subject areas, both generalist and specialist.

City & Guilds of London Art School

Courses:

1. **Foundation course in art and design — 1 year**
2. **Graduate/Diploma courses — 3 years**
 - Painting
 - Illustrative Arts
 - Restoration and Conservation Studies
 - Architectural Stone Carving
 - Ornamental Carving and Gilding
 - Decorative Arts
 - Illustrative Arts
3. **Graduate/Diploma courses — 3 years**
 - Fine Art: Painting
 - Fine Art: Sculpture
 - Illustrative Arts
 - Conservation and Restoration Studies
 - Architectural Stone Carving
 - Ornamental Wood Carving and Gilding
4. **Humanities**
 - History of Art
 - History of Architecture and Design
 - History of Letterform and Typography
 - Contemporary Art Theory
 - Cultural Studies
 - Professional Practice
5. **Postgraduate Studies**
6. **Part-time Courses**
 - Diploma in Fine Craft
 - Life-Drawing
 - Print Making
 - Lettering
 - Carving and Gilding
7. **Summer School**

124, Kensington Park Road, London SE11 4DJ.
Tel: 071-735 2306/5210 Fax: 071-582 5361
E-Mail: cgarts@mpic.co.uk

Awards

Universities award undergraduate degrees, postgraduate degrees and diplomas, and doctorates, which are research degrees. Common first degrees are Bachelor of Arts (BA), Bachelor of Education (BEd), Bachelor of Engineering (BEng), Bachelor of Laws (LLB), Bachelor of Medicine (MB) and Bachelor of Science (BSc).

First degrees

First degrees can be full-time, part-time or 'sandwich'. A full-time first (Bachelor's) degree takes three years of study, a part-time one usually five. Certain courses such as medicine or veterinary science take five or six years of study.

A sandwich degree, which takes four years, is one that includes one long, or two shorter periods of paid work experience in a job related to the subject area. This is an especially useful type of course for 18-year-old entrants and such graduates have traditionally been well-received by employers.

The only exception to the three-year undergraduate course is at the University of Buckingham, Britain's only fully independent university. A degree can be obtained here in only two years but the coursework is more intensive to make up for this.

Degrees can be in one main subject or in two or more. In those universities that were formerly polytechnics, many of the degrees are multi-disciplinary, meaning that they combine arts and science subjects. Examples are Business Studies and a foreign language or Business Studies with Engineering.

The majority of first degrees are Honours degrees, though some are at Ordinary level. The Honours degree you obtain is classified according to your performance as Class I, Class II (upper and lower divisions) and Class III.

Higher degrees

A higher, or postgraduate, degree is awarded after two further years of study. It can be a taught course or one that also includes a period of research. Common higher degrees are Master of Arts (MA), Master of Business Administration (MBA), Master of Laws (LLM) and Master of Science (MSc).

Higher degrees by research only, carried out over two or three years, are Master of Philosophy (MPhil) and Doctor of Philosophy (Ph.D).

2. Colleges and Institutes of Higher Education

There are also more than 50 Colleges and Institutes of Higher Education that offer a wide range of courses from certificate and diploma to first degree. Many include teacher training courses and some have their own specialisms such as agriculture.

Professional courses lead to the examinations of the Business and Technical Education Council (BTEC), the Scottish Vocational Education Council (SCOTVEC), the National Council for Vocational Qualifications (NCVQ), the London Chamber of Commerce and Industry (LCCI) and other similar bodies.

3. Colleges of Further Education

Colleges of Further Education are institutions run by local education authorities. They offer sub-degree, vocationally-oriented courses, full-time or part-time. Many of them offer the Art Foundation course which is a prerequisite for degree studies in Art and Design.

4. Independent Training Colleges

These colleges offer professional and vocational courses in areas like Accountancy, and Hotel and Catering.

Entry Requirements

British educational institutions have become more flexible with regard to entry qualifications than they used to be and are more willing to consider overseas qualifications as equivalent to the standard ones.

Entry into First-Degree Courses

Minimum academic qualification is as follows:

- 2 'A' level passes and 3 GCSE (or 'O' level) passes at grade C minimum or
- 3 'A' level passes and 1 GCSE (or 'O' level) passes at grade C minimum.

The Malaysian STPM is accepted as equivalent to 'A' level and the SPM as equivalent to GCSE (or 'O' level).

However, individual institutions can also have their own requirements with regard to pass grades or subjects. These can be obtained from the institution's prospectus.

Entry into Higher Degree Courses

Minimum academic qualification is as follows:

- a degree from any Malaysian university, as it is accepted as equivalent to a British first degree; where competition for places is strong, there may also be a grade requirement such as Second Class Honours;
- depending on the field of study, professional qualifications obtained in Malaysia together with appropriate work experience.

Students from Malaysia must also provide proof that they are competent in both spoken and written English, through results in IELTS, TOEFL or a GCSE (1119) pass in the English language. The standard that is acceptable varies according to both the institution and the course. Generally, a C grade pass in 1119 (GCSE) ('O' level), at least a 6.0 score in IELTS or at least a 550 score in TOEFL is acceptable. All British tertiary education institutions offer facilities for learning English. In some cases, they provide a short intensive language course before the beginning of the academic programme and this is usually offered free.

Many institutions admit mature students with non-standard qualifications but appropriate work experience. The regulations, however, vary considerably. There is usually a minimum age limit.

For students whose qualifications fall just short of the entry requirements, some institutions provide Access or Foundation courses designed to help them make up the deficiencies. Information about these can be found in the prospectuses of individual institutions.

If you have already acquired a tertiary qualification at home – a MARA diploma, for example – some British educational institutions may be willing to give you credit for this and admit you into the second, or later, year of a degree course. With good grades in the London Intermediate LLB examinations you can sometimes be admitted directly into the second year of an LLB degree. These concessions, however, are at the discretion of individual institutions.

Twinning Programmes

Many private colleges in Malaysia now have twinning arrangements of various kinds with British tertiary institutions. For both professional qualifications and first degrees it can now be possible to complete the first part of the course

here and the remainder in the United Kingdom. Obviously this route has distinct financial advantages. Information about these arrangements can be obtained from the British Council.

Academic Year

The academic year begins in late September or early October except in the case of the University of Buckingham which starts its school year in January.

Application Procedures

All applications for entry to first degree and diploma courses must be made through a central agency, UCAS, which passes them on to the individual universities and colleges. As it takes almost a year to process an application and, as an overseas student, you will want to give yourself the maximum time for your own preparations, your application should be submitted to reach UCAS by **1st September** of the **year before** your course begins. This is the earliest date when UCAS will accept applications. Prompt application is particularly important if you hope to study in one of the really competitive fields like accountancy, dentistry, law or medicine.

This means, of course, that you will be applying well before you have your STPM or 'A' level results. In this case your application will bring you either a rejection or a **conditional** offer of a place. The condition will be that you achieve certain minimum grades in your examinations. You should receive your conditional offer by May at the latest.

If you are applying after you know your examination results, you will receive either a firm offer or a rejection.

The **closing date** for applications (to all institutions other than Oxford and Cambridge) is officially 15th December but overseas students may still apply, up until 14th August, for places in any courses that are not already full. Note that the closing date for Oxford and Cambridge is earlier than this - 15th October.

Applications received after August are put through a process called Clearing. If you have left your application as late as this, your choice of course and institution will be limited.

You can make only one application but you may select up to eight courses. If you receive conditional offers, (based on your expected examination results) you must choose one and you can also keep one in reserve. At this stage you are

not allowed to change your mind, so be clear about your choice. If you already have your results then you must choose which offer you want to accept and you cannot hold any in reserve. Read this paragraph again to make you sure you understand the procedure as mistakes can result in delays or possibly disappointment.

Give all the information that is asked for in the application form. If you are in any doubt, you can get help from the Education Counselling Service of the British Council.

Visa Requirements

As a citizen of a Commonwealth country you do not need a visa to enter the United Kingdom but your status as a student there needs to be verified. To avoid any confusion at the airport when you arrive you are advised to visit the Consular Section at the British High Commission in Malaysia before you leave and ask them for an Entry Clearance Certificate. The British Council will advise you on what documentation is necessary for you to take with you. It will include the following:

- a letter of unconditional acceptance from the institution you will be studying at and
- some evidence that you have adequate funds to cover all expenses during your stay in Britain.

Permission for you to stay in Britain is formally issued for only one year at a time so you will need to ensure that this is extended if you are staying longer.

If you return to Malaysia for the long holiday at the end of an academic year, you must get a letter from your university or college to say that you will be re-admitted for the next year. The overseas office or Students' Union can help you with these matters.

Financial Aid

Study awards like scholarships are few in number, particularly for undergraduate study, and there is much competition for them.

1. The British High Commission and British Council offer about 50 awards annually for Malaysians studying at either undergraduate or post-graduate level. If you receive one of these, the British Foreign Office will pay your tuition fees only (directly to the institution).

These awards may be for one year only but can be extended up to three years on review of your performance.

Look out in the newspapers for notices, usually in October, about this scheme. If you work for the Government or a statutory body, you should submit your application through the following:

Training Division

Public Services Department
2nd Floor, Block B
Kompleks JPA
Jalan Tun Ismail
Kuala Lumpur

- Employees of the public services or state-controlled organisations can also apply to be nominated for the Technical Cooperation Training Programme (TCTP). Nominations are made by the Public Services Department. These awards are given for studies that lead to qualifications of benefit to the country's economic and social development and do not include studies in cultural subjects, fine arts or the humanities. The Training Officer in your department will be able to tell you how to apply.

- The Overseas Development Administration Shared Scholarship Scheme (ODASSS) provides 100 awards annually to students from all the Commonwealth countries who are enrolling on taught postgraduate courses. The awards are for a maximum of two years. Not all UK institutions participate in this scheme so you should apply directly to the institution concerned. The Education Counselling Service of the British Council has the details.

These awards are occasionally given for undergraduate study as well. Closing dates are in March and April.

- The Overseas Research Students Award Scheme (ORS) offers between 750 and 1,000 awards to outstanding students going on to do postgraduate research degrees. These in effect reduce your tuition fees to make them the same as those for British students. The closing date is 30th April and application should be made on an official form which you can obtain from the Registrar of a participating university.

- The Rhodes Scholarship is a much-coveted award to study at Oxford University. Just one is awarded annually to a Malaysian citizen with an Honours Degree who is between the ages of 19 and 25 and is single. It covers tuition fees,

airfares and a monthly allowance. Application forms are available in September or October.

- The Hornby Education Trust offers a few scholarships every year to English language teachers who need to improve their qualifications. The forms are available in October from the British Council which acts as an agent for the Trust.
- There are about 30 Commonwealth scholarships awarded annually for Government employees and university academic staff, for periods of study varying from 3 months to 3 years. They cover tuition fees, travel to the United Kingdom, a maintenance grant and, in the majority of cases a marriage allowance if the student's spouse is going too. Details of these scholarships can be obtained from the Association of Commonwealth Universities.

Expenses

Tuition fees

While there used to be a recommended minimum level for course fees in universities and colleges, this is no longer the case. Hence, there can be considerable variation among institutions with regard to the cost of a particular type of course. This can be attributed to the fact that institutions in different parts of the country have different budget commitments and operating costs. Apart from this, tuition fees also depend on the level of the course, its length and the subject you are studying. The fees are fixed on a year-to-year basis.

	Pounds Sterling
Arts course	4,550 – 7,500
Clinical courses	14,000 – 15,000
Science courses	5,000 – 10,000

Here is an example of the range of tuition fees for different types of courses:

Fees at institutions in Northern Ireland are somewhat lower as are those for sub-degree courses like 'A' levels and diplomas.

There is possibly greater variation in the fees charged by the different Independent Colleges which sometimes provide accommodation and meals as well.

Cost of Living

Your living expenses are going to depend on your lifestyle, on whether you fly home for the holidays and which part of the country you are living in. London and the South East of the country are more expensive than northern England, Scotland, Northern Ireland and Wales.

The British Council has recommended that you allow about 5,000 pounds to cover living expenses for three terms plus the Easter and Christmas vacations. Here is a general guide to the cost of basic items such as accommodation, energy bills, food, daily travel and other essentials such as books, equipment, clothes, leisure activities and spending money, for a twelve-month period. As it is difficult to be completely up to date, reckon that actual costs will be a little higher rather than lower.

	Pounds Sterling
London, Oxbridge	7,000
England in general	5,000 – 6,000
Scotland	5,500
Wales	5,000
Northern Ireland	5,000

Students from overseas are almost always guaranteed accommodation in a Hall of Residence at least for their first year. Every institution has an Accommodation Unit to help students find suitable off-campus accommodation.

In estimating your costs, remember to allow for inflation and fluctuations in the exchange rate.

Do not expect to be able to work to subsidise your living costs. Not only is the unemployment rate high in Britain but working will probably be contrary to the conditions of your student visa.

Useful Addresses

British High Commission

186 Jalan Ampang
Kuala Lumpur

The British Council

Jalan Bukit Aman
P.O. Box 10539
50916 Kuala Lumpur

UNITED STATES OF AMERICA

The United States of America is becoming an

increasingly popular place for Malaysian students wishing to further their studies. In 1992 there were 12,660 Malaysians studying there, making them the eighth largest group of foreign students. Currently, there are 14,000 Malaysian students studying in the United States.

Somewhere among the 50 states that make up the country, you can find every sort of physical feature – mountains, deserts, wide plains, and every variation in climate, from sub-arctic Alaska north-west of Canada to tropical Hawaii in the Pacific Ocean. There are also cheaper places and more expensive ones.

With over 300 institutions of higher learning, there is an enormous range of more than 500 subject areas available. At the same time there is considerable variation in both costs and quality.

American education at all levels focusses not so much on learning for 'its own sake' as on how education can be put to a useful purpose, either to benefit society and the country or to benefit the individual. This gives it a more hands-on character than education in Western Europe. It can also be said that the American system is rather more benign and flexible in the way it assesses students' performance, a feature which makes it a satisfying experience for those who find examinations hard to cope with.

Tertiary Education in US

Tertiary education is available in three main groups of institutions: Colleges, Institutes of Technology and Polytechnics, and Universities.

There are only two major differences between colleges and universities, both of which can be either publicly or privately funded:

- colleges concentrate on first degrees while universities offer both first, postgraduate and research degrees;
- universities tend to offer a wider range of studies and have better facilities.

Institutes of Technology and Polytechnics specialise in science and engineering subjects at both undergraduate and graduate levels. There are more than 2,000 of these.

There are also around 1,200 Junior or Community colleges, public and private, where you can follow a two-year course leading to either of the following:

- a technical or sub-professional qualification

- called an Associate Degree or
- a transfer programme designed for students who want to transfer to a full four-year degree course.

Courses of Study

Even at the tertiary level, the aim of the American system is to provide a broad intellectual base. Hence, for the first year and a half of a degree course, students must take courses in both social and natural sciences and in humanities and English. Only after that do they specialise, so at first there is no distinction between Science and Arts students.

By the end of your second year you choose a 'major' field of study along with a selection of 'minors', some of which may be mandatory, others of your own choice. Students may change their major during their course of study. In doing so, their graduation may be delayed if extra work is needed to meet the requirements of a new major.

A first (Bachelor's) degree usually takes four years of study. In a few fields, such as architecture, completion of the degree may take up to 5 years. A master's degree takes two years and a doctorate, at least four years of study and original research.

Entry Requirements

Each institution, whether university or college, has its own admission requirements. The most important factor will be your academic achievements but the institution will also consider things like your English language competence, letters of recommendation, extra-curricular activities, and sometimes, even a written essay.

Entry into Undergraduate Degree Courses

Students in the States do not have to pass an examination to graduate from secondary school. They are qualified to go on to higher education if they have 'passed' in their 12th Grade (final) year at school. So, basically, all you need to enter a Bachelor's degree course is to have completed 12 years of schooling. Nevertheless, as you are competing with hundreds of other students who all wish to be admitted into the more prestigious universities, you should consider completing Lower Sixth form or passing your STPM.

Because there is strong competition from local students, places for courses leading to medical, pharmaceutical or veterinary qualifica-

tions are virtually impossible for overseas students to attain.

Some institutions ask students to undergo a Scholastic Aptitude Test (SAT) and/or the Achievement Test (AT). These are organised by MACEE.

At some universities and colleges, Principal level passes in STPM can earn you credit for several units of the course. You can also obtain credits for diploma studies you have done, on a subject-by-subject basis. If you are accepted with credits that amount to less than one year's worth, you are admitted as an Advanced Placement Student.

There is also the option of undertaking a diploma or pre-university course here in Malaysia that will enable you to transfer into an undergraduate degree programme in the United States. Many private colleges now have twinning programmes and other arrangements; this could make the process of transfer not only a little easier but also much cheaper.

Entry into Postgraduate Degree Courses

The entry requirements for studies leading to Master's degrees are even more varied. They can vary from year to year in the same institution. Nevertheless, the one basic requirement is that you have an Honours degree.

It is possible that you could be admitted with a three-year, post-STPM qualification from Institute Technology MARA, for example, but you would probably have to complete some extra work at undergraduate level as a condition.

In the same way, if you already have a Master's degree, you may have to complete extra coursework before beginning on a Ph.D.

It is important to note that, even when you have been accepted as a graduate student, you will still have to prove at a later date that you are competent to be a candidate for the degree itself.

English Language Proficiency

You will have to satisfy the institution you apply to that you are very competent in spoken and written English. The most commonly requested proof is a score of 520 in the TOEFL test. Many universities and colleges run their own English language proficiency courses and these may admit you with a lower score.

You should sit for your TOEFL as early as possible so that the results can be received by the application deadline. It takes four to six weeks for

the results to be sent from the Testing Centre to the university or college in the United States.

The Academic year

The academic year at US colleges and universities begins in late August or early September and ends in mid to late May. Summer session courses (June, July, August) are optional and are not considered part of the academic year, but credits gained during the summer session contribute towards the degree. The academic year is divided into 2 parts, called "semesters" or into 3 parts, called "quarters". The semester system consists of two 15-week sessions and a summer session, and the quarter system consists of three 10-week sessions. Regardless of the system chosen, all students spend the same amount of time studying to earn their degree.

Credit System

You achieve your degree by collecting 'credits'. Credits are also called course units. A course unit is one class hour. In a typical class that meets three times a week you would collect three credits. Two or three periods in a laboratory are rated as one unit or credit.

For an undergraduate student the workload is usually five subjects per semester which gives a workload of about 15 to 17 units. To graduate with a Bachelor's degree you need 120 semester hours or 180 quarter credits.

Grading System

Each semester (or quarter) students are given grades for courses taken. Grades are assessed on the basis of all work done, not just on one final examination. Work graded may include any or all of the following: weekly or irregular examinations, mid-term examinations, final examinations, research papers or projects, presentations, homework, assignments and class participation. The most common grading system is by letters: A

for excellent work; B for above average work; C for average work; D for below average but passing work; and E or F for failing work. No credit is given for a failing grade.

At the end of each semester or quarter, your performance is rated according to what is called a Grade Point Average (GPA). The formula for this is as follows: your alphabetical score (A,B,C,D or F – which means fail) is given a numerical value (1,2,3,4, and 0) and this is multiplied by the number of credits you have collected. For example, you may have scored a B in English. This has the numerical value 3. You have also collected 3 credits in it. So, 3 multiplied by 3 gives you 9.

This is done for all the subjects (courses) you have taken. The scores added up and the total divided by the total number of credits gives you an average. For example below.

Some institutions use percentage grades instead of letters of the alphabet and many simply use a pass-fail system. You will find that there are still other variations.

A characteristic of this system is that you have to put in more time on your weaker subjects in order to bring your Grade Point Average to a satisfactory standard.

Educational Opportunities/Options

Students who study in US colleges/universities are able to enrol in a variety of programmes that offer them additional resources and avenues to increase their knowledge. Some of these opportunities include work opportunities or internships with US businesses and organisations or taking classes at partner universities, some of which are located in other countries. Students can also join clubs which promote both professional, cultural and athletic interests.

Available Services

In addition to academic advice, US colleges and universities provide students with career guidance

Courses	Grade score	Credit hours	
Computing	C = 2	4	$2 \times 4 = 8$
Drama	A = 4	3	$4 \times 3 = 12$
English	B = 3	3	$3 \times 3 = 9$
Mathematics	C = 2	2	$2 \times 2 = 4$
Physical Education	A = 4	1	$4 \times 1 = 4$
		13	37 grade points

37 divided by 13 = 2.84 Grade Point Average

and host employment fairs where US and international companies recruit and hire students. Foreign student advisors provide immigration, cultural and practical information for international students. Colleges and universities offer students a variety of housing options, campus health and medical services and provide good quality, low-cost health insurance.

Application Procedures

You can, and should, submit your application before you have the results of your SPM or STPM. Generally speaking, you will need to start the application process one year before you actually want to enter a course of study.

When you have decided what your field of study will be, you should write to six or ten institutions (3 to 6 if you are applying for a postgraduate course) for information about courses, admission requirements and application forms. You should address your letter to the Director of International Admissions for undergraduate degree courses and to the Head of the relevant department for postgraduate degree courses. Form letters requesting information are available at MACEE. You may want to view a video of the universities that you are considering as well as talk to a university representative should there be one available. More than 200 institutions of higher education are available to hold discussions with students at MACEE throughout the year.

You should include all important information about yourself, details of your schooling and as much detail as possible about what you want to study. It is important to consider factors such as cost, enrolment size, entrance difficulty, location, housing options, library facilities, minimum TOEFL score required, and the availability of financial aid. There are several publications available at MACEE which provide detailed information, such as the above, for each individual college and university.

When you receive the forms, complete and return them promptly. You may be asked to write an essay and will usually be asked to submit an application fee.

Visa Requirements

It generally takes 6 – 8 weeks before an applicant is informed of the status of their application. When you have accepted an offer of a place from a university or college approved by the United States Immigration and Naturalization Service

(INS), you will receive a Form I-20 which is a certificate of eligibility. Complete this form and take it to the United States Consular Office when you apply for your visa. Your visa will then be valid only while you study at that particular institution. If, in the meantime, you get a better offer and accept it, it may be possible to amend your visa before you leave. After you get to America, you will need some very good reason indeed to have it amended.

If your course of study or research is approved by the United States Information Service and sponsored by a private institution, organisation or a government agency, you will be issued with Form IAP-66, a 'Certificate of Eligibility for Exchange Visitors Status'. In this case the consular office will issue you an exchange visitor visa, J-1.

You will also need to provide the following:

- proof that you have the necessary competence in English or
- proof of confirmation of your enrolment on a pre-course English language training programme on your Form I-20 and
- that you have sufficient funds to cover your expenses;
- a signed statement saying that you understand and accept the conditions which allow you to enter the United States.

Once a student visa has been issued, travel arrangements should be made. Students will want to make sure that they have informed their school of their impending arrival date and time so that someone from the university can be available to pick them up from the airport.

Work Opportunities

International students are allowed to work part-time while pursuing a full-time course of study. Interested students should check with the Foreign Student Advisor at their colleges / university to find out what opportunities are available to them.

Financial Aid

Very few private educational establishments offer financial assistance to overseas students. Even if you are lucky enough to find one that does, it will only pay a part of your expenses. If you want to apply for it, you should do so a year before you mean to enrol for a course. It would be better to follow up the possibilities at home in Malaysia.

Expenses

State-supported institutions tend to be a little cheaper than private ones. As well as tuition fees, you will be expected to pay additional fees for using sports and other facilities. You may even be required to have your own computer but discounts are usually arranged for students. Payment of all fees is due in one lump sum at the beginning of each year.

Tuition fees

Each tertiary institution determines its own fees and the variation is considerable. Estimated average costs for a course in a university or college for an academic year is from US\$10,000 – US\$ 20,000. When calculating a budget, students should remember to include transportation costs. Specific cost for each individual institution is available at MACEE.

Accommodation

Overseas students can almost always live in an on-campus Hall of Residence or dormitory for their first year. This will include meals and could cost between US\$3,900 and US\$5,000 depending on the institution. Halls often incorporate study rooms, libraries and recreation rooms and may also have their own kitchens and laundry facilities.

In larger towns and cities it is often cheaper to find your own accommodation. The college accommodation unit will help you find a suitable place.

Cost of Living

These could be between US\$3,500 and US\$4,000 but it very much depends on what you do with your time. You can reduce costs by buying textbooks second-hand; Student Associations usually run a second-hand shop.

You should take advantage of any medical insurance policy your university or college may have. There is usually a policy designed specially for overseas students and that should cost between US\$175 and US\$300.

Useful addresses

The Malaysian-American Commission on Educational Exchange (MACEE) is a binational Fullright Commission established in 1963 to promote educational exchanges between the United States and Malaysia. The MACEE

Educational Advising centre provides information on higher education in the United States and assistance with registration for standardised examinations such as TOEFL, SAT, GRE and GMAT. Educational advisors are available to explain the application process, answer specific questions regarding study opportunities, and assist students in finding the resources needed to obtain accurate and up-to-date information. MACEE provides an unbiased service and dispense only information on regionally accredited institutions. MACEE is open from 10.00 am to 4.00 pm, Monday through Friday.

MACEE

191 Jalan Tun Razak
50400 Kuala Lumpur
Tel: 03-242 4539

and

112-B Madras Lane
10400 Penang
Tel: 04-375 360

Embassy of the United States of America

376 Jalan Tun Razak
50400 Kuala Lumpur
Tel: 03-248 9011

CANADA

Canada's popularity as a place to study in has grown rapidly in Malaysia. One indication of this is the number of Canadian matriculation, pre-university and twinning programmes now available in Malaysian private colleges.

It is a country that spends a great deal on tertiary education and offers internationally recognised courses. The tuition fees are also low relative to many other countries.

Canada is a safe, multicultural country where Malaysians can find much that is familiar to them; its accessible cultural, sporting and other recreational facilities also make it a place where you can participate in a wide range of activities and have fresh experiences.

Tertiary Education in Canada

Like the United States and Australia, Canada is a collection of federated states called provinces and territories, each responsible for providing its own educational facilities. Hence, all aspects of tertiary education – the institutions, the courses, the

funding arrangement, for example – vary from state to state. Even within a state there is variation between the different institutions.

Because the variations are so many, it is only possible here to give a general outline of what is available. Some Canadian institutions subscribe to a partnership called Education Canada (Malaysia) which offers not only detailed information about the institutions themselves but also a Counselling service, visa forms and information about immigration procedures and pre-departure orientation sessions.

Tertiary education is available in universities, university colleges and community colleges. There are approximately 90 degree-granting institutions and over 150 community colleges throughout the country.

1. Universities

Between them, the universities offer a complete range of courses (programmes), some specialising, for instance, in teacher education, fine arts, agriculture, others providing courses at undergraduate and postgraduate level and the rest, providing courses only at undergraduate level.

To find out about the courses that are available, consult the Directory of Canadian Universities and Colleges in the Education Canada (Malaysia) reference library. For more details, check the annual calendar published by universities.

Most undergraduate courses leading to a Bachelor's degree require 3 – 5 years of study. Degree courses in Architecture, Law, Health Sciences, Theology and other subjects as well as some postgraduate courses can take a longer period.

Entry Requirements

Every university has its own admission requirements but, in general, the basic academic requirement for an undergraduate course is one of the following:

- STPM (with a minimum of two Principal passes) or A levels;
- Canadian Matriculation/Pre-university Programme (Grade 12/OAC);
- an Australian matriculation qualification.

A few universities will also accept an SPM or

GCSE if you have a minimum of five or six credits.

You need to prove your competence in written and spoken English. The most commonly accepted proficiency test is TOEFL which may sometimes have to be accompanied with TSE and TWE (Test of Spoken English and Test of Written English). In some of the universities the language of instruction is French as well as English.

2. *Community Colleges and University Colleges*

University Colleges are community colleges that offer three – and four-year degree courses, either their own or those accredited by universities. There are only five of them and the entry requirements are the same as for universities.

Community Colleges are institutions where you can study for tertiary qualifications at all levels below that of degrees. They are called by a variety of names such as Colleges of Applied Arts and Technology, Institutes of Technology or Regional Colleges.

Some offer pre-university courses for students who lack the minimum qualifications and most offer some kind of Transfer Program. This means that students can do their first year or first and second year of a Bachelor's degree course at a community college and then transfer to a university to complete it.

Entry Requirements

To enrol for a pre-university course you will need SPM or GCSE ('O' level) passes and a minimum TOEFL score of 550. For a Transfer Program you need the same qualifications as for entry to a degree course. In some of the universities the language of instruction is French as well as English.

Twinning Programmes

It may be more convenient and it is certainly cheaper for you to begin studying for your Canadian degree at home in Malaysia. These are the courses currently on offer:

- Canadian Matriculation Program at Sunway College in Kuala Lumpur
Tel: 03-735 8622;
- Canadian Pre-University Program at Taylor's College, Kuala Lumpur
Tel: 03-734 5211;
- Twinning Program in Commerce, Computer Science, Engineering or Medicine at Sedaya

College in Kuala Lumpur

Tel: 03-757 7830;

- Twinning Program in Medicine at the International Medical College in Kuala Lumpur
Tel: 03-758 4249;
- Transfer Program in Business at Higher Education Learning Program (HELP) Institute in Kuala Lumpur
Tel: 03-254 2000.

Academic Year

The academic year is from September to April. In a few cases though, the institution operates on a semester or trimester basis and you can begin some courses in January, February, May and July.

Application Procedures

University places in Canada are said to be very much in demand and, as there may be a lot of correspondence involved, you should start the application process as early as possible, preferably a year in advance. Individual universities have their own deadlines for receiving applications.

You should make your application directly to the university concerned except for the universities in the province of Ontario. In this case you must apply to the Ontario Universities Application Centre (OUAC).

With your application you must include original or certified copies of transcripts of your qualifications for entry. Certified copies should be translated into English and be issued by the Malaysian Examination Boards. There is a small fee for this.

For some institutions, application forms are available from Education Canada (Malaysia).

Visa Requirements

To be granted a visa you must have a Student Authorisation which you get here in Malaysia. You must have an official acceptance from an approved Canadian educational institution and sufficient funds to cover your study and living expenses, including a return fare.

You should apply at least six weeks before your course in Canada begins. It is your responsibility to ensure that you have the Student Authorisation in time. The deadline for submitting your visa application is three weeks before you leave the country. Obviously you need to be well-organised and complete your university or college application forms early.

The Student Authorisation will allow you to attend one particular institution for a specified period of time. You must make sure that you inform the Canadian Immigration authorities if you transfer or drop out.

If you need an extension you can apply for this either while you are still in Canada or while you are home on holiday. If you apply from within Malaysia, you must do so at least four weeks before you are due to return to Canada.

Financial Aid

The Canadian Government does not offer any scholarships or awards for international students so you should check out all local sources of financial help.

It is possible to work but this is very restricted. Apart from the situation where a period of work experience is a part of your course of study, you may do the following:

- work part-time so long as it is on campus;
- work as a teaching assistant if you are a graduate student;
- work in a job related to your field of study for one year after you graduate.

Expenses

Tuition Fees

Tuition fees vary a lot according to the province, institution and type of course you are studying. For an undergraduate degree programme, they may be between C\$3,000 and C\$15,000. For a postgraduate courses, they range from about C\$4,000 to C\$13,000.

Cost of Living

For accommodation, food, clothing, etc., you should need about C\$6,000 to C\$10,000 for a twelve-month period. There will be other expenses as well, such as books, equipment, recreation, travel, etc., and you should make sure you have the most up-to-date information about the cost of living.

Although Canada's health care is as good as any in the world, it is very expensive. It is essential that you are covered by health insurance during the period of your stay in the country. You cannot take out health insurance until you actually arrive in Canada but your university or college will advise you about it.

Education Canada (Malaysia)

8C Jalan Ampang Hilir
55000 Kuala Lumpur
Tel: 03-453 2901

For transcripts of your Malaysian examination results, contact the following:

- for SPM – Lembaga Peperiksaan

Kementerian Pendidikan Malaysia

Jalan Duta
50605 Kuala Lumpur
Tel: 03-254 1144

- for STPM – Majlis Peperiksaan Malaysia

Kementerian Pendidikan Malaysia

Tingkat 1 & 4, Wisma Mirama
Jalan Wisma Putra
50640 Kuala Lumpur

For applications to institutions in the province of Ontario –

Ontario Universities Application Centre

Box 1328, 650 Woodlawn Road West
Guelph
Ontario, Canada N1H 7P4
Tel: 519-823 1940
Fax: 519-823 5232

GERMANY**Tertiary Education in Germany**

Germany offers two types of tertiary education – University and 'Fachhochschulen'. The main differences between the two are as follows:

Tuition fees: None; universities and Fachhochschulen – both financed from public funds

Medium of Instruction: German proficiency is a prerequisite; students sit for a proficiency test (PNDS) after a instruction course of instruction at home or in Germany. It usually takes about 8 months of 30 hours per week of instruction for pupils to be ready to sit for the PNDS.

Accommodation: Students look for this themselves.

Entry Requirements

To qualify for admission to either a university or Fachhochschulen, you must have a secondary school-leaving certificate recognised as equivalent to the German 'Abiturzeugnis'. This could be the Sijil Tinggi Peperiksaan Malaysia, the General Certificate of Education 'A' level or the International Baccalaureat, to name a few.

If your certificate is not recognised, you still have a chance to study in Germany. To qualify, you have to attend a preparatory course –

	University	Fachhochschulen
First established	1385	1970s
Focus	Research and pure sciences	A more practical education: application of research or knowledge acquired; caters to the needs of German industry
Courses	Include agriculture, economics, engineering, forestry, the humanities, law, medicine, science, social sciences and theology	Include agriculture, business administration, design, engineering, social science; industrial/business counselling services provided to regional industries; research for 'Diplom paper' which is equivalent to a corresponding university degree carried out with private sector
Graduates	Scientists, researchers, future university professors, etc.	Business administration officers, chartered engineers, etc.
Curriculum	Students can shape their individual course of study and need only to observe some general guidelines pertaining to the recommended curriculum and the examination regulations.	The curriculum is obligatory.

	Advantage: students free to make their choice	Advantages: degree course is more compact – 6 to 8 semesters; tuition groups smaller than those in universities; students get practical training in a company or office, hence better job prospects
	Disadvantage: quite demanding especially for first year students as they have to take full responsibility for their studies	Disadvantage: less freedom for student to chart his or her own individual course
Semesters	Two: winter semester and summer semester	
	Winter semester: 1st October–30th March; lectures begin in mid-October and end around mid-February	
	Summer semester: 1st April – 30th September; lectures begin in mid-April and end around mid-July	
	Both semesters contain non-lecture periods.	Shorter non-lecture periods
	A university course has a minimum of 10 semesters. Average length of course: between 12 and 14 semesters	A degree course is between 6 and 8 semesters.
Exams	Intermediate exam: after 4 – 5 semesters of study	Continuous assessment
	Final exam: Master's degree – after another 5 – 8 semesters; includes a thesis, a written exam and an oral exam	
	Doctorate level: can be pursued after a Master's degree	

'Studienkolleg' – and then sit for an assessment test – 'Feststellungsprüfung'. German is a compulsory subject in the preparatory course and you have to show proof that you are proficient in the language before you are allowed to attend it.

Expenses

Tuition is free but the following have to be paid for:

- obligatory costs training;
- books and study materials;
- contributions to 'Studentenwerk', a student organisation that offers facilities that could include a playing field, a refectory, dormitories and tickets for free transportation to your university; amount to be paid depends on the individual university and can range from Deutschmark (DM)45 to DM170 per semester;

- student health insurance – for students 30 years of age and below; this is about DM400, covering medicine, treatment at a hospital, doctor's fees and others.

Cost of Living

Germany is a very expensive country to live in, compared to Malaysia. A single room in a dormitory or a shared room can cost between DM250 and DM380 monthly. This is inclusive of heating and electricity.

Useful Addresses

If you need assistance or further information regarding career choices, placement, language instruction, etc., the following centres will be able to help you:

Carl Duisberg Centre (CDC)

Regional Office
53-B Jalan SS21/9
Damansara Utama
47400 Petaling Jaya
Tel: 03-717 4475
Fax: 03-717 4476

Deutsche Botschaft

3 Jalan U Thant
55000 Kuala Lumpur
Tel: 03-242 9666
Fax: 03-241 3943

INDIA

India is a colourful and exciting country of many contrasts. Many Malaysians will feel very much at home there and, for some, it can provide an opportunity to make contact with their country of ethnic origin. But one of the most compelling reasons for studying there is that, while Indian higher education qualifications are widely recognised as being at least up to the world average in quality, the costs are a lot lower than anywhere else.

Tertiary Education in India

By contrast with many other countries, the entire education system in India, from school to university, is the responsibility of the state governments. They prescribe the syllabuses, publish the textbooks, fix fees, conduct examinations, award certificates, diplomas and degrees, appoint staff – in fact, manage everything relating to the work and administration of the institution.

But the monopoly of tertiary education is not quite complete; there are a few self-financing colleges and polytechnics supported by minority religious or linguistic communities.

Not surprisingly for such a big country, there are plenty of tertiary education establishments: 191 universities, 4,870 colleges, 307 engineering colleges, 160 medical colleges, 918 polytechnics and 4,036 vocational schools. Large numbers of students from countries all over the world enrol every year.

Certificates, diplomas and degrees are regarded as being of equal standard right across the country. The name of the establishment in which you have studied does not even appear on your degree certificate.

There are several types of educational

institutions. These are as follows:

1. Traditional Colleges

They offer two-year, pre-degree certificate courses, three-year undergraduate courses and two-year graduate programmes in arts, science and commerce subjects.

2. Professional Colleges

They specialise exclusively in graduate and undergraduate courses in the areas of engineering, health sciences, hotel management, law, technology, etc.

3. Business Colleges

They offer two-year graduate programmes in business administration.

4. Agricultural Colleges

They offer both undergraduate and graduate courses in fisheries, forestry, veterinary science, agricultural sciences and others.

5. 'One-of-a-kind' Institutions

There are institutions known as "one-of-a-kind" that specialise in subjects considered by the government to be important to the needs of national industry.

6. Polytechnics

There are over 1,000 polytechnics that offer three-year diploma courses in engineering and technology.

7. Universities

Universities do not offer undergraduate courses, but concentrate on research and postgraduate courses on administering the higher education provision in the other institutions within their geographic region. They can be classified as follows:

- traditional;
- medical;
- agricultural;
- technological.

Entry Requirements

Acceptance of application to pre-degree, undergraduate and postgraduate courses in the arts, science and commerce subjects is decided by the colleges themselves. A quota system controls the number of students accepted and is related to categories like open merit, ethnic community, caste, etc.

Admission is by tests conducted at institutional, state and national levels and these are for the following:

- professional subjects like medicine, dentistry, engineering, etc.;
- postgraduate courses in business;
- courses in polytechnics.

Note also, however the following:

- in self-financing polytechnics, admission to diploma courses is also by tests;
- the 'one-of-a-kind' institutes also administer their own admission tests, but foreign students can sometimes be exempted from these.

The STPM should admit you to any undergraduate course and the SPM, to a diploma course, a personal enquiry, however, is necessary in all cases.

Special Quota Schemes

Some self-financing institutions in states like Karnataka, Maharashtra and Tamil Nadu reserve a quota of places for foreigners applying for courses in dentistry, medicine, nursing and pharmacy. These are called 'Payment seats' and entry involves an admission test. Information about 'Payment seats' can be obtained from the following:

Director of Medical Education
Government of Andhra Pradesh
Hyderabad 500 001

Director of Medical Education
Government of Karnataka
Bangalore 560 001

Director of Medical Education
Government of Maharashtra
St. George's Hospital Campus
Bombay 400 001

Director of Medical Education
Government of Tamil Nadu
Madras 600 025

Director of Technical Education
Government of Andhra Pradesh
Hyderabad 500 029

Director of Technical Education
Government of Karnataka
Bangalore 560 001

Director of Technical Education
Government of Kerala
Trivandrum 695-023

Director of Technical Education
Government of Maharashtra
Bombay 400 001

Director of Technical Education
Government of Tamil Nadu
Madras 600 025

There is also a scheme for admission to 'Minority seats' for students from religious or linguistic minorities such as Christians and Muslims. You must apply directly to the colleges for information.

The government also reserves places in some colleges offering business, dentistry, engineering, medicine and pharmacy courses for foreign students who score a minimum of 50% in their higher secondary (or equivalent) exams. You should contact the Ministry of External Affairs on this.

Academic Year

There is only one annual intake of students – in June and July. The academic year runs from June/July to March/April.

Visas

Contact the Indian High Commission for details about your visa application.

Expenses

Education at every level in India is generously subsidised by the government so the costs to the student are amongst the lowest in the world.

Tuition Fees

In self-financing colleges, the fees for

undergraduate and postgraduate degree courses in arts, commerce and science subjects should not be more than US\$500 per year. For professional subjects like dentistry, engineering, medicine, pharmacy, etc., the fees can go up to US\$5,000. For a three-year polytechnic diploma course, the tuition fee is around US\$100 to US\$200. If you have a 'Payment seat' place in one of the self-financing colleges, your fees will be a little higher.

Living Costs

On campus accommodation is available in hostels and here a room is shared by two students, bathrooms are also shared and you have to provide your own electric light bulbs and bedding. All meals are provided. If you have special requirements, you should contact the hostel warden as soon as you have your place in college. Alternatively, you can find your own off-campus accommodation. Whichever you choose, your total living costs should not be much more than US\$100 per month.

Medical and hospital services are easily available and comparatively inexpensive. Note that it is now mandatory for all overseas students entering India to be free from the HIV virus so you are advised to have a test before you leave Malaysia.

Useful Addresses

For a complete list of universities:

Association of Indian Universities

16 Kotla Marg
New Delhi 110 002

University Grants Commission

Bahadurshah Zafar Marg
New Delhi 110 002

For information about polytechnics and about admission tests for courses in engineering and technology:

All India Council for Technical Education

D-47, N.D.S.E. Part 1
New Delhi 110 049

For information about federal tests for admission to undergraduate courses in dentistry, medicine, etc.:

Central Board of Secondary Education

2 Community Centre

Preet Vihar

Delhi 110 092

For admission tests for hotel management courses:

National Council for Hotel Management

P.O. Box 2281

New Delhi 110 021

For similar information about state tests you should contact the State Director of Medical Education or the Director of Technical Education in the list under 'Special Quota Schemes'.

JAPAN

Students from around the world are warmly welcome to study in Japan. International students can enjoy a rewarding experience in Japan that benefits not only themselves but also the people they come into contact with. Furthermore, through their role as private ambassadors, international students can contribute a great deal to promoting mutual understanding and the development of friendly relations between Japan and their countries.

Tertiary Education in Japan

There are five types of higher education institutions in Japan for foreign students:

1. Universities

They offer undergraduate courses, the duration of which is usually 4 years. For dentistry, medicine and veterinary science, the duration is 6 years.

2. Graduate Schools

They offer Master's degree courses and Ph.D courses. Also available are postgraduate research and auditors' courses (part-time and non-degree). The duration of such courses is 1 semester or one academic year.

3. Junior Colleges

The courses are usually for 2 years but there are some, for example nursing, which are for 3 years. Sixty per cent of these colleges are 'women only' institutions, with courses such as education, health and welfare, home economics and social sciences.

4. Colleges of Technology

These provide a five year college education for junior high school graduates. The courses focus on science and technology and subjects include engineering and merchant shipping.

5. Vocational Colleges

These colleges offer vocational-technical education. Those providing specialised courses are considered to be higher education institutions. The courses are between 1 and 3 years.

Entry Requirements

Entry into Universities

You should have had 12 years of schooling at home and have completed your secondary education; those with 10 or 11 years of education need to study Japanese at one of the Japanese language schools that are part of the International Students Institute or the Kansai International Students Institute.

You have to pass the university's entrance examination – the Japanese Language Proficiency Test and the General Examination for foreign students.

You must show documented evidence of a pass or expected pass in a qualification examination equivalent to the University Entrance Qualification Examination in Japan, for example, the International Baccalaureate (only a few universities admit students on the basis of documents alone).

Entry into Graduate Schools

For both the Doctorate and Master's courses: a pass in the Graduate school entrance examination which could include screening of documents submitted, a short thesis, an interview and written tests;

For Doctorate courses: a Master's degree; alternatively, you can gain admission if the university is prepared to recognise that you have the academic ability to pursue this course;

For Master's courses: completion of 16 years of schooling and a graduate of a 4-year university course; alternatively, you can gain admission if the university is prepared to recognise that you have the academic ability to pursue this course;

For research: there are different entry

requirements for the various research programmes and these could include a prerequisite that

- you have completed 14 years of schooling, you are a university graduate, you have a Master's degree and you hold a Doctorate;
- you are a university graduate with less than 16 years' schooling, you are at least 22 years of age and have already been registered as a research student or researcher for about a year at a university or other recognised institution in Japan or elsewhere;
- you are a graduate of a medical or dental college with less than 18 years of schooling, you are at least 22 years of age and have already been registered as a research student or researcher for about a year at a university or other recognised institution in Japan or elsewhere.

Depending on the school, you may be required to contact a supervising instructor and get his/her informal consent for admission before you send in your application.

Entry into Junior Colleges

You must pass the college's entrance examination.

You should have had 12 years of schooling at home and have completed your secondary education; if you have only 10 or 11 years of education, you will need to study Japanese at one of the Japanese language schools that are part of the international Students Institute or the Kansai International Students Institute.

Screening by more than 50% of the junior colleges include using the results of the Japanese Language Proficiency Test by 47% of the colleges and using the results of the General Examination for Foreign Students by 255 colleges.

Entry into Colleges of Technology

You should have completed 12 years of schooling at home.

You must sit for an entrance examination – assessment methods vary and may include a Japanese language test, document screening and an interview.

Entry into Vocational Colleges

You must sit for an entrance examination – this consists of document screening, a Japanese

language test, an interview, academic examination, a practical examination, essay-writing and an aptitude test.

You should have completed 12 years of schooling (including middle school education); if you have only 10 or 11 years of education, you will need to study Japanese at one of the Japanese language schools that are part of the International Students Institute or the Kansai International Students Institute.

You must prove your proficiency in the Japanese language and the following are acceptable:

- a pass in levels 1 or 2 of the Japanese Language Proficiency Test given by the AIEJ and the Japan Foundation;
- your undergoing a minimum 6-month course at a Japanese language school and certified (?) by the Minister of Justice or
- your undergoing at least a year's education in an elementary, junior high or senior high school in Japan.

You need to provide evidence that you have a job waiting for you at home where you can apply the skills and knowledge gained from the course.

Short-Term Study

Recently, Japan has begun to place more emphasis on short-term programmes which enable international students to study in Japan for one year with the purpose of earning credits while remaining students of their own university back home. At present there are about 20 private universities operating such short-term programmes. Some national universities also offer such programmes (Chiba, Hiroshima, Kyushu, Nagoya, Osaka, Tohoku, Tokyo and Tsukuba Universities). It is likely that the number of both private and national universities with such programmes will increase from now on.

Scholarships

Economic assistance may be in the form of scholarships, tuition fee subsidies, or material assistance. Some scholarships for international students in Japan can be applied for in the student's home country, before the student enters Japan, but most scholarships must be applied for in Japan, after the students arrival. Most scholarships are for students and research students at the university level or above. There are a few

scholarships for students at special training colleges and almost none for students studying at Japanese-language institutions.

Most scholarships cover only part of a student's education and living expenses; only a few cover all the expenses. Therefore, students should check the cost of studying in Japan carefully and plan their stay accordingly, without relying on a scholarship.

Some of the scholarships available:-

1. Japanese government scholarships
2. Honours scholarships for privately financed international students:
 - a) Honours scholarships
 - b) Peace and Friendship Scholarships
3. Japanese private foundation scholarships
4. Educational institution scholarships

Application Procedures

Announcement of procedures is usually made by the institutions between June and August each year. A foreigner entering Japan must go through the following procedures:

1. Find a guarantor in Japan
2. Gain admission to the higher educational institution of your choice
3. Acquire a passport
4. Acquire a visa.

Students who are keen to study in Japan are advised to contact the Japanese Consulate or respective universities for details of application procedures.

Expenses

Average cost of first year of education

	Yen	
Universities	717,600	to 4,709,865
Graduate Schools	684,000	to 1,065,000
Junior colleges	488,400	to 1,329,000
Japanese-language	130,000	to 1,710,000
Special Training Colleges	118,000	to 1,134,000

The average monthly living expenses of an international student is about 98,238 to 171,920 Yen.

Source: Student Guide to Japan (AIEJ)

Employment

Many international students who will require specialised knowledge immediately after returning to their country express the desire to undergo training in a Japanese company for a certain period of time. To undergo company

training, it is necessary first of all to consult with the guidance instructor at your school, find a reliable company in your special field that is willing to accept you, and apply to change your status of residence from "college student" to "trainee".

The number of international students wishing to obtain employment in Japanese companies after graduation is increasing year by year. According to the Immigration Bureau, the number of international students who applied to change their status of residence so that they could work in Japan reached 2,555 in fiscal 1994. Permission was granted in 93.7% of the cases. The main points that are taken into account when screening applications for a change of status of residence for the purpose of employment are: 1) educational background, 2) the type of job in which the applicant wants to be employed, 3) remuneration, 4) the condition of the company concerned.

For details about procedures and documents necessary for application, please consult the immigration bureau. Information on employment in Japan can be gathered by the following

methods: (1) talking with students who have studied in Japan and are now working for Japanese companies; (2) using the occupation department of your school; (3) reading employment magazines for international students; (4) attending employment seminars for international students; (5) participating in visits to companies.

Useful information

Kuala Lumpur Japan Educational Information Centre

C/O JAGAM
10 Jalan 5/31
46000 Petaling Jaya
Selangor
Tel: 03-7570304

Information Centre, Association of International Education, Japan

4-5-29 Komaba, Meguro-ku
Tokyo 153
Tel: 03-5454-5216

CHAPTER 9

QUALIFICATIONS RECOGNISED

by the Public Sector in Malaysia

ACCOUNTANCY

Australia

Membership

- : Australian Society of Accountants
- : Institute of Chartered Accountants of Australia

Canada

Membership

- : Canadian Institute of Chartered Accountants

Malaysia

1. Membership

- : Malaysian Association of Certified Public Accountants;
- : Malaysian Institute of Accountants
- : Institute of Cooperative Auditors
- : Universiti Kebangsaan Malaysia;
- : Universiti Malaya;
- : Universiti Pertanian Malaysia

4. Bachelor of Accountancy(Hons)

- : Universiti Utara Malaysia

5. Advanced Diploma in Accountancy

- : Institut Teknologi MARA

6. Diploma in Accountancy

- : Politeknik Ungku Omar

7. Certificate of Accountancy and Diploma of Accountants

- : Universiti Malaya

New Zealand

Membership

- : New Zealand Society of Accountants

Pakistan

Membership

- : Institute of Chartered Accountants of Pakistan;
- : Institute of Cost and Management Accountants of Pakistan

United Kingdom

Membership

- : Chartered Institute of Public Finance and Accountancy;
- : Institute of Chartered Accountants in England and Wales;
- : Institute of Chartered Accountants of Ireland;
- : Institute of Chartered Accountants of Scotland;
- : Institute of Cost and Management Accountants;
- : The Chartered Association of Certified Accountants

ACTUARY

Australia

1. Fellowship

- : Institute of Actuaries

2. Fellowship Associateship

- : Institute of Actuaries

3. B.A/B.Ec (Actuarial Studies/Demography) : Macquarie University

Canada

Qualifications by recognised higher education institute

Malaysia

Diploma in Actuary Science : Institut Teknologi MARA

United Kingdom

1. Fellowship : Institute of Actuaries

2. Associateship (Passed all Group A examinations) : Institute of Actuaries

3. Associateship (Passed all Group A and B examinations) : Institute of Actuaries

United States of America

1. Fellowship : Society of Actuaries USA and Canada

2. Associateship : Society of Actuaries USA and Canada

3. B.A/B.S (Actuarial Science) : Ball State University;
Roosevelt University;
University of Iowa

4. M.S (Actuarial Science) : University of Connecticut;
University of Michigan, Ann Arbor

5. Master in Actuarial Science : Georgia State University

6. M.B.A. (Actuarial Science) : Temple University;
University of Texas, Austin

AGRICULTURE

Australia

1. Bachelor of Rural Science : University of New England

2. Bachelor of Science (Agriculture) : La Trobe University;
University of Adelaide;
University of Melbourne;
University of Queensland;
University of Sydney;
University of Tasmania;
University of Western Australia
: University of New England

3. Bachelor of Science (Agriculture)(Hons)

Belgium

M.Arg./Ph.D.Arg. : The State University of Ghent

Canada

Bachelor of Science (Agriculture) : University of Alberta;
University of British Columbia;
University of Guelph;
University of Manitoba;
University of McGill;
University of Saskatchewan

Indonesia

1. Doctorate : Institut Pertanian Bogor;
Universiti Gadjja Mada, Jogjakarta
: Universiti Gadjja Mada, Jogjakarta

2. Bachelor of Agriculture

Japan

Bachelor of Science (Agriculture) : Kyoto University;
Kyushu University

Malaysia

1. Bachelor of Science (Agriculture) : Universiti Malaya;
Universiti Pertanian Malaysia
: Universiti Pertanian Malaysia
: Universiti Pertanian Malaysia

2. Diploma in Agriculture

3. Diploma in Agriculture Technology

New Zealand

Bachelor of Science (Agriculture) : Lincoln College;
University of Canterbury;
University of Massey

United Kingdom

Bachelor of Science (Agriculture) : Queen's University, Belfast;
University of Aberdeen;
University of Bath;
University of Cambridge;
University of Edinburgh;
University of Exeter;
University of Glasgow;
University of Leeds;

University of London;
University of Manchester;
University of Newcastle;
University of Nottingham;
University of Oxford;
University of Reading;
University of Strathclyde;
University of Wales, Aberystwyth;
University of Wales, Bangor;
Wye College

United States of America

Bachelor of Science (Agriculture)

Alabama Agriculture and Mechanical College Normal, Alabama;
Alcon Agricultural and Mechanical College, Lorman, Mississippi;
Arkansas Agriculture, Mechanical and Normal College, Pine Bluff;
Auburn University, Auburn, Alabama;
Clemson South Carolina;
Colorado State University, Colorado;
Cornell University, Ithaca, New York;
Delaware State College, Dover, Delaware;
Federal City College, Washington;
Florida Agriculture and Mechanical University, Tallahassee, Florida;
Fort Valley State College, Fort Valley;
Iowa State University of Science and Technology;
Kansas State University, Manhattan, Kansas;
Kentucky State College, Frankfort, Kentucky;
Langston University, Langston, Oklahoma;
Lincoln University, Jefferson City, Missouri;
Louisiana State University, Baton Rouge, Louisiana;
Massachusetts Institute of Technology, Cambridge, Massachusetts;
Michigan State University, East Lansing, Michigan;
Mississippi State University, State College, Mississippi;
Montana State University, Bozeman;
New Mexico State University, Los Cruces, New Mexico;
North Carolina Agriculture and Technical State University, Greensboro, North Carolina;
North Dakota State University, Fargo, North Dakota;
North Carolina State University, Raleigh, North Carolina;
Ohio State University, Columbus, Ohio;
Oklahoma State University Stillwater, Oklahoma;
Oregon State University, Corvallis, Oregon;
Pennsylvania State University, University Park, Pennsylvania;
Prairieview Agricultural and Mechanical College, Prairieview, Texas;
Purdue University, Lafayette, Indiana;
Rutgers University, New Brunswick, New Brunswick, New Jersey;
South Carolina State College, Orangeburgh, South Carolina;
South Dakota State University, Brookings, South Dakota;
Southern University and Agricultural and Mechanical College, Baton Rouge, Louisiana;
Tennessee State University, Nashville, Tennessee;
Texas A&M University College, Station, Texas;
University of Alaska, Fairbanks;
University of Arizona, Tuscon, Arizona;
University of Arkansas, Fayetteville;
University of California, Berkeley, California;
University of Connecticut Storrs, Connecticut;
University of Delaware, Newark, Delaware;
University of Florida, Gainesville, Florida;
University of Georgia, Athens, Georgia;
University of Hawaii, Manoa Honolulu, Hawaii;
University of Illinois, Urbana, Illinois;
University of Kentucky, Lexington, Kentucky;
University of Maine, Orono, Maine;
University of Minnesota Minneapolis, Minnesota;
University of Missouri, Columbia, Missouri;
University of Nebraska, Lincoln, Nebraska;
University of Nevada, Reno, Nevada;
University of New Hampshire, Durham, New Hampshire;
University of Puerto Rico, Rio Piedras, Puerto Rico;
University of Rhode Island, Kingston, Rhode Island;

University of Tennessee, Knoxville, Tennessee;
 University of Vermont, Burlington, Vermont;
 University of Wisconsin, Madison, Wisconsin
 University of Wyoming, Laramie, Wyoming;
 Utah State University, Logan, Utah;
 Virginia Polytechnic Institute and State University, Blacksburg, Virginia;
 Virginia State College, Petersburg, Virginia;
 Washington State University, Pullman, Washington;
 West Virginia University, Morgantown, Virginia

ARCHITECTURE

Australia

1. Bachelor of Architecture

: Deakin University;
 New South Wales Institute of Technology, Brisbane;
 Queensland Institute of Technology, Brisbane;
 Royal Melbourne Institute of Technology, Victoria;
 South Australian Institute of Technology,
 University of Adelaide, Adelaide;
 University of Melbourne;
 University of Western Australia

2. B.A. (Environmental Design) with B.Architecture

: Tasmania State Institute of Technology

3. B.App.Sc. (Built Environmental) with Grad.Dip Arch.

: Queensland Institute of Technology, Brisbane

4. B.App.Sc. (Environmental) with B.Arch

: Curtin University of Technology

5. B.Design Studies with B.Arch

: University of Queensland

6. B.Sc.(Arch) with Bachelor of Architecture

: University of New Castle;
 University of New South Wales;
 University of Sydney

Canada

Bachelor of Architecture

: Laval University;
 McGill University;
 Nova Scotia Technical University;
 University of British Columbia;
 University of Manitoba;
 University of Montreal;
 University of Toronto

Hong Kong

B.A. (Arch Studies) with B.Arch

: University of Hong Kong

Ireland

Bachelor of Architecture

: University College Dublin, Ireland

Malaysia

1. Bachelor of Architecture

: Universiti Teknologi Malaysia;

2. Advanced Diploma in Architecture

: Institut Teknologi MARA

3. Diploma in Architecture

: Institut Teknologi MARA;

Universiti Teknologi Malaysia

New Zealand

1. Bachelor of Architecture

: University of Auckland

2. B. Building Sc. with B.Arch

: Victoria University of Wellington

United Kingdom

1. B.Arch(Hons) with Dip Arch.

: Glasgow University & Glasgow School of Art;

Heriot-Watt University;

University of Sheffield

2. B.A.(Hons) in Arch with Dip Arch.

: Brighton Polytechnic;

Canterbury College of Art;

City of Birmingham Polytechnic;

Kingston Polytechnic;

Leeds Polytechnic;

Leicester Polytechnic;

Liverpool Polytechnic;

Manchester Polytechnic;

Polytechnic of Central London;

Polytechnic of the South Bank;

Thames Polytechnic;

University of Cambridge;

University of Manchester;

University of New Castle Upon Tyne;

University of Nottingham

3. B.A.(Hons) in Arch with Grad Dip Arch. : Oxford Polytechnic
4. B.A.(Arch) with Dip Arch. : Humberdale College of Higher Education;
Plymouth Polytechnic;
Portsmouth Polytechnic;
University of Bristol
: University of Bath
: University of Dundee
: Polytechnic of North London;
University of College London (Bartlett School of Architecture and Planning)
: The Queen's University, Ireland
: North East London Polytechnic
: University of Strathclyde;
University of Wales, Institute of Science and Technology, Cardiff
: Polytechnic of North London
: Robert Gordon's Institute of Technology
: University of Edinburgh
: University of Edinburgh
: Architectural Association, London
5. B.Sc.(Arch Studies) with B.Arch
6. B.Sc.(Arch) with B.Arch(Hons)
7. B.Sc.(Arch) with Dip Arch.
8. B.Sc.(Arch) with Dip Adv.Arch. Studies
9. B.Sc.(Arch) with Grad Dip Arch.
10. B.Sc.(Hons)(Arch Studies) with B.Arch
11. B.Sc.(Hons) Arch with Dip Arch.
12. B.Sc.(Hons) Arch with Dip Adv.Arch. Studies
13. B.Sc.(Social Science) with Dip Arch.
14. M.A.(Hons) in Arch with Dip Arch.
15. Diploma in Architecture

United States of America

1. Bachelor of Architecture : Arizona State University, College of Architecture, Tempe, Arizona;
Arizona State University, College of Architecture, Tucson, Arizona;
Arkansas, University of School of Architecture, Fayetteville, Arkansas;
Auburn University, Department of Architecture, Auburn, Alabama;
Ball State University, College of Architecture and Planning, Muncie, Indiana;
Boston Architecture Centre;
California Polytechnic State University, Architecture Department, School of Architecture and Environmental Design, San Luis, Obispo, California;
California State Polytechnic University, Pomona, School of Environmental Design, Department of Architecture, Pomona, California;
Carnegie-Mellon University, Department of Architecture, Pittsburgh, Pennsylvania;
School of Architecture and Interior Design, University of Cincinnati, Ohio;
City College of the City, University of New York, School of Architecture and Environmental Studies, New York;
Clemson University, College of Architecture, Clemson, South Carolina;
Cooper Union, The Irwin S.Chanin School of Architecture New York, New York;
Cornell University, Department of Architecture, Ithaca, New York;
Detroit University, School of Architecture, Detroit, Michigan;
Drexel University, Department of Architecture, Philadelphia, Pennsylvania;
Hampton University, Department of Architecture, Hampton, Virginia;
Howard University, School of Architecture and Planning, Washington D.C.;
Idaho University, College of Art and Architecture, Moscow, Idaho;
Illinois Institute of Technology, College of Architecture, Planning and Design, Chicago;
Iowa State University, Ames, Iowa;
Kansas State University, College of Architecture and Design, Manhattan, Kansas;
Kent State University, School of Architecture and Environmental Design, Kent, Ohio;
Lawrence Institute of Technology, School of Architecture, Southfield, Michigan;
Louisiana State University, School of Architecture, Baton Rouge, Louisiana;
Louisiana Technology University, Dept. of Architecture, Rouson, Louisiana;
Massachusetts Institute of Technology, Department of Architecture, Cambridge, Massachusetts;
Miami University, Department of Architecture, Oxford, Ohio;
Mississippi State University, School of Architecture, Mississippi State, Mississippi;
Montana State University, School of Architecture, Bozeman, Montana;
New Jersey Institute of Technology, School of Architecture, Newark, New Jersey;
New York Institute of Technology, Center for Architecture, Old Westbury, New York;
New York State University of Buffalo, School of Architecture and Environmental Design, Buffalo, New York;
North Carolina State University, School of Design, Raleigh, North Carolina;
North Dakota State University, Department of Architecture, Fargo, North Dakota;
Pennsylvania State University, Department of Architecture, University Park, Pennsylvania;
Pratt Institute, School of Architecture, 200 Willoughby Avenue, Brooklyn, New York;
Rensselaer Polytechnic Institute, School of Architecture, Troy, New York;
Rhode Island School of Design, Division of Architecture Studies, Providence, Rhode Island;
Rice University, School of Architecture, Houston, Texas;
Southern California Institute of Architecture, 800 Berkeley Street, California;
Southern University and A&M College, Division of Architecture, Baton Rouge, Louisiana;
Syracuse University, School of Architecture, Syracuse, New York;

Temple University, Department of Architecture, Philadelphia, Pennsylvania;
 Texas Technology University, Division of Architecture, Lubbock, Texas;
 Tulane University, School of Architecture, New Orleans, Louisiana;
 University of Hawaii, School of Architecture, Honolulu, Hawaii;
 University of Houston, College of Architecture, Houston, Texas;
 University of Illinois at Chicago, School of Architecture, Chicago, Illinois;
 University of Illinois at Urbana, School of Architecture, Champaign, Illinois;
 University of Kansas, School of Architecture and Urban Design, Lawrence, Kansas;
 University of Kentucky, College of Architecture, Lexington, Kentucky;
 University of Maryland, School of Architecture College, Park, Maryland;
 University of Miami, Department of Architecture and Planning, Coral Gables, Florida;
 University of Michigan, College of Architecture and Urban Planning, Ann Arbor, Michigan;
 University of Minnesota, School of Architecture, Minneapolis, Minnesota;
 University of Nebraska, College of Architecture, Lincoln, Nebraska;
 University of New Mexico, School of Architecture and Planning, Albuquerque;
 University of North Carolina at Charlotte, College of Architecture, Charlotte, North Carolina;
 University of Notre Dame, Department of Architecture, Notre Dame, Indiana;
 University of Southern California, School of Architecture, Los Angeles, California;
 University of Southwestern Louisiana, School of Art and Architecture, Lafayette, Louisiana;
 University of Tennessee, School of Architecture, Knoxville, Tennessee;
 University of Texas at Austin, School of Architecture, Austin, Texas;
 University Oklahoma, Department of Architecture, Columbus, Ohio;
 University Oregon, Department of Architecture, Eugene, Oregon;
 Virginia Polytechnic Institute and State University, College of Architecture and Urban Studies,
 Blacksburg, Virginia;
 Washington State University, Department of Architecture, Pullman, Washington
 : California State Polytechnic University, Pomona, School of Environmental Design, Department
 of Architecture, Pomona, California;
 Catholic University of America, Department of Architecture and Planning, Washington D.C.;
 Clemson University, College of Architecture, Clemson, South Carolina;
 Florida A&M University, School of Architecture, Tallahassee, Florida;
 Georgia Institute Technology, College of Architecture, Atlanta, Georgia;
 Princeton University, School of Architecture, Princeton, New Jersey;
 Rensselaer Polytechnic Institute, School of Architecture, Troy, New York;
 Rice University, School of Architecture, Houston, Texas;
 Texas A&M University, Department of Architecture College, Station, Texas;
 Tuskegee Institute, Department of Architecture, Alabama;
 University of California, Berkeley, Department of Architecture, Berkeley, California;
 University of Colorado, College of Design and Planning Denver, Colorado;
 University of Florida, Department of Architecture, Gainesville, Florida;
 University of Houston, College of Architecture, Houston, Texas;
 University of Puerto Rico, School of Architecture, San Juan, Puerto Rico;
 University of Texas at Arlington, School of Architecture and Environmental Design, Arlington;
 University of Utah, Graduate School of Architecture, Salt Lake City, Utah;
 University of Virginia, School of Architecture, Charlottesville, Virginia;
 University of Washington, Department of Architecture, Seattle, Washington;
 University of Wisconsin-Milwaukee School of Architecture and Urban Planning;
 Washington University, School of Architecture, Saint Louis, Missouri;
 Yale University, School of Architecture

2. Master of Architecture

ARCHIVES

Australia

Diploma in Archives Administration

: School of Librarianship, University of New South Wales, Sydney

France

Diploma in Archives Administration

: State Technique International 'D' Archives, Archives Nationales, Paris

India

Diploma in Archives Administration

: Institute of Archival Studies, National Archives of India, New Delhi

Italy

Diploma in Conservation Science

: International Centre for The Studies of Preservation and Restoration of
 Cultural Property, Rome

United Kingdom

Certificate in Archives Administration

: School of Librarianship, Archives and Information Studies, University
 College, London

United States of America

Certificate in Archives Administration

: American University, Washington D.C.

ART AND DESIGN

Australia

B.A./B.A. (Hons)

: Recognised universities

Indonesia

Bachelor of Fine Arts

: Akademi Seni Rupa Jogjakarta

Malaysia

Diploma in Art and Design

: Institut Teknologi MARA

New Zealand

B.A./B.A. (Hons)

: Recognised universities

United Kingdom

1. B.A. (Hons) in Fine Art, Graphic Design,
 Three Dimensional Design

: Bath Academy of Arts;
 Polytechnic;
 Leeds Polytechnic;
 The Polytechnic Wolverhampton
 : Bristol Polytechnic;
 Buckinghamshire College of Higher Education;
 Camberwell School of Art and Craft;
 Central School of Art and Design;
 City Birmingham Polytechnic;
 Kingston Polytechnic;
 Lancaster Polytechnic;
 Leicester Polytechnic;
 Manchester Polytechnic;
 Middlesex Polytechnic;
 Newcastle Polytechnic;
 Ulster College

2. B.A. (Hons) in Fine Art, Graphic Design,
 Textile/Fashion, Three Dimensional Design,

: West Surrey College of Art and Design

4. B.A. (Hons) in Fine Art, Textile/Fashion,
 Three Dimensional Design

: Canterbury College of Art;
 Sheffield Polytechnic;
 Stourbridge College of Art;
 Wimbledon School of Art
 : Loughborough College of Art;
 Trent Polytechnic

5. B.A. (Hons) in Fine Art, Textile/Fashion,
 Three Dimensional Design

: Liverpool Polytechnic;
 Ravensbourne College of Art;
 St. Martin's School of Art

6. B.A. (Hons) in Fine Art, Graphic Design, Textile/Fashion

: Winchester School of Art

7. B.A. (Hons) in Fine Art, Textile/Fashion

: Chelsea School of Arts;

8. B.A. (Hons) in Fine Art, Graphic Design

: Exeter College of Art;
 Falmouth School of Art;
 Gloucestershire College of Art and Design;
 Goldsmith's College, School of Art;
 Gwent College of Higher Education;
 Hull College of Higher Education;
 North Staffordshire Polytechnic;
 Norwich School of Art

9. B.A. (Hons) in Fine Art

: North East London;
 Portsmouth Polytechnic;
 Sunderland Polytechnic

10. B.A. (Hons) in Graphic Design

: London College of Printing;
 Plymouth Polytechnic

11. B.A. (Hons) in Textile Fashion

: Huddersfield Polytechnic;
 Kinderminster College of Further Education

12. B.A. (Hons) in Three Dimensional Design

: Polytechnic of the South Bank;
 Teesside Polytechnic

13. B.A./B.A. (Hons)

: University of Bristol;
 University of Cambridge;
 University of East Anglia;
 University of Essex;

14 Advanced Diploma in Art and Design(Pottery)

United States of America

B.A.

University of Exeter;
University of Kent;
University of Lancaster;
University of Leeds;
University of Leicester;
University of London;
University of Loughbrough;
University of Manchester;
University of Newcastle;
University of Nottingham;
University of Oxford;
University of Reading;
University of Salford;
University of Sussex;
University of Wales, Aberystwyth;
University of Warwick

: Goldsmith's College School of Art and Design, University of London

: Recognised universities

ARTS AND SOCIAL SCIENCE

Australia

B.A./B.A. (Hons)

: Australian National University;
Deakin University;
Flinders University of South Australia;
Griffith University;
James Cook University of North Queensland;
La Trobe University;
Macquarie University;
Monash University;
Murdoch University;
University of Adelaide;
University of Melbourne;
University of New England;
University of New South Wales;
University of Newcastle;
University of Queensland;
University of Sydney;
University of Tasmania;
University of Western Australia;
Wollongong University

Belgium

Degree in Business Administration

: Catholic University of Leuven

Canada

B.A./B.A. (Hons)

: Acadia University, Wolfville;
Bishop University, Lennoxville;
Brandon University, Brandon;
Brock University, St. Catharines;
Carleton University, Ottawa;
Concordia University, Montreal;
Dalhousie University, Halifax;
Lakehead University, Thunder Bay;
Laurentian University, Sudbury;
McGill University, Montreal;
McMaster University, Hamilton;
Memorial University of Newfoundland, St. John's;
Mount Allison University;
Mount Saint Vincent University, Halifax;
Queen's University, Kingston;
Saint Mary's University, Halifax;
Simon Fraser University, Burnaby;
Trent University, Peterborough;
University of Moncton, Moncton;
University of Alberta, Edmonton;
University of British Columbia, Vancouver;
University of Calgary, Calgary;

University of Guelph, Guelph;
University of Laval, Quebec;
University of Lethbridge, Lethbridge;
University of Manitoba, Winnipeg;
University of Montreal, Montreal;
University of New Brunswick, Fredericton;
University of Ottawa, Ottawa;
University of Prince Edward Island;
University of Quebec, Ste Fe;,
University of Regina, Regina;
University of Saskatchewan, Saskatchewan;
University of Sherbrooke, Sherbrooke;
University of Toronto, Toronto;
University of Victoria, Victoria;
University of Waterloo, Waterloo;
University of Western Ontario, London;
University of Windsor, Windsor;
University of Winnipeg, Winnipeg;
Victoria University, Toronto;
Wilfrid Laurier University, Waterloo;
York University, Downsview, Toronto

Egypt

B.A/M.A

France

Licence de Letters

Indonesia

Bachelor of Arts

Iraq

1. B.A.

2. M.A.

Japan

Bachelor of Arts

Jordan

1. Bachelor of Arts

: Universiti Ain Sham;
Universiti Al-Azhar;
Universiti Alexandria;
Universiti Assiut;
Universiti Cairo

: University of Paris

: Institut Pertanian Bogor;
Institut Teknologi Bandung;
Universitas Airlangga;
Universitas Andalas;
Universitas Gadjah Mada;
Universitas Hasanuddin;
Universitas Indonesia;
Universitas Padjadjaran;
Universitas Srivijaya;
Universitas Udayana

: University Baghdad;
Kulliyah Al-Derassat
: University Baghdad

: Danki Tsushin;
Tokyo Kogyo (Tokyo Institute of Technology);
Tokyo Suisan;
University of Hiroshima;
University of Hitotsubashi;
University of Hokkaido;
University of Kagoshima;
University of Keio;
University of Kobe;
University of Kyoto;
University of Kyushu;
University of Meiji;
University of Nagasaki;
University of Nagoya;
University of Osaka;
University of Tohoku;
University of Tokyo;
University of Tsukuba;
University of Wesada;
Yokohama Kokuritsu

: Universiti Jordan

2. Bachelor of Arts(Arabian Language)	: Universiti Jordan
Kuwait	
B.A./B.A.(Hons)	: Universiti Kuwait
Libya	
1. B.A.	: Universiti Libya, Fakulti Bahasa Arab dan Pengajian Islam
2. M.A	: Universiti Libya, Fakulti Bahasa Arab dan Pengajian Islam
Malaysia	
1. General Degree(Hons)	: Universiti Kebangsaan Malaysia; Universiti Malaya; Universiti Pertanian Malaysia; Universiti Sains Malaysia
2. Bachelor Degree in Economics(Hons)	: Universiti Islam Antarabangsa Malaysia
3. Bachelor of Computer Science	: Universiti Teknologi Malaysia
4. Advanced Diploma in Business Administration	: Institut Teknologi MARA
5. Advanced Diploma in Transportation	: Institut Teknologi MARA
6. Diploma in Arts	: Institut Teknologi MARA
7. Diploma in Banking Studies	: Institut Teknologi MARA
8. Diploma in Business Studies	: Institut Teknologi MARA
9. Diploma in Chef Training	: Institut Teknologi MARA
10. Diploma in Computer Science	: Institut Teknologi MARA; Universiti Pertanian Malaysia; Universiti Teknologi Malaysia; Universiti Utara Malaysia
11. Diploma in General Administration	: Institut Teknologi MARA
12. Diploma in Hotel and Catering Management	: Institut Teknologi MARA
13. Diploma in Institutional and Catering Management	: Institut Teknologi MARA
14. Diploma in Insurance	: Institut Teknologi MARA
15. Diploma in Marketing	: Institut Teknologi MARA
16. Diploma in Photography	: Institut Teknologi MARA
17. Diploma in Stenography	: Institut Teknologi MARA
18. Diploma in Tourism Management	: Institut Teknologi MARA
19. Diploma in Transportion	: Institut Teknologi MARA
20. Certificate in Business Studies	: Politeknik Ungku Omar
21. Syahadah	: Insitut Tahfiz dan Latihan AL-Quran (Maahad Tahfiz, Jabatan Perdana Menteri)
New Zealand	
B.A./B.A.(Hons)	: Massey University; University of Auckland; University of Canterbury; University of Otago; University of Waikato; Victoria University of Wellington
Phillipines	
1. Master in Business Management	: Asian Institute of Management
2. Master in Management	: Asian Institute of Management
Saudi Arabia	
B.A.(Islamic Studies and Arabian Language)	: Universiti Al-Malek Abd. Aziz, Jeddah; Universiti Al-Malek Faisal, Ehsa; Universiti Al-Malek Saud, Riyadh; Universiti Islam Imam Mohamad Bin Saud, Riyadh; Universiti Islam Madinah; Universiti Omm Al-Qura, Mekah
Singapore	
B.A./B.A.(Hons)	: University of Singapore
Syria	
B.A.	: University of Damascus
United Kingdom	
1. Certificate in Marketing	: Institute of Marketing
2. Diploma in Marketing	: Institute of Marketing
3. B.A./B.A.(Hons)	: Bath University of Technology; Brunel University; Heriot-Watt University; Loughbrough University of Technology; New University of Ulster; Queen's University of Belfast, Ireland; St David's University College, Lampeter; The City University, London;

- University of Warwick;
 - University of York;
 - University College of North Wales, Bangor;
 - University College of South Wales and Monmouthshire, Cardiff;
 - University College of Swansea;
 - University College of Wales, Aberystwyth;
 - University of Aston in Birmingham;
 - University of Birmingham;
 - University of Bradford;
 - University of Cambridge;
 - University of Durham;
 - University of East Anglia;
 - University of Essex;
 - University of Exeter;
 - University of Hull;
 - University of Keele;
 - University of Kent at Canterbury;
 - University of Lancaster;
 - University of Leeds;
 - University of Leicester;
 - University of Liverpool;
 - University of London;
 - University of Manchester;
 - University of Newcastle Upon Tyne;
 - University of Nottingham;
 - University of Oxford;
 - University of Reading;
 - University of Salford;
 - University of Sheffield;
 - University of Southampton;
 - University of Strathclyde;
 - University of Surrey;
 - University of Wales;
 - University of Wales, Institute of Science and Technology
4. Diploma in Public Relations
5. Associateship
6. Graduate Associateship Member
7. Licentiate of Chartered Institute of Secretaries and Administrators
8. Membership of Chartered Institute of Secretaries and Administrators
9. Membership
10. Ordinary National Diploma
11. Higher National Diploma
12. C.I.T.
- United Kingdom(Scotland)**
1. M.A.Ordinary/M.A.(Hons)
2. Law Licence
3. LL.B
- United States of America**
- B.A./B.Sc.
- : Communication, Advertising and Marketing Education Foundation Limited (CAM)
 - : Institute of Credit Management;
 - : Institute of Statisticians;
 - : The Chartered Insurance Institute
 - : Institute of Purchasing and Supply
 - : The Chartered Institute of Secretaries and Administration
 - : The Chartered Institute of Secretaries and Administration
 - : Association of International Accountants;
 - : Institute of Public Relation, U.K.
 - : The Chartered Institute of Secretaries and Administration
 - : The Chartered Institute of Secretaries and Administration
 - : Institute of Transport
 - : University of Aberdeen;
 - : University of Dundee;
 - : University of Edinburgh;
 - : University of Glasgow;
 - : University of St.Andrews;
 - : University of Stirling
 - : University College Buckingham
 - : University College Buckingham
 - : Accredited Universities and Colleges;
 - : Approved Universities and Colleges

DENTISTRY

Australia

Bachelor of Dental Surgery

- : University of Adelaide;
- : University of Melbourne;

- Bangladesh**
Bachelor of Dental Surgery
- Canada**
Doctor of Dental Surgery
- Egypt**
Bachelor of Dental Surgery
- Indonesia**
Degree in Dentistry
- Iran**
Doctor of Dental Surgery
- Iraq**
Bachelor of Dental Surgery
- Ireland**
1. Licentiate of Dental Surgery
2. Bachelor of Dental Surgery
- Korea**
Doctor of Dental Surgery
- Malaysia**
Bachelor of Dental Surgery
- Malta**
1. Diploma in Dental Surgery
2. Bachelor of Dental Surgery
- New Zealand**
Bachelor of Dental Surgery
- Singapore**
1. Licentiate of Dental Surgery
2. Bachelor of Dental Surgery
- Turkey**
Diploma in Dental Surgery
- United Kingdom**
1. Licentiate of Dental Surgery
2. Bachelor of Dental Surgery
- University of Queensland;
University of Sydney;
University of Victoria;
University of Western Australia
- : University of Dacca, Dacca Dental College, Bangladesh
- : Faculty of Dental Surgery, University of de Montreal, Montreal, Quebec;
Faculty of Dentistry, Mc Gill University;
Faculty of Dentistry, University of Alberta, Edmonton, Alberta;
Faculty of Dentistry, University of Manitoba, Winnipeg, Manitoba;
Faculty of Dentistry, Dalhousie University of Halifax, Nova Scotia;
Faculty of Dentistry, University of Toronto, Toronto, Ontario
- : Ain-Shams University;
Al-Azhar University;
Alexandria University;
Assiut University;
Cairo University;
University of Mansourah;
University of Tanta
- : Universiti Airlangga Surabaya;
Universiti Gajah Mada, Jogjakarta;
Universiti Indonesia, Jakarta;
Universiti Padjajaran, Bandung;
Universiti Sumatra Utara, Medan
- : University Tehran
- : University Baghdad
- : The Royal College of Surgeons, Ireland;
University of Dublin
: National University of Ireland
- : Seoul National University
- : Universiti Malaya
- : The Royal University of Malta
: The Royal University of Malta
- : University of New Zealand;
University of Otago
- : King Edward VII College of Medicine
: National University of Singapore
- : University of Ankara,
University of Hacetteppe;
University of Istanbul
- : Queens University of Belfast,
The Royal College of Physicians and Surgeons, Glasgow,
The Royal College of Surgeons, Edinburgh,
The Royal College of Surgeons, England;
University of Birmingham;
University of Bristol,
University of Durham;
University of Leeds,
University of Liverpool;
University of Manchester;
University of Sheffield;
University of St Andrews
: Queen's University of Belfast
University of Birmingham,

University of Bristol;
 University of Dundee;
 University of Edinburgh;
 University of Glasgow;
 University of Liverpool;
 University of London;
 University of Manchester;
 University of Newcastle Upon Tyne;
 University of Sheffield;
 University of St Andrews;
 University of Wales

United States of America

Doctorate in Dental Surgery

Baltimore College of Dental Surgery, School of Dentistry, University of Maryland;
 Boyne School of Dental Science, Creighton University, Omaha;
 College of Dentistry, Baylor University, Dallas;
 College of Dentistry, Howard University, Washington;
 College of Dentistry, State University Iowa, Iowa City;
 College of Dentistry, The Ohio State University, Columbus;
 College of Dentistry, University of Illinois, Chicago;
 College of Dentistry, University of Illinois, Chicago;
 College of Dentistry, University of Nebraska, Lincoln;
 College of Dentistry, University of Tennessee, Memphis;
 Harvard School of Dental Medicine, Boston;
 Northwestern University, Dental School, Chicago;
 School of Dental and Oral Surgery, Columbia University;
 School of Dentistry, Case Western Reserve University, Cleveland;
 School of Dentistry, Fairleigh Dickinson University, Teaneck;
 School of Dentistry, Indiana University, Indianapolis;
 School of Dentistry, Loma Linda University, California;
 School of Dentistry, Louisiana State University;
 School of Dentistry, Loyola University of New Orleans;
 School of Dentistry, Loyola University of Chicago, Chicago;
 School of Dentistry, Marquette University, Milwaukee, Wisconsin;
 School of Dentistry, Medical College of Virginia, Richmond;
 School of Dentistry, Meharry Medical College, Nashville;
 School of Dentistry, St. Louis University, St. Louis;
 School of Dentistry, Temple University, Philadelphia;
 School of Dentistry, University of Alabama, Birmingham;
 School of Dentistry, University of California, San Francisco;
 Medical Centre, San Francisco;
 School of Dentistry, University of Detroit, Detroit;
 School of Dentistry, University of Louisville, Louisville;
 School of Dentistry, University of Michigan, Ann Arbor;
 School of Dentistry, University of Minnesota, Minneapolis;
 School of Dentistry, University of Missouri, Kansas City;
 School of Dentistry, University of North Carolina, Chapel Hill;
 School of Dentistry, University of Pennsylvania, Philadelphia;
 School of Dentistry, University of Puerto Rico, San Juan;
 School of Dentistry, University of the Pacific, College of Physicians and Surgeons, San Francisco;
 School of Dentistry, University of Washington, Seattle;
 School of Dentistry, Washington University, St. Louis;
 School of Dentistry, West Virginia University, Morgantown;
 Seton Hall, College of Dentistry, New Jersey, College of Medicine and Dentistry, Jersey City;
 The University of Texas, Dental Branch, Houston;
 Tufts University, School of Dental Medicine, Boston;
 University of Oregon, Dental School, Portland

EDUCATION

Australia, New Zealand and United States of America

All training courses for Teaching

: Universities recognised by the Government

Egypt

1. Bachelor of Education

: Universiti Ain Sham;
 Universiti Al-Azhar;
 Universiti Alexandria;
 Universiti Assiut;

2. Diploma in Education	: Universiti Cairo : Universiti Ain Sham; : Universiti Al-Azhar
Indonesia	
<i>Institut Keguruan dan Ilmu Pendidikan (IKIP)</i>	
1. Bachelor in Arts	: IKIP Makasar; : IKIP Medan; : IKIP Menado; : IKIP Padang; : IKIP Semarang; : IKIP Surabaya
2. Bachelor in Science/Arts	: IKIP Bandung; : IKIP Djakarta; : IKIP Jogjakarta; : IKIP Malang
<i>Institut Agama Islam Negeri (IAIN)</i>	
Bachelor Programme	
	: IAIN Alaudin, Makasar; : IAIN Antasari Bandjarmasin; : IAIN Ar Raniry, Banda Atjeh; : IAIN Imam Bondjol Padang; : IAIN Raden Fatah, Palembang; : IAIN Raden Intan Tanung Karang; : IAIN Sjarif, Hidajatullah Djakarta; : IAIN Sultan Sjarif Qasim Pekan Baru, Riau; : IAIN Sumatera Utara; : IAIN Sunan Ampel, Surabaya; : IAIN Sunan Gunung Djati, Bandung; : IAIN Sunan Khalidjaga, Jogjakarta; : IAIN Thaha Sjarifuddin, Djambi; : IAIN Wali Songo Semarang
Kuwait	
1. Bachelor of Arts and Education	: Universiti Kuwait
2. Diploma in Education	: Universiti Kuwait
Malaysia	
1. Bachelor in Education(Hons)	: Universiti Sains Malaysia
2. Bachelor of Education(Argiculture Science)	: Universiti Pertanian Malaysia
3. Bachelor of Education(Bahasa Malaysia as First Language)	: Universiti Pertanian Malaysia
4. Bachelor of Education(Counselling)	: Universiti Pertanian Malaysia
5. Bachelor of Education(English as Second Language)	: Universiti Pertanian Malaysia
6. Bachelor of Homescience Technology Education	: Universiti Pertanian Malaysia
7. Bachelor of Physical Education	: Universiti Pertanian Malaysia
8. Bachelor in Science Education(Hons)	: Universiti Malaya; : Universiti Sains Malaysia; : Universiti Teknologi Malaysia
9. Bachelor of Science in Education(Hons)	: Universiti Pertanian Malaysia
10. Diploma in Education	: Universiti Kebangsaan Malaysia
11. Diploma in Management Art	: Institut Teknologi MARA
12. Diploma in Science Education	: Universiti Teknologi Malaysia
Saudia Arabia	
1. Bachelor of Education	: Universiti Riyadh
2. Diploma in Education	: Universiti Riyadh
Singapore	
Diploma in Education	: University of Singapore
Syria	
1. Bachelor of Education	: Universiti Damascus
2. Diploma in Education	: Universiti Damascus
United Kingdom	
1. Postgraduate Certificate in Education	: Universities recognised by the Government
2. Postgraduate Certificate of Education	: All Polytechnics with qualifications from CNAA
3. Art Teacher's Diploma	: All Polytechnics with qualifications from CNAA
4. Diploma in Education	: Universities recognised by the Government
5. Diploma of Education	: All Polytechnics with qualifications from CNAA
6. Diploma in Home Economics	: Salford College of Technology

Australia

- | | |
|---------------------------------------|--|
| 1. B.Eng in Communication Engineering | : Australia Maritime College, Tasmania;
Australia National University;
South Australia Institute of Technology, Whyalla;
La Trobe University;
University of Canberra;
West Australia School of Mines, Kalgoorlie |
| 2. B.Eng in Electrical Electronics | : Australia Maritime College, Tasmania;
Australia National University;
South Australia Institute of Technology, Whyalla;
La Trobe University;
University of Canberra;
West Australia School of Mines, Kalgoorlie |
| 3. B.Eng in Maritime Engineering | : Australia Maritime College, Tasmania;
Australia National University;
South Australia Institute of Technology, Whyalla;
La Trobe University;
University of Canberra;
West Australia School of Mines, Kalgoorlie |
| 4. B.Eng in Mineral Engineering | : Australia Maritime College, Tasmania; Australia National University;
South Australia Institute of Technology, Whyalla;
La Trobe University;
University of Canberra;
West Australia School of Mines, Kalgoorlie |
| 5. B.Eng in Mining Engineering | : Australia Maritime College, Tasmania;
Australia National University;
South Australia Institute of Technology, Whyalla;
La Trobe University;
University of Canberra;
West Australia School of Mines, Kalgoorlie |
| 6. B.Eng in Systems Engineering | : Australia Maritime College, Tasmania;
Australia National University;
South Australia Institute of Technology, Whyalla;
La Trobe University;
University of Canberra;
West Australia School of Mines, Kalgoorlie |
| 7. Degree in Aeronautical Engineering | : Royal Melbourne Institute of Technology;
University of New South Wales;
University of Sydney |
| 8. Degree in Agricultural Engineering | : University of Melbourne;
University of Southern Queensland |
| 9. Degree in Ceramic Engineering | : University of New South Wales |
| 10. Degree in Chemical Engineering | : Curtin University of Technology;
Monash University;
Royal Melbourne Institute of Technology;
University of Adelaide;
University of Melbourne;
University of New South Wales;
University of Newcastle;
University of Queensland;
University of Sydney;
University of Technology, Sydney |
| 11. Degree in Civil Engineering | : Ballarat University College;
Bendigo College of Advanced Education;
Chisholm Institute of Technology;
Curtin University of Technology;
Deakin University;
Footscray Institute of Technology;
James Cook University of North Queensland;
Monash University;
Queensland University of Technology, Brisbane;
Royal Melbourne Institute of Technology;
Royal Military College of Duntroon;
South Australia Institute of Technology, Adelaide;
Swinburne College of Technology; |

- Tasmania College of Advanced Education;
 Uni College of Central Queensland;
 Uni College of Southern Queensland;
 University of Adelaide;
 University of Melbourne;
 University of New South Wales;
 University of Newcastle;
 University of Queensland;
 University of Sydney;
 University of Tasmania;
 University of Technology, Sydney;
 University of Western Australia;
 University of Wollongong
12. Degree in Communications Engineering : Tasmania College of Advanced Education;
 University of Wollongong
13. Degree in Computer and Communication Engineering: Monash University;
 Royal Melbourne Institute of Technology;
 University of Wollongong
14. Degree in Electrical Engineering : Ballarat University College;
 Bendigo College of Advanced Education;
 Chisholm Institute of Technology;
 Curtin University of Technology;
 Deakin University;
 Footscray Institute of Technology;
 James Cook University of North Queensland;
 Queensland University of Technology, Brisbane;
 Royal Melbourne Institute of Technology;
 Royal Military College of Duntroon;
 South Australia Institute of Technology, Adelaide;
 Swinburne College of Technology;
 Tasmania College of Advanced Education;
 Uni College of Central Queensland;
 Uni College of Southern Queensland;
 University of Adelaide;
 University of Melbourne;
 University of New South Wales;
 University of Newcastle;
 University of Queensland;
 University of Sydney;
 University of Tasmania;
 University of Technology, Sydney;
 University of Western Australia;
 University of Wollongong
15. Degree in Electrical Engineering(Communications) : Curtin University of Technology
16. Degree in Electrical Engineering(Energy) : Curtin University of Technology
17. Degree in Electromechanical Engineering : Gippsland Institute of Advanced Education
18. Degree in Electronic Engineering : South Australia Institute of Technology;
 Tasmania College of Advanced Education
19. Degree in Geological Engineering : Royal Melbourne Institute of Technology
20. Degree in Industrial Engineering : Bendigo College of Advanced Education;
 University of Melbourne;
 University of New South Wales;
 University of Newcastle
21. Degree in Machinery Engineering : Bendigo College of Advanced Education
22. Degree in Manufacturing Engineering : Royal Melbourne Institute of Technology;
 Swinburne College of Technology;
 University of Technology, Sydney
23. Degree in Materials Engineering : Monash University
24. Degree in Mechanical Engineering : Ballarat University College;
 Chisholm Institute of Technology;
 Curtin University of Technology;
 Footscray Institute of Technology;
 Monash University;
 Queensland University of Technology, Brisbane;
 Royal Melbourne Institute of Technology;
 Royal Military College of Duntroon;
 South Australia Institute of Technology, Adelaide;
 Swinburne College of Technology;

25. Degree in Metallurgical Engineering

26. Degree in Mineral Engineering

27. Degree in Naval Architecture Engineering

28. Degree in Structural Engineering

Austria

1. Degree in Civil Engineering

2. Graduate Membership —
(Institute of Electronic and Radio
Engineering U.K.)(IERE)

Belgium

Graduate Membership —
(Institute of Electronic and Radio
Engineering U.K.)(IERE)

Canada

1. Degree in Agricultural Engineering

2. Degree in Ceramic Engineering

3. Degree in Chemical Engineering

Tasmania College of Advanced Education;
Uni College of Central Queensland;
Uni College of Southern Queensland;
University of Adelaide;
University of Melbourne;
University of New South Wales;
University of Newcastle;
University of Queensland;
University of Sydney;
University of Tasmania;
University of Technology, Sydney;
University of Western Australia;
University of Wollongong
: University of Melbourne;
University of Queensland
: University of Melbourne;
University of New South Wales;
University of Queensland;
University of Sydney
: University of New South Wales
: Curtin University of Technology;
University of Technology, Sydney

: Vienna Technical University
Fakultat Fur Bauningenieurwesen Und Architektur Der Univeristat,
Innsbruck
Hochschule fur Bodenkultur, Wein;
Montanistische Hochschule, Leoben;
Technische Hochschule, Graz;
Technische Hochschule, Wein

Faculte Polytechnique de Mons;
Ecole d' application de in l' artillerieet du genie de in l' ecole
royale militaire;
Institut agronomique de Gembloux;
Institut agronomique de in l' universote Catholique de Louvain;
Rijkslandbouwinstitut annexe a l' Unversite de Gand;
Unriversite de Bruxelles;
Unriversite de Gand,
Unriversite de Liegeily Compris Institut electretechnique Montefiore);
Unriversite de Louvain

: Technical University of Nova Scotia;
University Laval;
University of British Columbia;
University of Guelph;
University of Manitoba;
University of Saskatchewan
: McMaster University
: Ecole Polytechnique;
Lakehead University;
McGill University;
McMaster University;
Ottawa University;
Queen's University;
Royal Military College;
Technical University of Nova Scotia;
Toronto University;
University of Alberta;
University of British Columbia;
University of Calgary;
University of Laval;
University of New Brunswick;
University of Saskatchewan;
University of Sherbrooke;
University of Waterloo;
University of Western Ontario;

4. Degree in Civil Engineering
5. Degree in Computer Engineering
6. Degree in Computer Systems Engineering
7. Degree in Electrical Engineering
8. Degree in Extractive Metallurgy
9. Degree in Fuels and Materials Engineering
10. Degree in Geological Engineering
11. Degree in Industrial Engineering
- University of Windsor
 Carleton University;
 Concordia University;
 Ecole Polytechnique;
 Lakehead University;
 Laurentian University;
 McGill University;
 McMaster University;
 Memorial University of New Foundland;
 Ottawa University;
 Queen's University;
 Royal Military College;
 Technical University of Nova Scotia;
 Toronto University;
 Universite de Moncton;
 Universite de Quebec Chicoutimi;
 Universite du Quebec Trois-Rivieres;
 University of Alberta;
 University of British Columbia;
 University of Calgary;
 University of Laval;
 University of New Brunswick;
 University of Saskatchewan;
 University of Sherbrooke;
 University of Waterloo;
 University of Western Ontario;
 University of Windsor;
 University of Manitoba
- Concordia University;
 Ottawa University;
 Royal Military College; Victoria University
- Carleton University
- Carleton University;
 Concordia University;
 Ecole Polytechnique;
 Lakehead University;
 McGill University;
 McMaster University;
 Memorial University of New Foundland;
 Ottawa University;
 Queen's University;
 Royal Military College;
 Technical University of Nova Scotia;
 Toronto University;
 Universite du Quebec Trois-Rivieres;
 University of Alberta;
 University of British Columbia;
 University of Calgary;
 University of Laval;
 University of Manitoba;
 University of New Brunswick;
 University of Saskatchewan;
 University of Sherbrooke;
 University of Waterloo;
 University of Western Ontario;
 University of Windsor;
 Victoria University
- Laurentian University
- Royal Military College
- Ecole Polytechnique;
 Universite de Quebec Chicoutimi;
 University Laval;
 University of British Columbia;
 University of Saskatchewan
- Technical University of Nova Scotia;
 Toronto University;
 Universite de Moncton;

12. Degree in Materials Engineering

13. Degree in Mechanical Engineering

14. Degree in Metallurgical Engineering

15. Degree in Mineral Engineering

16. Degree in Mining Engineering

17. Degree in Petroleum Engineering

18. Degree in Systems Design Engineering

19. Degree in Systems Engineering

20. Degree in Unified Engineering

21. Degree in Water Resources Engineering

Denmark

1. Graduate Membership —
(Institute of Electronic and
Radio Engineering U.K.)(IERE)
2. Degree in Civil Engineering

Ethiopia

Degree in Civil Engineering

Finland

Graduate Membership —
(Institute of Electronic and Radio
Engineering U.K.)(IERE)

France

Degree in Chemical Engineering

Germany

1. Degree in Civil Engineering

- Universite du Quebec Trois-Rivieres;
University of Windsor
: Toronto University;
University of Western Ontario
: Carleton University;
Concordia University;
Ecole Polytechnique;
Lakehead University;
McGill University;
McMaster University;
Memorial University of New Foundland;
Ottawa University;
Queen's University;
Royal Military College;
Technical University of Nova Scotia;
Toronto University;
University of Alberta;
University of British Columbia;
University of Calgary;
University of Laval;
University of Manitoba;
University of New Brunswick;
University of Saskatchewan;
University of Sherbrooke;
University of Waterloo;
University of Western Ontario;
University of Windsor
: Ecole Polytechnique;
McGill University;
McMaster University;
Queen's University;
Technical University of Nova Scotia;
Toronto University;
University Laval;
University of Alberta;
University of British Columbia
: University of Alberta;
University of British Columbia
: Ecole Polytechnique;
Queen's University;
Technical University of Nova Scotia;
University Laval;
University of Alberta;
University of Saskatchewan
: University of Alberta
: University of Waterloo
: University of Regina
: Universite de Quebec Chicoutimi
: University of Guelph

Denmarks Ingenier-akademi, Kobenhvn;
Denmarks Ingenier-akademi, Aalborg;
Denmarks Tekniske Højskole, Kobenhavn
: Denmark Technical University

: University of Addis Ababa

Abo Akademi, Faculty of Chemistry and Technology
(Language: Swedish);
Helsingin teknillinen korkeakoulu (Helsinki University of Technology);
Lappeenranta teknillinen korkeakoulu;
Oulun Yliopisto Faculty of Technology;
Tampereen teknillinen korkeakoulu

: University of Toulouse

: Fachhochschule Berlin;

- 2 Degree in Communication Engineering
- 3 Degree in Electrical Engineering

- 4 Degree in Electronic Engineering

- 5 Degree in Industrial Engineering

- 6 Degree in Manufacturing Engineering

- 7 Degree in Mechanical Engineering

- 8 Graduate Membership —
(Institute of Electronic and Radio
Engineering U.K.)(IERE)

Ghana

- 1 Degree in Civil Engineering
- 2 Degree in Chemical Engineering
- 3 Degree in Electrical Engineering
- 4 Degree in Mechanical Engineering
- 5 Degree in Mineral Engineering

Greece

- 1 Degree in Civil Engineering
- 2 Degree in Electrical Engineering
- 3 Graduate Membership —
(Institute of Electronic and Radio Engineering
U.K.)(IERE)

Holland

- Degree in Civil Engineering

Hong Kong

- 1 Degree in Civil Engineering
- 2 Degree in Electrical Engineering
- 3 Degree in Mechanical Engineering

Iceland

- All Engineering Degrees

India

- 1 Degree in Civil Engineering
- 2 Degree in Electrical Communication
- 3 Degree in Electrical Engineering

- Fachhochschule Cologne;
- Fachhochschule Holzminden
- Fachhochschule Berlin
- Fachhochschule Berlin;
- Fachhochschule Cologne;
- Fachhochschule Heilbronn;
- Fachhochschule Holzminden;
- Fachhochschule Nol fenbuttel
- Fachhochschule Berlin;
- Fachhochschule Heilbronn
- Fachhochschule Heilbronn;
- Fachhochschule Holzminden
- Fachhochschule Berlin;
- Fachhochschule Heilbronn
- Fachhochschule Cologne;
- Fachhochschule Holzminden;
- Fachhochschule Nol fenbuttel
- Friedrich-Alexander-Universität Erlangen-Nürnberg;
- Gesamthochschule Kassel;
- Rheinisch-Westfälische Technische Hochschule Aachen;
- Ruhr-Universität Bochum;
- Technische Hochschule Darmstadt;
- Technische Hochschule München;
- Technische Universität Berlin;
- Technische Universität Carolo-Wilhelmina-zu Braunschweig;
- Technische Universität Clausthal;
- Technische Universität Hannover;
- Universität Trier-Kaiserslautern;
- Universität Dortmund;
- Universität Hohenheim(Landw-Hochschule);
- Universität Karlsruhe(TH);
- Universität Stuttgart(TH)

- Kumasi University of Science and Technology
- Kumasi University of Science and Technology
- Kumasi University of Science and Technology
- Kumasi University of Science and Technology
- Kumasi University of Science and Technology

- National Technical University, Athens
- National Technical University, Athens
- Ethnikon Metsovion Polytechnion,
- Polytechniki Scholi Paneπιστιμιου Thessalonikis

- Technological University of Delft

- University of Hong Kong
- University of Hong Kong
- University of Hong Kong

- Technical College of Iceland,
- University of Iceland

- Calcutta University Bengal Engineering, Sibpur Howrah;
- Indian Institute of Technology, Bombay;
- Indian Institute of Technology, Delhi;
- Indian Institute of Technology, Kampur;
- Indian Institute of Technology, Kharagpur;
- Indian Institute of Technology, Madras;
- University of Poona Engineering College, University of Roorkee
- Indian Institute of Science, Bangalore
- Indian Institute of Technology, Bombay;
- Indian Institute of Technology, Delhi;
- Indian Institute of Technology, Kampur;
- Indian Institute of Technology, Kharagpur;
- Indian Institute of Technology, Madras

- 4. Degree in Electrical Technology
- 5. Degree in Marine Engineering
- 6. Degree in Mechanical Engineering

- 7. Degree in Metallurgical Engineering

Indonesia

- 1. Degree in Civil Engineering
- 2. Degree in Electrical Engineering
- 3. Degree in Mechanical Engineering

Ireland

- 1. Degree in Chemical Engineering
- 2. Degree in Civil Engineering
- 3. Degree in Computer Science
- 4. Degree in Electrical Engineering
- 5. Degree in Manufacturing Engineering
- 6. Degree in Mechanical Engineering
- 7. Degree in Physics Engineering

Italy

- 1. Degree in Electrical Engineering
- 2. Graduate Membership —
(Institute of Electronic and Radio
Engineering U.K. (IERE))

Japan

- 1. Degree in Aeronautical Engineering

- : Indian Institute of Science, Bangalore
- : Indian Institute of Technology
- : Indian Institute of Technology, Bombay;
- : Indian Institute of Technology, Delhi;
- : Indian Institute of Technology, Kampur;
- : Indian Institute of Technology, Kharagpur;
- : Indian Institute of Technology, Madras
- : Indian Institute of Science, Bangalore;
- : Indian Institute of Technology, Bombay;
- : Indian Institute of Technology, Kampur;
- : Indian Institute of Technology, Kharagpur;
- : Indian Institute of Technology, Madras;

- : Institut Teknologi Bandung;
- : Institut Teknologi Sepuluh Nopember;
- : Universitas Indonesia;
- : University Gadjja Mada
- : Institut Teknologi Bandung;
- : Institut Teknologi Sepuluh Nopember;
- : Universitas Indonesia;
- : University Gadjja Mada
- : Institut Teknologi Bandung;
- : Institut Teknologi Sepuluh Nopember;
- : Universitas Indonesia;
- : University Gadjja Mada

- : College of Technology, Kevin Street, Dublin;
- : Cork Regional Technical College;
- : University College of Dublin;
- : University of Galway;
- : University of Limeric
- : College of Technology, Kevin Street, Dublin;
- : Cork Regional Technical College;
- : University College of Dublin;
- : University of College of Galway;
- : University of Dublin, Trinity College, Dublin;
- : University of Limeric
- : University of Dublin, Trinity College, Dublin
- : College of Technology, Kevin Street, Dublin;
- : Cork Regional Technical College;
- : University College of Dublin;
- : University of Galway;
- : University of Dublin, Trinity College, Dublin;
- : University of Limeric
- : University of Dublin, Trinity College, Dublin
- : University of Limeric

- : University of Rome;
- : Facolta di Ingegneria di Bari;
- : Facolta di Ingegneria di Bologna;
- : Facolta di Ingegneria di Cagliari;
- : Facolta di Ingegneria di Napoli;
- : Facolta di Ingegneria di Padova;
- : Facolta di Ingegneria di Palermo;
- : Facolta di Ingegneria di Pisa;
- : Facolta di Ingegneria di Roma;
- : Facolta di Ingegneria di Trieste;
- : Politecnica de Milano;
- : Politecnica de Torino

- : University of Kyoto;

- University of Kyushu;
University of Nagoya;
University of Tokyo
2. Degree in Chemical Engineering : University of Kogyo (Tokyo Institute of Technology);
University of Kyoto;
University of Nagoya;
University of Yokohama Kokuritsu
3. Degree in Civil Engineering : Kyoto Kogyo;
Kyushu Kogyo (Kyushu Institute of Technology);
Nagoya Kogyo (Nagayo Institute of Technology);
Tokyo Noko;
University of Akita;
University of Hokkaido;
University of Kobe;
University of Kogyo (Tokyo Institute of Technology);
University of Kyoto;
University of Kyushu;
University of Nagoya;
University of Osaka;
University of Tohoku;
University of Tokyo;
University of Yamanashi;
University of Yokohama Kokuritsu
4. Degree in Construction Engineering : University of Ibaraki
5. Degree in Electrical Engineering : Kyoto Kogyo;
Kyushu Kogyo (Kyushu Institute of Technology);
Nagoya Kogyo (Nagayo Institute of Technology);
Tokyo Noko;
University of Akita;
University of Chiba;
University of Hokkaido;
University of Ibaraki;
University of Kobe;
University of Kogyo (Tokyo Institute of Technology);
University of Kyoto;
University of Kyushu;
University of Nagoya;
University of Osaka;
University of Tohoku;
University of Tokyo;
University of Yamanashi;
University of Yokohama Kokuritsu
6. Degree in Electro-Communication Engineering : University of Danki Tsushin
7. Degree in Electron Engineering : University of Ibaraki
8. Degree in Electronic Engineering : Kyoto Kogyo;
Nagoya Kogyo (Nagayo Institute of Technology);
University of Akita;
University of Hokkaido;
University of Ibaraki;
University of Kobe;
University of Kyoto;
University of Kyushu;
University of Nagoya;
University of Osaka;
University of Tohoku;
University of Tokyo;
University of Yamanashi
9. Degree in Environmental Engineering : University of Yamanashi
10. Degree in Industrial Engineering : Nagoya Kogyo (Nagayo Institute of Technology);
University of Chiba;
University of Kogyo (Tokyo Institute of Technology)
11. Degree in Marine Engineering : University of Tokyo
12. Degree in Mechanical Engineering : Kyoto Kogyo;
Kyushu Kogyo (Kyushu Institute of Technology);
Nagoya Kogyo (Nagayo Institute of Technology);
Tokyo Noko;
University of Akita;

- University of Hokkaido;
University of Ibaraki;
University of Kobe;
University of Kogyo (Tokyo Institute of Technology);
University of Kyoto;
University of Kyushu;
University of Nagoya;
University of Osaka;
University of Tohoku;
University of Yamanashi;
University of Yokohama Kokuritsu
13. Degree in Metal Processing Engineering : Kyushu Kogyo (Kyushu Institute of Technology)
14. Degree in Metallic Engineering : University of Akita
15. Degree in Metallurgical Engineering : Kyushu Kogyo (Kyushu Institute of Technology);
Nagoya Kogyo (Nagoya Institute of Technology);
University of Ibaraki
16. Degree in Mining Engineering : University of Akita
17. Degree in Naval Architecture Engineering : University of Kyushu;
University of Osaka;
University of Tokyo;
University of Yokohama Kokuritsu
18. Degree in Polymer Engineering : Nagoya Kogyo (Nagoya Institute of Technology)
- Kenya and Uganda (East Africa)**
1. Degree in Civil Engineering : University of East Africa
2. Degree in Electrical Engineering : University of East Africa
3. Degree in Mechanical Engineering : University of East Africa
- Malaysia**
1. Bachelor of Engineering (Agricultural) : Universiti Pertanian Malaysia
2. Bachelor of Engineering (Civil) : Universiti Pertanian Malaysia
3. Bachelor of Engineering (Electronic/Computer) : Universiti Pertanian Malaysia
4. Bachelor of Engineering (Mechanical/System) : Universiti Pertanian Malaysia
5. Degree in Biochemical Engineering : Universiti Kebangsaan Malaysia
6. Degree in Chemical Engineering : Institut Teknologi MARA;
Universiti Kebangsaan Malaysia;
Universiti Malaya
7. Degree in Civil Engineering : Institut Teknologi MARA;
Universiti Kebangsaan Malaysia;
Universiti Malaya;
Universiti Sains Malaysia;
Universiti Teknologi Malaysia
8. Degree in Computer and Communication Engineering : Universiti Sains Malaysia
9. Degree in Electrical Engineering : Institut Teknologi MARA;
Universiti Kebangsaan Malaysia;
Universiti Malaya;
Universiti Teknologi Malaysia
10. Degree in Electronic Engineering : Institut Teknologi MARA
11. Degree in Material Engineering : Universiti Sains Malaysia
12. Degree in Mechanical Engineering : Institut Teknologi MARA;
Universiti Kebangsaan Malaysia;
Universiti Malaya;
Universiti Teknologi Malaysia
13. Degree in Mineral Resources Engineering : Universiti Sains Malaysia
14. Degree in Petroleum and Natural Gas Engineering : Universiti Teknologi Malaysia
15. Diploma in Aeronautical Engineering : Universiti Teknologi Malaysia
16. Diploma in Chemical Engineering : Universiti Teknologi Malaysia
17. Diploma in Civil Engineering : Institut Teknologi MARA;
Universiti Teknologi Malaysia
18. Diploma in Electrical Engineering(Communication) : Universiti Teknologi Malaysia
19. Diploma in Electrical Engineering(Devices) : Institut Teknologi MARA
20. Diploma in Electrical Engineering(Energy) : Institut Teknologi MARA;
Universiti Teknologi Malaysia
21. Diploma in Electronic Engineering : Institut Teknologi MARA
22. Diploma in Machinery Engineering
(Marine Technology) : Universiti Teknologi Malaysia
23. Diploma in Mechanical Engineering : Institut Teknologi MARA;
Universiti Teknologi Malaysia
- New Zealand**
1. Degree in Chemical Engineering : University of Auckland

2. Degree in Civil Engineering

: University of Auckland;
University of Canterbury;
University of Massey;
University of Otago;
University of Waikato;
Victoria University of Wellington

3. Degree in Electrical Engineering

: University of Auckland;
University of Canterbury;
University of Massey;
University of Otago;
University of Waikato;
Victoria University of Wellington

4. Degree in Materials Engineering

: University of Auckland

5. Degree in Mechanical Engineering

: University of Auckland;
University of Canterbury;
University of Massey;
University of Otago;
University of Waikato;
Victoria University of Wellington

6. Degree in Metallurgical Engineering

: University of Otago

7. Degree in Mineral Engineering

: University of Otago

8. Degree in Physics Engineering

: University of Auckland;
University of Otago;
Victoria University of Wellington

Netherlands

Graduate Membership —
(Institute of Electronic and Radio
Engineering U.K.)(IERE)

Landbouwhoghe-school, Wageningen
Technische Hoge-school, Delft;
Technische Hoge-school, Eindhoven;
Technische Hoge-school, Twente

Nigeria

1. Degree in Civil Engineering

: University Bello;
University of Lagos

2. Degree in Electrical Engineering

: University Bello

3. Degree in Mechanical Engineering

: University Bello;
University of Lagos

Norway

1. Degree in Civil Engineering

: Norges Tekniske Hogskole Trondheim

2. Graduate Membership —
(Institute of Electronic and Radio
Engineering U.K.)(IERE)

Norges tekniske hogskole Trondheim

Portugal

1. Graduate Membership —
(Institute of Electronic and Radio
Engineering U.K.)(IERE)

Engenheiros fabricis diplomados par la Academia Militar;
Engenheiros hidrografos diplomados par le Ministerio de Marinha;
Faculdade de Engenharia de Porto;
Instituto Superior de Agronomia, Lisboa;
Instituto Superior Tecnico, Lisboa;
Universidade de Lourenco Marques (Mocambique);
Universidade de Luanda (Angola)

Singapore

1. Degree in Chemical Engineering

: National University of Singapore

2. Degree in Civil Engineering

: National University of Singapore

3. Degree in Electrical Engineering

: National University of Singapore

4. Degree in Mechanical Engineering

: National University of Singapore

South Korea

1. Degree in Aeronautical Engineering

: Seoul National University

2. Degree in Chemical Engineering

: Hanyang University;
Seoul National University

3. Degree in Civil Engineering

: Hanyang University;
Seoul National University

4. Degree in Computer Engineering

: Seoul National University

5. Degree in Control and Instrumentation Engineering

: Seoul National University

6. Degree in Electrical Engineering

: Hanyang University;
Seoul National University

7. Degree in Electronic Engineering

: Hanyang University

8. Degree in Electronics Communication Engineering

: Hanyang University

9. Degree in Industrial Engineering

: Hanyang University;
Seoul National University

10. Degree in Inorganic Materials Engineering : Hanyang University;
Seoul National University
11. Degree in Machine Design and Production Engineering : Hanyang University
12. Degree in Materials Engineering : Hanyang University
13. Degree in Mechanical Design and Production Engineering : Seoul National University
14. Degree in Mechanical Engineering : Hanyang University;
Seoul National University
15. Degree in Metallurgical Engineering : Hanyang University;
Seoul National University
16. Degree in Mineral and Petroleum Engineering : Seoul National University
17. Degree in Mining and Minerals Engineering : Hanyang University
18. Degree in Nuclear Engineering : Hanyang University;
Seoul National University
19. Degree in Precision Mechanical Engineering : Hanyang University
20. Degree in Textile Engineering : Hanyang University;
Seoul National University

Spain

Graduate Membership —
(Institute of Electronic and
Radio Engineering U.K.)(IERE)

Escuela Tecnica Superior de Ingenieros Aeronautical, Madrid;
Escuela Tecnica Superior de Ingenieros de Minas, Madrid;
Escuela Tecnica Superior de Ingenieros de Minas, Qviedo;
Escuela Tecnica Superior de Ingenieros de Montes, Madrid;
Escuela Tecnica Superior de Ingenieros de Telecommunication, Madrid;
Escuela Tecnica Superior de Ingenieros Electromecanicos del
ICAI, Madrid;
Escuela Tecnica Superior de Ingenieros Industriales, Barcelona;
Escuela Tecnica Superior de Ingenieros Industriales, Bilbao;
Escuela Tecnica Superior de Ingenieros Industriales, Madrid;
Escuela Tecnica Superior de Ingenieros Industriales, San Sebastian;
Escuela Tecnica Superior de Ingenieros Industriales, Sevilla;
Escuela Tecnica Superior de Ingenieros Industriales, Tarassa;
Escuela Tecnica Superior de Ingenieros Industriales, Valencia;
Escuela Tecnica Superior de Ingenieros Navales, Madrid;
Escuela Tecnica Superior de Ingenieros Agronomos, Madrid;
Escuela Tecnica Superior de Ingenieros Argonomos, Valencia;
Escuela Tecnica Superior de Ingenieros de Caminos, Canales y Puertos,
SantanDer;
Escuela Tecnica Superior de Ingenieros Agronomos, Cardoba;
Escuela Tecnica Superior de Ingenieros de Caminos, Carnales y
Putertos, Madrid;
Esuela Tecnica Superior de Ingenieros de Caminos, Canales y
Puertos, Valencia;
Institute Quimico de Sarria para Ingenieria Industrial, Seccion Quimica,
Barcelona

Sri Lanka

1. Degree in Civil Engineering : University of Ceylon, Paradeniya
2. Degree in Electrical Engineering : University of Ceylon, Paradeniya
3. Degree in Mechanical Engineering : University of Ceylon, Paradeniya

Sudan

1. Degree in Civil Engineering : University of Khartoum
2. Degree in Electrical Engineering : University of Khartoum
3. Degree in Mechanical Engineering : University of Khartoum

Sweden

Graduate Membership —
(Institute of Electronic and Radio
Engineering U.K.)(IERE)

Chalmers Tekniska Hogskola Goteborg;
Kungli Tekniska Hogskolan, Stockholm;
Linkopings Hogskolan, Linkoping;
Teknisha Hogskolan, Lund;
Uppsala Universitet, Uppsala

Switzerland

1. Degree in Civil Engineering : Zurich, University of Technical Science;
2. Graduate Membership —
(Institute of Electronic and Radio
Engineering U.K.)(IERE)
Ecole Polytechnique Federale, Lausanne;
Eidgenossliche Technische Hochschule, Zurich;
Universite de Geneva, Ingenieur-Geologue;
Universite de Geneve, Ingenieur-Chimiste;
Universite de Neuchatel Ingenieur-hortogers;
Universite de Neuchatel Ingenieur, Chimiste

Turkey

1. Degree in Aeronautical Engineering : Istanbul Technical University;
Middle East Technical University
2. Degree in Chemical Engineering : Bogaziei University;
Middle East Technical University
3. Degree in Civil Engineering : Bogaziei University;
Istanbul Technical University;
Middle East Technical University
4. Degree in Electrical Engineering : Bogaziei University;
Istanbul Technical University;
Middle East Technical University
5. Degree in Electronics and Telecommunication Engineering : Istanbul Technical University
6. Degree in Industrial Engineering : Istanbul Technical University;
Middle East Technical University
7. Degree in Mechanical Engineering : Istanbul Technical University;
Middle East Technical University

West Indies

1. Degree in Chemical Engineering : University of West Indies
2. Degree in Civil Engineering : University of West Indies
3. Degree in Electrical Engineering : University of West Indies
4. Degree in Mechanical Engineering : University of West Indies

United Kingdom

1. Degree in Aero Mechanical Engineering : Royal Military College of Science, Shrivenham
2. Degree in Aeronautical Engineering : Coventry University;
Loughborough University of Technology;
Queen Mary and Westfield College, London;
The City University;
The Queen's University of Belfast;
University of Aston, Birmingham;
University of Bristol;
University of Cambridge;
University of Glasgow;
University of London;
University of Salford;
Victoria University of Manchester
3. Degree in Aerospace Engineering : Manchester University
4. Degree in Agriculture Engineering : Cranfield Institute of Technology, Silsoe College;
Harper-Adams Agricultural College
5. Degree in Air Engineering Stream : Royal Naval Engineering College, Manadon
6. Degree in Architecture Engineering : University of Wales College of Cardiff
7. Degree in Auto Engineering : Coventry University
8. Degree in Avionics Engineering : Queen Mary and Westfield College, London;
University of York
9. Degree in Bio-Chemical Engineering : University College, London;
University of Swansea
10. Degree in Building Science Engineering : Southbank University;
UMIST;
University of Central Lancashire;
University of Northumbria, Newcastle;
University of Reading;
University of Ulster;
University of Wales;
Wolverhampton University
11. Degree in Business Computer Engineering : Coventry University
12. Degree in Business Information Engineering : Sheffield Hallam University;
University of East London;
University of Portsmouth
13. Degree in Business Manufacturing Engineering : Glasgow Caledonian University
14. Degree in Chemical Engineering : Heriot-Watt University;
Southbank University;
The Queen's University of Belfast;
UMIST;
University College, London;
University of Aston, Birmingham;
University of Birmingham;

15. Degree in Civil Engineering

University of Bradford;
University of East London;
University of Edinburgh;
University of Exeter;
University of Glamorgan;
University of Leeds;
University of London;
University of New Castle Upon Tyne;
University of Nottingham;
University of Salford;
University of Sheffield;
University of Strathclyde;
University of Surrey;
University of Swansea;
University of Teeside;
University of Wales;
Victoria University of Manchester
: Boston Institute of Higher Education;
Brighton University;
Heriot-Watt University;
Kings College London;
Loughborough University of Technology;
Manchester University;
Middlesex University;
Napier University;
Nottingham Trent University;
Oxford Brooker University;
Queen Mary and Westfield College, London;
Royal Military College of Science, Shrivenham;
Sheffield Hallam University;
Southbank University;
The City University;
The Queen's University of Belfast;
UMIST;
University College, London;
University of Aberdeen;
University of Abertay, Dundee;
University of Aston, Birmingham;
University of Bath;
University of Birmingham;
University of Bradford;
University of Bristol;
University of Cambridge;
University of Derby;
University of Dundee;
University of Durham;
University of East London;
University of Edinburgh;
University of Exeter;
University of Glamorgan;
University of Glasgow;
University of Greenwich;
University of Lancaster;
University of Leeds;
University of Leicester;
University of Liverpool;
University of London;
University of New Castle Upon Tyne;
University of Nottingham;
University of Oxford;
University of Paisby;
University of Plymouth;
University of Portsmouth;
University of Salford;
University of Sheffield;
University of Southampton;
University of Strathclyde;

- 16. Degree in Combined Engineering Studies
 - 17. Degree in Command and Control Engineering
 - 18. Degree in Communication and Information Engineering
 - 19. Degree in Communication Engineering

 - 20. Degree in Composites Engineering
 - 21. Degree in Computer Aided Engineering

 - 22. Degree in Computer and Information System Engineering

 - 23. Degree in Computer Engineering

 - 24. Degree in Computer Science Engineering

 - 25. Degree in Computer Systems Engineering

 - 26. Degree in Cybernetics Engineering
 - 27. Degree in Digital System Engineering
 - 28. Degree in Electrical and Physics Engineering
 - 29. Degree in Electrical Engineering
- : University of Sunderland;
 - : University of Surrey;
 - : University of Sussex;
 - : University of Swansea;
 - : University of Teeside;
 - : University of Ulster;
 - : University of Wales;
 - : University of Wales, College of Cardiff;
 - : University of Warwick;
 - : University of Westminster;
 - : Victoria University of Manchester
 - : Coventry University
 - : Royal Military College of Science, Shrivenham

 - : Royal Military College of Science, Shrivenham
 - : Coventry University;
 - : Kings College London;
 - : Napier University;
 - : University of North London;
 - : University of Northumbria, Newcastle;
 - : University of Plymouth
 - : University of Plymouth
 - : Nottingham Trent University;
 - : Sheffield Hallam University

 - : Brighton University;
 - : University of Central England, Birmingham
 - : Boston Institute of Higher Education;
 - : Brighton University;
 - : De Montfort University;
 - : Kings College, London;
 - : Manchester Metropolitan University;
 - : Manchester University;
 - : Queen Mary and Westfield College, London;
 - : Straffordshire University;
 - : University College, London;
 - : University of East Anglia;
 - : University of East London;
 - : University of Glamorgan;
 - : University of Greenwich;
 - : University of Northumbria, Newcastle;
 - : University of Sunderland;
 - : University of Ulster;
 - : University of Wales College of Cardiff;
 - : University of Swansea;
 - : University of Westminster
 - : Brighton University;
 - : Robert Gordon's University;
 - : St. Andrew's University;
 - : University College of Aberystwith;
 - : University of Paisby;
 - : University of Portsmouth;
 - : University of Reading
 - : Coventry University;
 - : University College of North Wales, Bangor; University of York
 - : University of Reading
 - : University of the West England, Bristol
 - : University College of North Wales, Bangor
 - : Boston Institute of Higher Education;
 - : Brighton University;
 - : Brunel University;
 - : Coventry University;
 - : De Montfort University;
 - : Gwent College of Higher Education;
 - : Heriot, Watt University;
 - : Kings College, London;
 - : Loughborough University of Technology;

Manchester Metropolitan University;
Manchester University;
Middlesex University;
Napier University;
Nottingham Trent University;
Oxford Brooker University;
Queen Mary and Westfield College London;
Robert Gordon's University;
Royal Military College of Science, Shrivenham;
Royal Naval Engineering College, Manadon;
Sheffield Hallam University;
Southbank University;
Straffordshire University;
The City University;
UMIST;
University College, London;
University of Aberdeen;
University of Abertay Dundee;
University of Aston, Birmingham;
University of Bath;
University of Birmingham;
University of Bradford;
University of Bristol;
University of Cambridge;
University of Central England, Birmingham;
University of Central Lancashire;
University of Derby;
University of Dundee;
University of Durham;
University of East Anglia;
University of Edinburgh;
University of Exeter;
University of Glamorgan;
University of Glasgow;
University of Greenwich;
University of Kent, Canterbury;
University of Lancaster;
University of Leeds;
University of Leicester;
University of Liverpool;
University of London;
University of Newcastle Upon Tyne;
University of Salford;
University of North London;
University of Northumbria, Newcastle;
University of Nottingham;
University of Oxford;
University of Paisby;
University of Plymouth;
University of Portsmouth;
University of Sheffield;
University of Southampton;
University of Strathclyde;
University of Sunderland;
University of Surrey;
University of Sussex;
University of Swansea;
University of Teeside;
University of the West England, Bristol;
University of Ulster;
University of Wales;
University of Wales, College of Cardiff;
University of Warwick;
University of Westminster;
University of York;
Victoria University of Manchester

31. Degree in Electronic Engineering
- : Bournemouth University;
 - : Brunel University;
 - : Loughborough University of Technology;
 - : The City University;
 - : University of Aston, Birmingham;
 - : University of Bath;
 - : University of Birmingham;
 - : University of Bristol;
 - : University of Cambridge;
 - : University of Essex;
 - : University of Glasgow;
 - : University of Hull;
 - : University of Kent, Canterbury;
 - : University of Lancaster;
 - : University of Leeds;
 - : University of Liverpool;
 - : University of London;
 - : University of Nottingham;
 - : University of Sheffield;
 - : University of Southampton;
 - : University of Strathclyde;
 - : University of Surrey;
 - : University of Sussex;
 - : University of Wales;
 - : University of Warwick;
 - : Victoria University of Manchester
32. Degree in Energy Engineering
- : Southbank University;
 - : Napier University;
 - : University of Swansea
33. Degree in Environmental Engineering
- : Brighton University;
 - : Cranfield Institute of Technology, Silsoe College;
 - : Southbank University
34. Degree in Geology Engineering
- : University of Portsmouth
35. Degree in Information System Management Engineering
- : Royal Military College of Science, Shrivenham;
 - : University of Glamorgan
36. Degree in Information Systems Engineering
- : Coventry University;
 - : de Montfort University;
 - : Manchester Metropolitan University;
 - : Napier University;
 - : Royal Military College of Science, Shrivenham;
 - : St. Andrew's University;
 - : Straffordshire University;
 - : University of East London;
 - : University of Plymouth;
 - : University of Reading;
 - : University of Teeside
37. Degree in Information Technology Engineering
- : Royal Military College of Science, Shrivenham
38. Degree in Management and Manufacturing Engineering
- : University of Central England, Birmingham
39. Degree in Manufacturing Engineering
- : Manchester Metropolitan University;
 - : Middlesex University;
 - : Nottingham Trent University;
 - : Sheffield Hallam University;
 - : Straffordshire University;
 - : The City University;
 - : UMIST;
 - : University of Aston, Birmingham;
 - : University of Bath;
 - : University of Birmingham;
 - : University of Cambridge;
 - : University of Derby;
 - : University of London;
 - : University of Northumbria, Newcastle;
 - : University of Nottingham;
 - : University of Paisby;
 - : University of Plymouth;

40. Degree in Marine Engineering

41. Degree in Materials Engineering

42. Degree in Mechanical Engineering

University of the West England, Bristol;
University of Ulster;
University of Wales, College of Cardiff;
University of Wales
: Royal Naval Engineering College, Manadon;
University of New Castle Upon Tyne
: Coventry University;
Manchester Metropolitan University;
Queen Mary and Westfield College London;
Sheffield Hallam University;
UMIST;
University of Greenwich;
University of Northumbria, Newcastle;
University of Swansea
: Brighton University;
Brunel University;
Glasgow Caledonian University;
Heriot-Watt University;
Kings College, London;
Loughborough University of Technology;
Manchester Metropolitan University;
Manchester University;
Middlesex University;
Nottingham Trent University;
Oxford Brooker University;
Queen Mary and Westfield College, London;
Robert Gordon's University;
Royal Military College of Science, Shrivenham;
Sheffield Hallam University;
Stockport College;
Straffordshire University;
The City University;
The Queen's University of Belfast;
University College, London;
University of Aberdeen;
University of Abertay, Dundee;
University of Aston, Birmingham;
University of Bath;
University of Birmingham;
University of Bradford;
University of Bristol;
University of Cambridge;
University of Central England, Birmingham;
University of Central Lancashire;
University of Derby;
University of Dundee;
University of Durham;
University of Edinburgh;
University of Exeter;
University of Glasgow;
University of Greenwch;
University of Lancaster;
University of Leeds;
University of Leicester;
University of Liverpool;
University of London;
University of New Castle Upon Tyne;
University of North London;
University of Nottingham;
University of Oxford;
University of Paisby;
University of Plymouth;
University of Portsmouth;
University of Reading;
University of Salford;
University of Sheffield;
University of Southampton;

- University of Strathclyde;
- University of Sunderland;
- University of Surrey;
- University of Sussex;
- University of Teeside;
- University of the West England, Bristol;
- University of Wales, College of Cardiff;
- University of Wales;
- University of Warwick;
- Victoria University of Manchester;
- Wolverhampton University
- 43. Degree in Metal Technology Engineering : Wolverhampton University
- 44. Degree in Metallurgical Engineering : London Guildhall University;
- : Sheffield Hallam University;
- UMIST;
- University of Greenwich;
- University of Teeside
- 45. Degree in Microelectronic Engineering : Brighton University;
- University College of Aberystwyth
- 46. Degree in Mineral Engineering : Camborne School of Mines;
- University of Birmingham;
- University of Leeds;
- University of London;
- University of New Castle Upon Tyne;
- University of Nottingham;
- University of Sheffield;
- University of Wales, College of Cardiff
- 47. Degree in Mining Engineering : Camborne School of Mines;
- Staffordshire University;
- University of Edinburgh;
- University of Glasgow
- 48. Degree in Music Technology Engineering : University of York
- 49. Degree in Nautical Studies Engineering : University of Sunderland
- 50. Degree in Naval Engineering : University College, London;
- University of Strathclyde
- 51. Degree in Nuclear Engineering : Manchester University
- 52. Degree in Nuclear Engineering : Manchester University
- 53. Degree in Production Engineering : Manchester Metropolitan University
- 54. Degree in Software Engineering : Coventry University;
- Sheffield Hallam University;
- Staffordshire University;
- UMIST;
- University of Teeside;
- University of York
- 55. Degree in Structural Engineering : Manchester University;
- Southbank University;
- University College, London
- 56. Degree in Systems and Design Engineering : Bournemouth University
- 57. Degree in Telecommunication Engineering : Queen Mary and Westfield College, London
- 58. Degree in Weapon Engineering : Royal Naval Engineering College, Manadon

United States of America

- 1. Degree in Aeronautical Engineering : Air Force Institute of Technology, Wright-Patterson Air Force Base;
- California Polytechnic State University, San Luis, Obisho;
- Embry-Riddle Aeronautical University, Daytona Beach, Florida;
- Naval Postgraduate School, Monterey;
- Ohio State University, Columbus;
- Purdue University, West Lafayette;
- Stanford University, Stanford;
- United State Air Force Academy, USAF Academy;
- University of Illinois, Urbana-Champaign;
- University of Washington, Seattle;
- Wichita State University, Wichita
- 2. Degree in Aerospace Engineering : Auburn University, Auburn;
- Boston University, Boston;
- California Polytechnic University, Pomona;

Cornell University, Ithaca, New York;
Georgia Institute of Technology, Atlanta;
Iowa State University, Ames;
Mississippi State University, Mississippi State;
North Carolina State University, Raleigh;
Northrop University, Inglewood;
Oklahoma State University, Stillwater;
Park College of St. Louis University, St. Louis;
Pennsylvania State University, University Park;
Polytechnic Institute of New York, Brooklyn;
Princeton University, Princeton;
San Diego State University, San Diego;
State University of New York, Buffalo;
Syracuse University, Syracuse;
Texas A&M University, College Station;
Tri State University, Angola;
United State Naval Academy, Annapolis;
University of Alabama, Tuscaloosa;
University of Arizona, Tucson;
University of California, Los Angeles;
University of Cincinnati, Ohio;
University of Colorado, Boulder;
University of Florida, Gainesville;
University of Maryland, College Park;
University of Michigan, Ann Arbor;
University of Minnesota, Minneapolis;
University of Missouri-Rolla, Rolla;
University of Notre Dame, Notre Dame;
University of Oklahoma, Norman;
University of Southern California, Los Angeles;
University of Tennessee, Knoxville;
University of Texas, Arlington;
University of Texas, Austin;
University of Virginia, Charlottesville;
Virginia Polytechnic Institute and State University, Blacksburg;
West Virginia University, Morgantown

3. Degree in Agriculture Engineering

Arkansas State University;
Auburn University, Auburn;
California Polytechnic State University, San Luis, Obispo;
Clemson University, Clemson;
Colorado State University, Fort Collins;
Cornell University, Ithaca, New York;
Louisiana State University;
Louisiana Technology University, Ruston;
Michigan State University, East Lansing;
Mississippi State University, Mississippi State;
Montana State University, Bozeman;
New Mexico State University, Las Cruces;
North Carolina State University, Raleigh;
North Dakota State University, Fargo;
Ohio State University, Columbus;
Oklahoma State University, Stillwater;
Oregon State University, Corvallis;
Pennsylvania State University, University Park;
Purdue University, West Lafayette;
South Dakato State University, Brookings;
Texas A&M University, College Station;
Texas Technology University, Lubbock;
The State University of New Jersey, Rutgers, New Brunswick;
University of California, Davis;
University of Florida, Gainesville;
University of Georgia, Athens;
University of Idaho, Moscow;
University of Illinois, Urbana-Champaign;
University of Maine, Otono;
University of Maryland, College Park;

- University of Minnesota, Minneapolis;
 University of Missouri-Columbia, Columbia;
 University of Nebraska, Lincoln;
 University of Tennessee, Knoxville;
 University of Wisconsin-Madison, Madison;
 University of Wyoming, Laramie;
 Virginia Polytechnic Institute and State University, Blacksburg;
 Washington State University, Pullman
- 4 Degree in Agriculture and Irrigation Engineering : Utah State University, Logan
- 5 Degree in Analysis and Design Engineering : University of North Carolina, Charlotte
- 6 Degree in Astronautical Engineering : United State Air Force Academy, USAF Academy;
 University of Washington, Seattle
- 7 Degree in Bio-Engineering : University of California, San Diego;
 University of Illinois, Chicago
- 8 Degree in Building Engineering : Iowa State University, Ames;
 Lawrence Institute of Technology, Southfield
- 9 Degree in Ceramic Engineering : Clemson University, Clemson;
 Georgia Institute of Technology, Atlanta;
 Iowa State University, Ames;
 Ohio State University, Columbus;
 Pennsylvania State University, University Park;
 State University of New York, College of Ceramics at Alfred University;
 The State University of New Jersey, Rutgers, New Brunswick;
 University of Florida, Gainesville;
 University of Illinois, Urbana-Champaign;
 University of Missouri-Rolla, Rolla;
 University of Washington, Seattle
- 10 Degree in Chemical Engineering : Arizona State University, Tempe;
 Auburn University, Auburn;
 Brigham Young University, Provo, Utah;
 Brown University, Providence;
 Bucknell University, Lewisburg;
 California Institute of Technology, Pasadena;
 California State Polytechnic University, Pomona;
 California State University, Long Beach;
 Carnegie-Mellon University, Pittsburgh;
 Case Western Reserve University, Cleveland, Ohio;
 Catholic University of America, Washington D.C.;
 City College of the City University of New York, New York;
 Clarkson University, New York;
 Clemson University, Clemson;
 Cleveland State University, Ohio;
 Colorado School of Mines, Golden;
 Colorado State University, Fort Collins;
 Columbia University, New York;
 Drexel University, Philadelphia;
 Fairleigh Dickinson University, Teaneck Campus;
 Florida Institute of Technology, Melbourne;
 Gannon University, Erie;
 General Motor Institute(GMI) Engineering and Management Institute, Flint, Michigan;
 Georgia Institute of Technology, Atlanta;
 Howard University, Washington D.C.;
 Illinois Institute of Technology, Chicago;
 Indiana University-Purdue University, Indianapolis;
 Iowa State University, Ames;
 Johns Hopkins University, G.W.C. Whiting School of Engineering;
 Lamar University, Beaumont;
 Lehigh University, Bethlehem;
 Lawrence Institute of Technology;
 Louisiana State University;
 Louisiana Technology University, Ruston;
 Manhattan College, Riverdale;

Massachusetts Institute of Technology, Cambridge;
Michigan State University, East Lansing;
Michigan Technological University, Houston;
Milwaukee School of Engineering, Milwaukee;
Mississippi State University, Mississippi State;
Montana State University, Bozeman;
Morgan State University;
New Jersey Institute of Technology, Newark;
New Mexico State University, Las Cruces;
North Carolina Agriculture and Technical State University, Greensboro;
North Carolina State University, Raleigh;
Northeastern University of College of Engineering, Boston;
Northwestern University, Evanston;
Oakland University, Rochester;
Ohio State University, Columbus;
Ohio University, Athens;
Oklahoma State University, Stillwater;
Oregon State University, Corvallis;
Pennsylvania State University, University Park;
Polytechnic Institute of New York, Brooklyn;
Prairie View A&M University, Prairie View;
Princeton University, Princeton;
Purdue University, Calumet, Hammond;
Purdue University, West Lafayette;
Rice University, Houston;
Rochester Institute of Technology, Rochester;
Rose-Hulman Institute of Technology, Terra Haute;
San Jose State University, San Jose;
Seattle University, Seattle;
South Dakota School of Mines and Technology, Rapid City;
Southern Illinois University, Carbondale;
Southern University and Agriculture and Mechanical College, Baton Rouge;
Southfield; Le Tourneau College, Longview, Texas;
Stanford University, Stanford;
State University New York, Stony Brook;
State University of New York, Buffalo;
State University of New York, Maritime College, Ft. Schuyler;
Stevens Institute of Technology;
Syracuse University, Syracuse;
Temple University;
Tennessee Technological University, Cookeville;
Texas A&I University, Kingsville;
Texas A&M University, College Station;
Texas Technology University, Lubbock;
The Citadel Charleston;
The Cooper Union, New York;
The State University of New Jersey, Rutgers, New Brunswick;
Tri State University, Angola;
Tufts University, Medford;
Tulane University, New Orleans;
Tuskegee Institute, Alabama;
Union College, Schenectady;
United State Naval Academy, Annapolis;
University of Akron, Akron;
University of Alabama, Huntsville;
University of Alabama, Tuscaloosa;
University of Arizona, Tucson;
University of Arkansas, Fayetteville;
University of Bridgeport, Bridgeport;
University of California, Berkeley;
University of California, Davis;
University of California, Santa Barbara;
University of Cincinnati, Ohio;
University of Colorado, Boulder;
University of Connecticut, Storrs;
University of Dayton, Ohio;
University of Delaware, Newark;

University of Detroit, Detroit;
 University of Evansville, Evansville;
 University of Houston, Houston Texas;
 University of Idaho, Moscow;
 University of Illinois at Urbana-Champaign;
 University of Illinois, Chicago;
 University of Iowa, Iowa City;
 University of Louisville, Louisville;
 University of Maine, Orono;
 University of Maryland, College Park;
 University of Mass, Lowell;
 University of Massachusettes, Amherst;
 University of Michigan, Ann Arbor;
 University of Michigan, Dearborn;
 University of Minnesota, Minneapolis;
 University of Mississippi, Mississippi;
 University of Missouri-Columbia, Columbia;
 University of Missouri-Rolla, Rolla;
 University of Nebraska, Lincoln;
 University of New Hampshire, Durham;
 University of New Haven, West Haven;
 University of New Mexico, Albuquerque;
 University of New Orleans, New Orleans;
 University of North Carolina, Charlotte;
 University of North Dakota, Grand Forks;
 University of Notre Dame, Notre Dame;
 University of Oklahoma, Norman;
 University of Pacific, Stockton;
 University of Pennsylvania, Philadelphia;
 University of Pittsburgh, Pittsburgh;
 University of Puerto-Rico, Mayaguez;
 University of Rochester, Rochester;
 University of South Alabama, Mobile;
 University of South Carolina, Columbia;
 University of South Florida, Tampa;
 University of South Western Louisiana, Lafayette;
 University of Southern California, Los Angeles;
 University of Tennessee, Knoxville;
 University of Texas, Austin;
 University of Texas, San Antonio;
 University of Toledo, Ohio;
 University of Tulsa, Tulsa, Oklahoma;
 University of Virginia, Charlottesville;
 University of Washington, Seattle;
 University of Wisconsin-Madison, Madison;
 University of Wyoming, Laramie;
 Utah State University, Logan;
 Villanova University, Villanova;
 Virginia Polytechnic Institute and State University, Blacksburg;
 Washington State University, Pullman;
 Washington University, St. Louis;
 West Virginia University, Morgantown;
 Western New England College, Springfield;
 Wichita State University, Wichita;
 WiDener University;
 Wright Patterson Air Force Base;
 Yale University, New Haven;
 Worcester Polytechnic Institute, Worcester;
 Youngstown State University, Youngstown
 : Airforce Institute of Technology, Wright Patterson Air Force Base;
 Arizona State University, Tempe;
 Auburn University, Auburn;
 Bradley University, Peoria, Illinois;
 Brigham Young University, Provo Utah;
 Brown University, Providence;
 Bucknell University, Lewisburg;
 California Polytechnic State University, San Luis, Obispo;

11. Degree in Civil Engineering

California State Polytechnic University, Pomona;
California State University, Chico;
California State University, Long Beach;
California State University, Los Angeles;
California State University, Sacramento;
Carnegie-Mellon University, Pittsburgh;
Case Western Reserve University, Cleveland, Ohio;
Catholic University of America, Washington, D.C.;
Christian Brothers College, Memphis;
City College of the City, University of New York, New York;
Clarkson University, New York;
Cleveland State University, Ohio;
Colorado State University, Fort Collins;
Columbia University, New York;
Cornell University, Ithaca, New York;
Drexel University, Philadelphia;
Duke University, Durham;
Florida Institute of Technology, Melbourne;
George Washington University, Washington D.C.;
Georgia Institute of Technology, Atlanta;
Howard University, Washington D.C.;
Illinois Institute of Technology, Chicago;
Iowa State University, Ames;
John Hopkins University, G.W.C. Whiting School of Engineering;
Lamar University, Beaumont;
Lehigh University, Bethlehem;
Lemson University, Clemson;
Louisiana State University;
Louisiana Technology University, Ruston;
Loyola Marymount University, Los Angeles;
Manhattan College, Riverdale;
Marquette University, Milwaukee;
Massachusetts Institute of Technology, Cambridge;
Memphis State University, Memphis;
Merrimack College, North Andover;
Michigan State University, East Lansing;
Michigan Technological University, Houston;
Mississippi State University, Mississippi State;
Montana State University, Bozeman;
Morgan State University;
New England College, Henniker;
New Jersey Institute of Technology, Newark;
New Mexico State University, Las Cruces;
North Carolina State University, Raleigh;
North Dakota State University, Fargo;
Northeastern University, College of Engineering, Boston;
Northern Arizona University, Flagstaff;
Northwestern University, Evanston;
Norwich University, Northfield;
Ohio Northern University, Ada;
Ohio State University, Columbus;
Ohio University, Athena;
Oklahoma State University, Stillwater;
Old Dominion University, Norfolk;
Oregon State University, Corvallis;
Pennsylvania State University, University Park;
Polytechnic Institute of New York, Brooklyn;
Portland State University, Portland;
Prairie View A&M University, Prairie View;
Princeton University, Princeton;
Purdue University, West Lafayette;
Rice University, Houston;
Rose-Hulman Institute of Technology, Terra Haute;
San Diego State University, San Diego;
San Jose State University, San Jose;
South Dakota School of Mines and Technology, Rapid City;
South Dakota State University, Brookings;

Southern Illinois University, Edwardsville;
Southern Methodist University, Dallas, Texas;
Southern University and Agriculture and Mechanical College, Baton Rouge;
St.Martin's College Olympia;
Stanford University, Stanford;
State University of New York, Buffalo;
Stevens Institute of Technology;
Syracuse University, Syracuse;
Temple University;
Tennessee State University, Nashville;
Tennessee Technological University, Cookeville;
Texas A&I University, Kingsville;
Texas A&M University, College Station;
Texas Technology University, Lubbock;
The Citadel Charleston;
The Cooper Union, New York;
The State University of New Jersey, Rutgers, New Brunswick;
Tri State University, Angola;
Tufts University, Medford;
Tulane University, New Orleans;
Union College, Schenectady;
United State Air Force Academy, USAF Academy;
United State Coast Guard Academy, New London;
United State Military Academy;
United States International University, San Diego;
University of Akron, Akron;
University of Alabama, Tuscaloosa;
University of Alaska, Fairbanks;
University of Arizona, Tuscon;
University of Arkansas, Fayetteville;
University of California, Berkeley;
University of California, Davis;
University of California, Irvine;
University of Central Florida;
University of Cincinnati, Ohio;
University of Colorado, Boulder;
University of Connecticut, Storrs;
University of Dayton, Ohio;
University of Delaware, Newark;
University of Detroit, Detroit;
University of Florida, Gainesville;
University of Hartford, Hartford;
University of Hawaii, Manoa;
University of Houston, Houston, Texas;
University of Idaho, Moscow;
University of Illinois at Urbana-Champaign;
University of Iowa, Iowa City;
University of Louisville, Louisville;
University of Maine, Orono;
University of Maryland, College Park;
University of Mass, Lowell;
University of Massachusetts, Amherst;
University of Miami, Coral Gables;
University of Michigan, Ann Arbor;
University of Minnesota, Minneapolis;
University of Mississippi, Mississippi;
University of Missouri-Columbia, Columbia;
University of Missouri-Rolla, Rolla;
University of Nebraska-Lincoln;
University of Nevada, Reno;
University of New Hampshire, Durham;
University of New Haven, West Haven;
University of New Mexic, Albuquerque;
University of North Carolina, Charlotte;
University of North Dakota, Grand Forks;
University of Notre Dame, Notre Dame;
University of Oklahoma, Norman;

University of Pacific, Stockton;
 University of Pennsylvania, Philadelphia;
 University of Pittsburgh, Pittsburgh;
 University of Portland, Portland;
 University of Puerto-Rico, Mayaguez;
 University of Santa Clara, Santa Clara;
 University of South Carolina, Columbia;
 University of South Florida, Tampa;
 University of South Western Louisiana, Lafayette;
 University of Southern California, Los Angeles;
 University of Tennessee, Knoxville;
 University of Texas, Arlington;
 University of Texas, Austin;
 University of Texas, El Paso;
 University of Texas, San Antonio;
 University of The District of Columbia;
 University of Toledo, Ohio;
 University of Vermont, Burlington;
 University of Virginia, Charlottesville;
 University of Washington, Seattle;
 University of Wisconsin-Madison, Madison;
 University of Wisconsin, Milwaukee;
 University of Wisconsin, Platteville;
 University of Wyoming, Laramie;
 Utah State University, Logan;
 Valparaiso University, Valparaiso;
 Villanova University, Villanova;
 Virginia Military Institute, Lexington;
 Virginia Polytechnic Institute and State University, Blacksburg;
 Washington State University, Pullman;
 Washington University, St. Louis;
 West Virginia University, Morgantown;
 Widener University;
 Worcester Polytechnic Institute, Worcester;
 Youngstown State University, Youngstown

12. Degree in Coastal and Oceanographics Engineering : University of Florida, Gainesville
13. Degree in Communication Engineering : University of Illinois, Chicago
14. Degree in Computer and Information Science Engineering : University of Florida, Gainesville;
 University of Illinois, Chicago
15. Degree in Computer and Systems Engineering : Arizona State University, Tempe;
 Rensselaer Polytechnic Institute, Troy
16. Degree in Computer Engineering : Boston University, Boston;
 Florida Institute of Technology, Melbourne;
 Iowa State University, Ames;
 Northern Arizona University, Flagstaff;
 Oakland University, Rochester;
 Purdue University, West Lafayette;
 Southeastern Massachusetts University, North Dartmouth;
 University of California, Berkeley;
 University of Central Florida;
 University of Illinois, Urbana-Champaign;
 University of Michigan, Ann Arbor;
 University of Missouri-Columbia, Columbia;
 University of New Mexico, Albuquerque;
 University of Pacific, Stockton
17. Degree in Computer Science Engineering : Massachusetts Institute of Technology, Cambridge;
 Universities of Massachusetts, Amherst;
 University of Colorado, Boulder;
 University of Connecticut, Storrs;
 University of Texas, Arlington;

18. Degree in Electrical
Engineering

Washington University, St.Louis
: Airforce Institute of Technology, Wright Patterson Air Force Base;
Arizona State University, Tempe;
Auburn University, Auburn;
Bradley University, Peoria, Illinois;
Brigham Young University, Provo, Utah;
Brown University, Providence;
Bucknell University, Lewisburg;
California Polytechnic State University, San Luis, Obisho;
California State Polytechnic University, Pomona;
California State University, Chico;
California State University, Long Beach;
California State University, Los Angeles;
California State University, Sacramento;
Carnegie-Mellon University, Pittsburgh;
Case Western Reserve University, Cleveland, Ohio;
Catholic University of America, Washington D.C.;
Christian Brothers College, Memphis;
City College of the City University of New York, New York;
Clarkson University, New York;
Clemson University, Clemson;
Cleveland State University, Ohio;
Colorado State University, Fort Collins;
Columbia University, New York;
Cornell University, Ithaca, New York;
Drezel University, Philadelphia
Duke University, Durham;
Fairleigh Dickinson University, Teaneck Campus;
Florida Institute of Technology, Melbourne;
Gannon University, Erie;
General Motor Institute(GMI) Engineering and Management Institute, Flint, Michigan;
George Washington University, Washington D.C.;
Georgia Institute of Technology, Atlanta;
Howard University, Washington D.C.;
Illinois Institute of Technology, Chicago;
Indiana University-Purdue University, Indianapolis;
Iowa State University, Ames;
John Hopkins University, G.W.C. Whiting School of Engineering;
Lamar University, Beaumont;
Lawrence Institute of Technology , Southfield;
Le Tourneau College, Longview, Texas;
Lehigh University, Bethlehem;
Louisiana State University;
Louisiana Technology University, Ruston;
Loyola Marymount University, Los Angeles;
Manhattan College, Riverdale;
Marquette University, Milwaukee;
Massachusetts Institute of Technology, Cambridge;
Memphis State University, Memphis;
Merrimack College, Naval Post Graduate School, Monterey, North Andover;
Michigan State University, East Lansing;
Michigan Technological University, Houston;
Milwaukee School of Engineering, Milwaukee;
Mississippi State University, Mississippi State;
Montana State University, Bozeman;
Morgan State University;
New Jersey Institute of Technology, Newark;
New Mexico State University, Las Cruces;
North Carolina Agriculture and Technical State University, Greensboro;
North Carolina State University, Raleigh;
North Dakota State University, Fargo;
Northeastern University of College of Engineering, Boston;
Northern Arizona University, Flagstaff;
Northwestern University, Evanston;
Norwich University, Northfield;
Oakland University, Rochester;
Ohio Northern University, Ada;

Ohio State University, Columbus;
Ohio University, Athens;
Oklahoma State University, Stillwater;
Old Dominion University, Norfolk;
Oregon State University, Corvallis;
Pennsylvania State University, University Park;
Polytechnic Institute of New York, Brooklyn;
Portland State University, Portland;
Prairie View A&M University, Prairie View;
Princeton University, Princeton;
Purdue University, Calumet, Hammond;
Purdue University, West Lafayette;
Rice University, Houston;
Rochester Institute of Technology, Rochester;
Rose-Hulman Institute of Technology, Terra Haute;
San Diego State University, San Diego;
San Jose State University, San Jose;
Seattle University, Seattle;
South Dakota School of Mines and Technology, Rapid City;
South Dakota State University, Brookings;
Southern Illinois University, Carbondale;
Southern Illinois University, Edwardsville;
Southern Methodist University, Dallas, Texas;
Southern University and Agriculture and Mechanical College, Baton Rouge;
Stanford University, Stanford;
State University, New York, Stony Brook;
State University of New York, Buffalo;
State University of New York, Maritime College, Ft. Schuyler;
Stevens Institute of Technology;
Syracuse University, Syracuse;
Temple University;
Tennessee State University, Nashville;
Tennessee Technological University, Cookeville;
Texas A&I University, Kingsville;
Texas A&M University, College Station;
Texas Technology University, Lubbock;
The Citadel Charleston;
The Cooper Union, New York;
The State University of New Jersey, Rutgers, New Brunswick;
Tri State University, Angola;
Tufts University, Medford;
Tulane University, New Orleans;
Tuskegee Institute, Alabama;
Union College, Schenectady;
United State Air Force Academy, USAF Academy;
United State Coast Guard Academy, New London;
United State Military Academy;
United State Naval Academy, Annapolis;
Uniter States International University, San Diego;
University of Akron, Akron;
University of Alabama, Huntsville;
University of Alabama, Tuscaloosa;
University of Alaska, Fairbanks;
University of Arizona, Tuscon;
University of Arkansas, Fayetteville;
University of Bridgeport, Bridgeport;
University of California, Berkeley;
University of California, Davis;
University of California, Irvine;
University of California, Santa Barbara;
University of Central Florida;
University of Cincinnati, Ohio;
University of Colorado, Boulder;
University of Connecticut, Storrs;
University of Dayton, Ohio;
University of Delaware, Newark;
University of Detroit, Detroit;

University of Evansville, Evansville;
University of Florida, Gainesville;
University of Hartford, Hartford;
University of Hawaii, Manoa;
University of Houston, Houston Texas;
University of Idaho, Moscow;
University of Illinois at Urbana-Champaign;
University of Illinois, Chicago;
University of Iowa, Iowa City;
University of Louisville, Louisville;
University of Maine, Orono;
University of Maryland, College Park;
University of Mass, Lowell;
University of Massachusetts, Amherst;
University of Miami, Coral Gables;
University of Michigan, Ann Arbor;
University of Michigan, Dearborn;
University of Minnesota, Minneapolis;
University of Mississippi, Mississippi;
University of Missouri-Columbia, Columbia;
University of Missouri-Rolla, Rolla;
University of Nebraska, Lincoln;
University of Nevada, Reno;
University of New Hampshire, Durham;
University of New Haven, West Haven;
University of New Mexico, Albuquerque;
University of New Orleans, New Orleans;
University of North Carolina, Charlotte;
University of North Dakota, Grand Forks;
University of Notre Dame, Notre Dame;
University of Oklahoma, Norman;
University of Pacific, Stockton;
University of Pennsylvania, Philadelphia;
University of Pittsburgh, Pittsburgh;
University of Portland, Portland;
University of Puerto-Rico, Mayaguez;
University of Rochester, Rochester;
University of Santa Clara, Santa Clara;
University of South Alabama, Mobile;
University of South Carolina, Columbia;
University of South Florida, Tampa;
University of South Western Louisiana, Lafayette;
University of Southern California, Los Angeles;
University of Tennessee, Knoxville;
University of Texas, Arlington;
University of Texas, Austin;
University of Texas, El Paso;
University of Texas, San Antonio;
University of The District of Columbia;
University of Toledo, Ohio;
University of Vermont, Burlington;
University of Virginia, Charlottesville;
University of Washington, Seattle;
University of Wisconsin-Madison, Madison;
University of Wisconsin-Milwaukee;
University of Wyoming, Laramie;
Utah State University, Logan;
Valparaiso University, Valparaiso;
Villanova University, Villanova;
Virginia Military Institute, Lexington;
Virginia Polytechnic Institute and State University, Blacksburg;
Washington State University, Pullman;
Washington University, St. Louis;
West Virginia University, Morgantown;
Western New England College, Springfield;
Wichita State University, Wichita;
Widener University;

- Worcester Polytechnic Institute, Worcester;
Yale University, New Haven;
Youngstown State University, Youngstown
19. Degree in Electrical Science and System Engineering : Southern Illinois University, Carbondale
20. Degree in Electrical Science Engineering : Massachusetts Institute of Technology, Cambridge
21. Degree in Electromagnetic and Electronic Engineering : University of Illinois, Chicago
22. Degree in Electronic Engineering : California Polytechnic State University, San Luis, Obispo;
California State Polytechnic, Pomona;
California State University, Chico;
California State University, Sacramento;
Monmouth College, West Long Branch;
Northrop University, Inglewood;
Oregon State University, Corvallis
23. Degree in Environmental Engineering : California Polytechnic State University, San Luis, Obispo;
Colorado State University, Fort Collins;
Cornell University, Ithaca, New York;
Georgia Institute of Technology, Atlanta;
Manhattan College, Riverdale;
Montana College of Mineral Science and Technology, Butte;
Northwestern University, Evanston;
Pennsylvania State University, University Park;
University of Central Florida;
University of Florida, Gainesville;
University of Massachusetts, Amherst;
University of North Carolina, Chapel Hill;
University of North Carolina, Charlotte;
University of Wisconsin-Madison, Madison;
VanDerbilt University, Nashville
24. Degree in Environmental Health Engineering : University of Texas, Austin
25. Degree in Environmental Science Engineering : California Institute of Technology, Pasadena;
Clemson University, Clemson;
University of Michigan, Ann Arbor
26. Degree in Environmental Systems Engineering : Clemson University, Clemson
27. Degree in Fluid and Thermal Science Engineering : Case Western Reserve University, Cleveland, Ohio
28. Degree in Fluid Engineering : University of Illinois, Chicago;
University of South Florida, Tampa
29. Degree in Forestry Engineering : University of Maine, Otono
30. Degree in Industrial and Operation Research Engineering : Cornell University, Ithaca, New York;
Syracuse University, Syracuse;
University of Massachusetts, Amherst;
University of Michigan, Ann Arbor;
Virginia Polytechnic Institute and State University, Blacksburgs
31. Degree in Industrial and System Engineering : Ohio State University, Columbus;
Ohio University, Athens;
San Jose State University, San Jose;
University of Florida, Gainesville;
University of Michigan, Dearborn;
University of Southern California, Los Angeles
32. Degree in Industrial Engineering : Arizona State University, Tempe;
Auburn University, Auburn;
California Polytechnic State University, San Luis, Obispo;
California State Polytechnic, Pomona;
California State University, Fresno;

Cleveland State University, Ohio;
 Columbia University, New York;
 Fairleigh Dickinson University, Teaneck Campus;
 Florida A&M University;
 General Motor Institute(GMI) Engineering and Management Institute, Flint, Michigan;
 Georgia Institute of Technology, Atlanta;
 Iowa State University, Ames;
 Lehigh University, Bethlehem;
 Louisiana State University;
 Louisiana Technology University, Ruston;
 Mississippi State University, Mississippi State;
 Montana State University, Bozeman;
 New Jersey Institute of Technology, Newark;
 New Mexico State University, Las Cruces;
 North Carolina Agricultural and Technical State University, Greensboro;
 North Carolina State University, Raleigh;
 North Dakota State University, Fargo;
 Northeastern University, College of Engineering, Boston;
 Northwestern University, Evanston;
 Oklahoma State University, Stillwater;
 Oregon State University, Corvallis;
 Polytechnic Institute of New York, Brooklyn;
 Purdue University, West Lafayette;
 Rochester Institute of Technology, Rochester;
 Stanford University, Stanford;
 Tennessee Technological University, Cookeville;
 Texas A&M University, College Station;
 Texas Technology University, Lubbock;
 The State University of New Jersey, Rutgers, New Brunswick;
 University of Alabama, Tuscaloosa;
 University of Alaska, Fairbanks;
 University of Arizona, Tuscon;
 University of Arkansas, Fayetteville;
 University of California, Berkeley;
 University of Central Florida;
 University of Cincinnati, Ohio;
 University of Houston, Houston, Texas;
 University of Illinois, Chicago;
 University of Illinois, Urbana-Champaign;
 University of Louisville, Louisville;
 University of Miami, Coral Gables;
 University of Missouri-Columbia, Columbia;
 University of Nebraska, Lincoln;
 University of New Haven, West Haven;
 University of Oklahoma, Norman;
 University of Pittsburgh, Pittsburgh;
 University of Puerto Rico, Mayaguez;
 University of South Florida, Tampa;
 University of Tennessee, Knoxville;
 University of Texas, Arlington;
 University of Texas, El Paso;
 University of Toledo, Toledo, Ohio;
 University of Wisconsin-Madison, Madison;
 University of Wisconsin-Milwaukee
 West Virginia University, Morgantown;
 Western Michigan University, Kalamazoo;
 Wichita State University, Wichita

33. Degree in Industrial System Engineering

34. Degree in Manufacturing Engineering

35. Degree in Marine Engineering

○ University of Alabama, Huntsville

○ Boston University, Boston;

North Carolina State University, Raleigh;

North Dakota State University, Fargo;

University of Massachusetts, Amherst;

Utah State University, Logan

State University of New York Maritime College, Ft.Schuyler;

Texas A&M University, Galveston;

United State Coast Guard Academy, New London;
United State Naval Academy, Annapolis;
Webb Institute of Naval Architecture, Glen Cove

36. Degree in Material
Engineering

: Auburn University, Auburn;
Brown University, Providence;
Lehigh University, Bethlehem;
North Carolina State University, Raleigh;
San Jose State University, San Jose;
Stevens Institute of Technology;
University of Michigan, Ann Arbor;
University of North Carolina, Charlotte;
University of South Florida, Tampa;
University of Wisconsin-Milwaukee;
Virginia Polytechnic Institute and State University, Blacksburg

37. Degree in Material Science
Engineering

: Carnegie-Mellon University, Pittsburgh;
Case Western Reserve University, Cleveland, Ohio;
Cornell University, Ithaca, New York;
Massachusetts Institute of Technology, Cambridge;
Michigan Technological University, Houston;
Northwestern University, Evanston;
University of Minnesota, Minneapolis;
University of Pennsylvania, Philadelphia;
Wright State University, Dayton

38. Degree in Mechanical and
Aerospace Engineering

: Syracuse University, Syracuse

39. Degree in Mechanical and
Materials Engineering

: Southern Illinois University, Carbondale
: Arizona State University, Tempe;
Auburn University, Auburn;
Bradley University, Peoria, Illinois;
Brigham Young University, Provo, Utah;
Brown University, Providence;
Bucknell University, Lewisburg;
California Polytechnic State University, San Luis, Obispo;
California State Polytechnic University, Pomona;
California State University, Chico;
California State University, Long Beach;
California State University, Los Angeles;
California State University, Sacramento;
Carnegie-Mellon University, Pittsburgh;
Case Western Reserve University, Cleveland, Ohio;
Catholic University of America, Washington D.C.;
Christian Brothers College, Memphis;
City College of the City University of New York, New York;
Clarkson University, New York;
Clemson University, Clemson;
Cleveland State University, Ohio;
Colorado State University, Fort Collins;
Columbia University, New York;
Cornell University, Ithaca, New York;
Drexel University, Philadelphia;
Duke University, Durham;
Florida Institute of Technology, Melbourne;
George Washington University, Washington D.C.;
Georgia Institute of Technology, Atlanta;
Howard University, Washington D.C.;
Illinois Institute of Technology, Chicago;
Iowa State University, Ames;
Lamar University, Beaumont;
Lehigh University, Bethlehem;
Louisiana State University;
Louisiana Technology University, Ruston;
Loyola Marymount University, Los Angeles;
Manhattan College, Riverdale;
Marquette University, Milwaukee;

40. Degree in Mechanical
Engineering

Massachusetts Institute of Technology, Cambridge;
Memphis State University, Memphis;
Michigan State University, East Lansing;
Michigan Technological University, Houston;
Mississippi State University, Mississippi State;
Montana State University, Bozeman;
Morgan State University;
New Jersey Institute of Technology, Newark;
New Mexico State University, Las Cruces;
North Carolina State University, Raleigh;
North Dakota State University, Fargo;
Northeastern University, College of Engineering, Boston;
Northern Arizona University, Flagstaff;
Northwestern University, Evanston;
Norwich University, Northfield;
Ohio Northern University, Ada;
Ohio State University, Columbus;
Ohio University, Athens;
Oklahoma State University, Stillwater;
Old Dominion University, Norfolk;
Oregon State University, Corvallis;
Pennsylvania State University, University Park;
Polytechnic Institute of New York, Brooklyn;
Portland State University, Portland;
Prairie View A&M University, Prairie View;
Princeton University, Princeton;
Purdue University, West Lafayette;
Rice University, Houston;
Rose-Hulman Institute of Technology, Terra Haute;
San Diego State University, San Diego;
San Jose State University, San Jose;
South Dakota School of Mines and Technology, Rapid City;
South Dakota State University, Brookings;
Southern Illinois University, Edwardsville;
Southern Methodist University, Dallas, Texas;
Southern University and Agriculture and Mechanical College, Baton Rouge;
Stanford University, Stanford;
State University of New York, Buffalo;
Stevens Institute of Technology;
Syracuse University, Syracuse;
Temple University;
Tennessee State University, Nashville;
Tennessee Technological University, Cookeville;
Texas A&I University, Kingsville;
Texas A&M University, College Station;
Texas Technology University, Lubbock;
The Cooper Union, New York;
The State University of New Jersey, Rutgers, New Brunswick;
Tri State University, Angola;
Tufts University, Medford;
Tulane University, New Orleans;
Union College, Schenectady;
United State Air Force Academy, USAF Academy;
United State Military Academy;
University of Akron, Akron;
University of Alabama, Tuscaloosa;
University of Alaska, Fairbanks;
University of Arizona, Tucson;
University of Arkansas, Fayetteville;
University of California, Berkeley;
University of California, Davis;
University of California, Irvine;
University of Central Florida;
University of Cincinnati, Ohio;
University of Colorado, Boulder;
University of Connecticut, Storrs;
University of Dayton, Ohio;

University of Delaware, Newark;
 University of Detroit, Detroit;
 University of Florida, Gainesville;
 University of Hartford, Hartford;
 University of Hawaii, Manoa;
 University of Houston, Houston, Texas;
 University of Idaho, Moscow;
 University of Illinois at Urbana-Champaign;
 University of Iowa, Iowa City;
 University of Louisville, Louisville;
 University of Maine, Orono;
 University of Maryland, College Park;
 University of Mass, Lowell;
 University of Massachusetts, Amherst;
 University of Miami, Coral Gables;
 University of Michigan, Ann Arbor;
 University of Minnesota, Minneapolis;
 University of Mississippi, Mississippi;
 University of Missouri-Columbia, Columbia;
 University of Missouri-Rolla, Rolla;
 University of Nebraska-Lincoln;
 University of Nevada, Reno;
 University of New Hampshire, Durham;
 University of New Haven, West Haven;
 University of New Mexico, Albuquerque;
 University of North Carolina, Charlotte;
 University of North Dakota, Grand Forks;
 University of Notre Dame, Notre Dame;
 University of Oklahoma, Norman;
 University of Pennsylvania, Philadelphia;
 University of Pittsburgh, Pittsburgh;
 University of Portland, Portland;
 University of Puerto-Rico, Mayaguez;
 University of Santa Clara, Santa Clara;
 University of South Carolina, Columbia;
 University of South Florida, Tampa;
 University of South Western Louisiana, Lafayette;
 University of Southern California, Los Angeles;
 University of Tennessee, Knoxville;
 University of Texas, Arlington;
 University of Texas, Austin;
 University of Texas, El Paso;
 University of Texas, San Antonio;
 University of Toledo, Ohio;
 University of Vermont, Burlington;
 University of Virginia, Charlottesville;
 University of Washington, Seattle;
 University of Wisconsin-Madison, Madison;
 University of Wisconsin-Milwaukee;
 University of Wyoming, Laramie;
 Utah State University, Logan;
 Valparaiso University, Valparaiso;
 Villanova University, Villanova;
 Virginia Military Institute, Lexington;
 Virginia Polytechnic Institute and State University, Blacksburg;
 Washington State University, Pullman;
 Washington University, St. Louis;
 West Virginia University, Morgantown;
 WiDener University;
 Worcester Polytechnic Institute, Worcester;
 Wright Patterson Air Force Base;
 Youngstown State University, Youngstown

41. Degree in Metallurgical
Engineering

California Polytechnic State University, San Luis, Obispo;
 Carnegie-Mellon University, Pittsburgh;
 Case Western Reserve University, Cleveland, Ohio;
 Colorado School of Mines, Golden;

- Columbia University, New York;
 Georgia Institute of Technology, Atlanta;
 Illinois Institute of Technology, Chicago;
 Iowa State University, Ames;
 Lehigh University, Bethlehem;
 Montana College of Mineral Science and Technology, Butte;
 New Mexico Institute of Mining and Technology, Socorro;
 Ohio State University, Columbus;
 Pennsylvania State University, University Park;
 Polytechnic Institute of New York, Brooklyn;
 Purdue University, West Lafayette;
 South Dakota School of Mines and Technology, Rapid City;
 University of Alabama, Tuscaloosa;
 University of Arizona, Tucson;
 University of Cincinnati, Ohio;
 University of Florida, Gainesville;
 University of Idaho, Moscow;
 University of Illinois, Chicago;
 University of Illinois, Urbana-Champaign;
 University of Michigan, Ann Arbor;
 University of Missouri-Rolla, Rolla;
 University of Nevada, Reno;
 University of Notre Dame, Notre Dame;
 University of Oklahoma, Norman;
 University of Pittsburgh, Pittsburgh;
 University of Tennessee, Knoxville;
 University of Texas, El Paso;
 University of Washington, Seattle;
 University of Wisconsin-Madison, Madison;
 Washington State University, Pullman
42. Degree in Mineral Engineering: California Institute of Technology, Pasadena;
 Michigan Technological University, Houston;
 Montana College of Mineral Science and Technology, Butte;
 Montana College of Mineral Science and Technology, Butte;
 Texas A&M University, College Station;
 University of Alabama, Tuscaloosa;
 University of Minnesota, Minneapolis;
 University of Minnesota, Minneapolis
43. Degree in Mining Engineering : Colorado School of Mines, Golden;
 Columbia University, New York;
 Montana College of Mineral Science and Technology, Butte;
 New Mexico Institute of Mining and Technology, Socorro;
 Pennsylvania State University, University Park;
 South Dakota School of Mines and Technology, Rapid City;
 University of Alaska, Fairbanks;
 University of Arizona, Tucson;
 University of Idaho, Moscow;
 University of Missouri-Rolla, Rolla;
 University of Nevada, Reno;
 University of Wisconsin, Platteville;
 University of Wisconsin-Madison, Madison;
 Virginia Polytechnic Institute and State University, Blacksburg;
 West Virginia University, Morgantown
44. Degree in Natural Gas
 Engineering : Texas A&I University, Kingsville
45. Degree in Naval Architecture
 Engineering : Massachusetts Institute of Technology, Cambridge;
 State University of New York Maritime College, Ft. Schuyler;
 United State Naval Academy, Annapolis;
 University of California, Berkeley;
 University of Michigan, Ann Arbor;
 Webb Institute of Naval Architecture, Glen Cove
46. Degree in Nuclear Engineering : Air Force Institute of Technology, Wright-Patterson Air Force Base;
 Georgia Institute of Technology, Atlanta;
 Iowa State University, Ames;
 Massachusetts Institute of Technology, Cambridge;
 Mississippi State University, Mississippi State;

- North Carolina State University, Raleigh;
 Northwestern University, Evanston;
 Oregon State University, Corvallis;
 Polytechnic Institute of New York, Brooklyn;
 Purdue University, West Lafayette;
 Texas A&M University, College Station;
 University of Arizona, Tuscon;
 University of California, Berkeley;
 University of California, Santa Barbara;
 University of Cincinnati, Ohio;
 University of Florida, Gainesville;
 University of Illinois, Urbana-Champaign;
 University of Maryland, College Park;
 University of Michigan, Ann Arbor;
 University of Missouri-Rolla, Rolla;
 University of New Mexico, Albuquerque;
 University of Oklahoma, Norman;
 University of Tennessee, Knoxville;
 University of Virginia, Charlottesville;
 University of Wisconsin-Madison, Madison
47. Degree in Ocean Engineering : California State University, Long Beach;
 Florida Atlantic University, Boca Raton;
 Florida Institute of Technology, Melbourne;
 Massachusetts Institute of Technology, Cambridge;
 Texas A&M University, College Station;
 United State Coast Guard Academy, New London;
 United State Naval Academy, Annapolis;
 University of Hawaii, Manoa
48. Degree in Petroleum Engineering : Colorado School of Mines, Golden;
 Louisiana State University;
 Louisiana Technology University, Ruston;
 Marietta College, Marietta;
 Mississippi State University, Mississippi State;
 Montana College of Mineral Science and Technology, Butte;
 New Mexico Institute of Mining and Technology, Socorro;
 Pennsylvania State University, University Park;
 Stanford University, Stanford;
 Texas A&M University, College Station;
 Texas Technology University, Lubbock;
 University of Missouri-Rolla, Rolla;
 University of Oklahoma, Norman;
 University of Southern California, Los Angeles;
 University of Southwestern Louisiana, Lafayette;
 University of Texas, Austin;
 University of Tulsa, Oklahoma;
 University of Wyoming, Laramie;
 West Virginia University, Morgantown
49. Degree in Petroleum Refining Engineering : Colorado School of Mines, Golden
50. Degree in Physical Engineering : Massachusetts Institute of Technology, Cambridge
51. Degree in Polymer Science Engineering : Case Western Reserve University, Cleveland, Ohio
52. Degree in Structural Engineering : University of California, San Diego;
 University of Illinois, Chicago;
 University of South Florida, Tampa
53. Degree in System Analyst Engineering : George Washington University, Washington D.C.
54. Degree in Systems and Control Engineering : University of California, San Diego;
 Case Western Reserve University, Cleveland, Ohio
55. Degree in System Engineering : Air Force Institute of Technology, Wright-Patterson Air Force Base;
 Arizona State University, Tempe;
 Boston University, Boston;
 Oakland University, Rochester;

- United State Naval Academy, Annapolis;
University of Arizona, Tucson;
University of Virginia, Charlottesville;
Wright State University, Dayton
56. Degree in System Science Engineering : Washington University, St.Louis
57. Degree in Textile Engineering : Georgia Institute of Technology, Atlanta
58. Degree in Thermal and Environmental Engineering : Southern Illinois University, Carbondale
59. Degree in Thermo-Mechanical and Energy Conversation Engineering : University of Illinois, Chicago
60. Degree in Welding Engineering : Ohio State University, Columbus

FISHERY

Canada

- Bachelor of Science (Fishery) : Laval University

Indonesia

1. Doctorate : Insitut Pertanian Bogor Fakultas Perikanan
2. Bachelor in Biology and Refrigeration Engineering : Institut Teknologi Bandung;
3. Bachelor in Fishery : Universiti Gadjja Mada (Fakulti Biology)

Japan

1. Bachelor of Fishery Science : Tokyo University of Fishery
2. Bachelor of Science (Fishery) : Kagoshima University;
University of Nagasaki;
University of Tokyo

Malaysia

1. Diploma in Fishery : Universiti Pertanian Malaysia
2. Bachelor of Science (Fishery) : Universiti Pertanian Malaysia

United States of America

- Bachelor of Science (Fishery) : Alabama Polytechnic, Auburn, Alabama;
Colorado State University;
Cornell University, New York;
Humbolt State University;
Louisiana State University;
Miami University;
Michigan State University;
Oklahoma State University;
Oregon State University;
RhoDe Island University, Kingston;
Stanford University, Atto, California;
University of California;
University of Florida;
University of Louisiana;
University of Michigan;
University of Minnesota, Minneapolis;
University of Oklahoma;
University of Texas;
University of Washington State;
University of Wisconsin, Madison;
Utah State Agricultural College

FOOD SCIENCE

Australia

1. Certificate in Dietetics : Emily McPherson College, Merbourne, Australia
2. Diploma in Dietetic : Emily McPherson College, Merbourne, Australia;
Western Australia University
3. Diploma in Institutional Management : Emily McPherson College, Merbourne, Australia
4. Diploma in Nutrition and Food Science : Deakin University Geelong, Australia;
Emily McPherson College, Merbourne, Australia
5. Bachelor of Applied Science(Nutrition) : University of Deakins, Australia
6. Bachelor of Science(Food Science) : University of New South Wales

Malaysia

1. Diploma in Food Technology : Institut Teknologi MARA

2. Bachelor of Food Science and Technology
New Zealand
 B.Technology (Food Technology)
United Kingdom
 1. Dietetic Diploma
2. Integrated Catering and Dietetics Diploma
- : Universiti Pertanian Malaysia
 : Massey University
 : Glasgow College of Domestic Science;
 Leeds College of Technology;
 North London Polytechnic;
 Queen Elizabeth College;
 University of London
 : Cardiff College of Food Technology;
 Ealing Technology College;
 Edinburgh College of Domestic Science;
 Glasgow College of Domestic Science;
 Robert Gordon's Institute of Technology, Aberdeen;
 St.Mary's College;
 University of Surrey;
 West of Scotland, College of Domestic Science

FORESTRY

Australia

- Bachelor of Science (Forestry)
- : Australian National University;
 University of Adelaide;
 University of Melbourne;
 University of New England;
 University of New South Wales;
 University of Queensland;
 University of Sydney;
 University of Tasmania;
 University of Western Australia

Canada

- Bachelor of Science (Forestry)
- : Lakehead University;
 University of British Columbia;
 University of New Brunswick;
 University of Toronto

India

- Diploma in Forestry Science
- : Indian Forest College of Dehra Dun

Indonesia

- Bachelor of Science (Forestry)
- : Fakultas Perhutanan Universiti Gadjja Mada

Malaysia

1. Diploma in Forestry
- : Institut Teknologi MARA;
 Universiti Pertanian Malaysia;
 : Universiti Pertanian Malaysia

2. Bachelor of Science (Forestry)

New Zealand

- Bachelor of Science (Forestry)(Hons)
- : University of Canterbury

United Kingdom

- Bachelor of Science (Forestry)(Hons)
- : Imperial Institute;
 University of Aberdeen;
 University of Edinburgh;
 University of Oxford;
 University of Wales

United States of America

- Bachelor of Science (Forestry)
- : Auburn University;
 California Polytechnic State University;
 California State University, Boulder;
 Clemson University;
 Duke University;
 Humboldt State University;
 Iowa State University of Ames;
 Louisiana State University;
 Louisiana Technology University;
 Mcneese State University;
 Michigan State University;
 Michigan Technological University;
 Mississippi State University;
 North Carolina State University;
 Northern Arizona University, Flagstaff;

Ohio State University
 Oklahoma State University;
 Oregon State University;
 Pennsylvania State University;
 Purdue University, Lafayette;
 Rutgers University;
 Southern Illinois University, Carbondale;
 State University of New York;
 Stephen F. Austin State University;
 Texas A&M University;
 University of Arizona, Tucson;
 University of Arkansas at Monticello;
 University of California, Berkeley;
 University of Florida, Gainesville;
 University of Georgia, Athens;
 University of Idaho, Moscow;
 University of Illinois, Urbana;
 University of Kentucky, Lexington;
 University of Maine;
 University of Massachusetts;
 University of Michigan;
 University of Minnesota;
 University of Missouri;
 University of Montana;
 University of Nevada;
 University of New Hampshire;
 University of Tennessee;
 University of Vermont;
 University of Washington;
 University of Wisconsin, Madison;
 University of Wisconsin, Steven Point;
 Utah State University;
 Virginia Polytechnic Institute and State University;
 Washington State University;
 West Virginia University;
 Yale University, New Haven, Connecticut

GENERAL SCIENCE

Australia

1. B.Sc. Pass/Hons

: Australian National University;
 Deakin University;
 Flinders University of South Australia;
 Griffith University;
 James Cook University of North Queensland;
 La Trobe University;
 Macquaries University;
 Monash University;
 Murdoch University;
 University of Adelaide;
 University of Melbourne;
 University of New Castle;
 University of New England;
 University of New South Wales;
 University of Queensland;
 University of Sydney;
 University of Tasmania;
 University of Western Australian;
 Wollongong University
 : Royal Melbourne Institute of Technology

2. Associateship: B.Sc

Belgium

1. Master of Science

2. Ph.D. Science

Canada

B.Sc. Pass/Hons

: The State University of Ghent
 : The State University of Ghent

: Acadia University;
 Bishop's University;

Brandon University;
Brock University;
Carleton University;
Lakehead University;
Laurentian University;
McMaster University;
Memorial University, Newfoundland;
Ottawa University;
Queens University;
Simon Fraser University;
Trent University;
University McGill;
University of Alberta;
University of British Columbia;
University of Calgary;
University of Concordia;
University of Dalhousie;
University of Guelph;
University of Laval;
University of Manitoba;
University of Montreal;
University of New Brunswick;
University of Saskatchewan;
University of Toronto;
University of Victoria;
University of Waterloo;
University of Western Ontario;
University of Windsor;
University of Winnipeg;
Victoria University;
York University

France

Doctorate

Indonesia

Bachelor

: Semna University

: Institut Teknologi Bandung;
Universiti Gadjah Mada;
Universiti Indonesia

Japan

Bachelor of Science

: Danki Tsushin;
Tokyo Kogyo (Tokyo Institute of Technology);
Tokyo Suisan;
University Kagoshima
University of Hiroshima;
University of Hokkaido;
University of Hototsubashi;
University of Keio;
University of Kobe;
University of Kyoto;
University of Kyushu;
University of Meiji;
University of Nagasaki;
University of Nagoya;
University of Osaka;
University of Tokyo;
University of Tsukuba;
University of Waseda;
University Tohoku;
Yokohama Kokuritsu

Malaysia

1. Diploma in Science

: Institut Teknologi MARA;
Universiti Pertanian Malaysia;
Universiti Teknologi Malaysia

2. Bachelor of General Science(Hons)

: Universiti Kebangsaan Malaysia;
Universiti Malaya;
Universiti Pertanian;
Universiti Sains Malaysia

New Zealand
B.Sc.Pass/Hons

Singapore

B.Sc.Pass/Hons

Thailand

Master of Science

United Kingdom

B.Sc.Pass/Hons

: Massey University;
University of Auckland;
University of Canterbury;
University of Otago;
Victoria University of Wellington;
Waikato University

: University of Singapore

: Asian Institute of Technology

: Bath University of Technology;
Brunel University;
City University;
Heriot-Watt University;
Loughborough University of Technology;
New University of Ulster;
Queen's University of Belfast;
St David's University College, Lampeter;
University College of North Wales and Monmouthshire;
University College of Wales, Aberystwith;
University of Aberdeen;
University of Aston;
University of Birmingham;
University of Bradford;
University of Bristol;
University of Cambridge;
University of College of North Wales, Bangor;
University of College of Swansea;
University of Dundee;
University of Durham;
University of East Anglia;
University of Essex;
University of Exeter;
University of Glasgow;
University of Hull;
University of Keele;
University of Kent, Canterbury;
University of Lancaster;
University of Leeds;
University of Leicester;
University of Liverpool;
University of London;
University of Manchester;
University of Nottingham;
University of Oxford;
University of Reading;
University of Salford;
University of Sheffield;
University of Southampton;
University of St Andrews;
University of Stirling;
University of Strathclyde;
University of Surrey;
University of Sussex;
University of Wales, Institute of Science and Technology;
University of Wales;
University of Warwick;
University of York

LAND SURVEYING

Australia

1. B.Applied Sc.(Land Surveying)

2. B.Applied Sc.in Surveying

: Royal Melbourne Institute of Technology;
Western Australia Institute of Technology
: Queensland University of Technology;

3. Bachelor of Surveying

South Australia Institute of Technology
: Flinders University of South Australia;
University of Adelaide;
University of Melbourne;
University of New South Wales;
University of Queensland;
University of Tasmania

Canada

B.Sc. in Engineering (Surveying)

: University of New Brunswick

Malaysia

1. Certificate of Competency

: Lembaga Juruukur Tanah Semenanjung Malaysia

2. Diploma in Land Surveying

: Institut Teknologi MARA;

Politeknik Ungku Omar;
Universiti Teknologi Malaysia

: Institut Teknologi MARA

: Universiti Teknologi Malaysia

: Institute of Surveyors Malaysia (General Practise Section)

3. Advanced Diploma in Land Surveying

4. Degree in Land Surveying

5. Membership

United Kingdom

1. Diploma in Surveying

: University of London

2. B.Sc.(CNA) in Land Surveying and Mapping

: North East London Polytechnic

3. B.Sc. in Surveying Science

: University of Newcastle Upon Tyne

4. B.Sc.(Hons) in Topographic Science

: University of Glasgow

5. Corporate Member

: Royal Institute of Chartered Surveyors (R.I.C.S.) Land Surveying Division
United Kingdom

LANDSCAPE ARCHITECTURE

Malaysia

Diploma in Landscape Design

: Institute Teknologi Malaysia;

University of Teknologi, Malaysia

United States of America

Bachelor of Landscape Architecture

: Iowa State University of Ames;

Louisiana State University, Baton Rouge;

State University of New York, Syracuse;

Texas A&M University;

University of Arkansas, Fayetteville

LAW

Australia

Bachelor of Law(LLB)

: Macquarie University;

The Australian National University;

University of Adelaide;

University of Melbourne;

University of Monash;

University of New South Wales;

University of Queensland;

University of Sydney;

University of Tasmania;

University of Western Australia

Ireland

Barrister at Law

: King's Inn

Malaysia

1. Degree in Law (LLB)

: Universiti Malaya;

Universiti Islam Antarabangsa

2. Advanced Diploma in Law

: Institut Teknologi MARA;

3. Diploma in Law

: Institut Teknologi MARA

New Zealand

Bachelor of Law(LLB)

: University of Auckland;

University of Canterbury;

University of Otago;

Victoria University of Wellington

Singapore

Bachelor of Law(LLB)

: National University of Singapore

United Kingdom

Barrister at Law

: Gray's Inn;

Inner Temple;

LIBRARY SCIENCE

Australia

1. Grad.Diploma in Librarianship : Canberra Collg of Advanced Education, School of Liberal Studies
2. Graduate Diploma in Library and Information Studies : Western Australian Institute of Technology, Dept. of Library
3. Grad.Diploma in Library Studies : South Australian Institute of Technology, School of Librarianship
4. Grad.Diploma in Management Librarianship : University of New South Wales, School of Librarianship
5. Bachelor of Art in Librarianship : Canberra College of Advanced Education, School of Liberal Studies
6. B.A. in Library Studies : South Australian Institute of Technology, School of Librarianship
7. B.Soc.Sc in Librarianship : Royal Melbourne Institute of Technology, Dept. of Librarianship
8. Associateship of Library Studies : Western Australian Institute of Technology, Dept. of Library

Canada

1. Master of Library Science : Dalhousie University School of Library Service, Halifax;
McGill University, Graduate School of Library and Information Studies, Montreal, Quebec;
University of Alberta, Faculty of Library Science, Edmonton;
University of British Columbia, School of Library, Archival and Information Science, Vancouver;
University of Toronto, Faculty of Library Science, Toronto;
University of Western Ontario, School of Library and Information Science, Ontario
2. Maitrise en bibliothéconomie et sciences de l'information : Université de Montreal Ecole de bibliothéconomics et des sciences de l'information, Montreal, Quebec

Malaysia

1. Diploma in Library Science : Institut Teknologi MARA
2. Postgraduate Diploma in Library Science : Institut Teknologi MARA

New Zealand

1. Diploma of Librarianship : New Zealand Library School, National Library of New Zealand, Wellington

United Kingdom

1. Diploma in Librarianship : University College of London, School of Library, Archive and Information Studies
2. Diploma in Library and Information Studies : The Queen's University of Belfast, Department of Library and Information Studies;
University College of London, School of Library, Archive and Information Studies
3. B.A.(Honours) : Leeds Polytechnic, Department of Librarianship, Faculty of Commerce
4. B.A.(Librarianship) : Newcastle Upon Tyne Polytechnic, Department of Librarianship and Information Science;
University of Strathclyde, Department of Librarianship, Faculty of Commerce
5. B.A.Degree in Librarianship (CNAA) : City of Birmingham, Polytechnic Department of Librarianship, Commerce Centre;
Leeds Polytechnic, Department of Librarianship, Faculty of Commerce;
Liverpool Polytechnic, Department of Library Studies;
The Polytechnic of North London, School of Librarianship
6. B.A.Degree in Librarianship with Modern Language Studies : Brighton Polytechnic, School of Librarianship, Department of General and Social Studies
7. B.A. in Library Studies(CNAA) : Manchester Polytechnic Department of Librarianship
8. B.Sc (Information Science) : Leeds Polytechnic, Department of Librarianship, Faculty of Commerce
9. B.Sc in Librarianship : Loughbrough University of Technology, Department of Library and Information Studies
10. M.A.(Librarianship) : The University of Sheffield Postgraduate School of Librarianship and Information Science;
University College of London, School of Library, Archive and Information Studies
11. M.Sc. in Information Studies : The University of Sheffield Postgraduate School of Librarianship and Information Science
12. Master of Library Science : College of Librarianship Wales, Aberystwyth;
The Queen's University of Belfast, Department of Library and Information Studies;

13. Joint Honours Degree of Bachelor of Librarianship
(University of Wales)
14. Postgraduate Diploma of Librarianship

University of Strathclyde, Department of Librarianship, Faculty of Commerce

- : College of Librarianship Wales, Aberystwyth
 - : College of Librarianship Wales, Aberystwyth;
 - Ealing Technical College, Department of Librarianship;
 - Liverpool Polytechnic, Department of Library Studies;
 - Loughborough University of Technology, Department of Library and Information Studies;
 - Manchester Polytechnic Department of Librarianship;
 - Robert Gordon's Institute of Department of Librarianship, Aberdeen;
 - University of Strathclyde, Department of Librarianship, Faculty of Commerce
15. Associateship Library Association
- : Brighton Polytechnic, School of Librarianship, Department of General and Social Studies;
 - City of Birmingham, Polytechnic, Department of Librarianship, Commerce Centre;
 - Ealing Technical College, Department of Librarianship;
 - Manchester Polytechnic Department of Librarianship;
 - Newcastle Upon Tyne Polytechnic, Department of Librarianship and Information Science;
 - Robert Gordon's Institute of Technology, Department of Librarianship, Aberdeen;
 - The Polytechnic of North London School of Librarianship

United States of America

1. Master of Arts

- : Emory University, Division of Library and Information Management, Atlanta, Georgia;
- Florida State University, School of Library and Information Studies, Tallahassee;
- Texas Women's University, School of Library and Information Studies, Denton, Texas;
- University of Chicago, Graduate Library School, Chicago, Illinois;
- University of Iowa, School of Library and Information Science, Iowa City;
- University of Kentucky, College of Library and Information Science, Lexington;
- University of Minnesota Library School, Minneapolis;
- University of Missouri, Columbia School of Library and Information Science, Columbia;
- Northern Illinois University, Department of Library Science, DeKalb;
- University of South Florida, School of Library and Information Science, Tampa;
- University of Wisconsin, Milwaukee School of Library and Information Science, Milwaukee;

3. Master of Librarianship

- : Emory University, Division of Library and Information Management, Atlanta, Georgia;
- University of Washington, Graduate School of Library and Information Science, Seattle;
- University of South Florida, School of Library and Information Science, Tampa

2. Master of Arts in Library

- : University of Denver, Graduate School of Librarianship and Information Management, Denver, Colorado;
- University of Michigan, School of Information and Library Studies, Ann Arbor

4. Master of Library and Information Science

- : Louisiana State University, School of Library and Information Science, Baton Rouge;
- North Carolina Central University, School of Library and Information Science, Durham;
- Rosary College Graduate School of Library and Information Science, River Forest, Illinois;
- State University of New York at Buffalo, School of Information and Library Studies, Buffalo, New York;
- University of California, Berkeley School of Library and Information Studies, Berkeley;
- University of Oklahoma, School of Library and Information Science, Norman, Oklahoma;
- University of Texas, Austin, Graduate School of Library and Information Science, Austin

5. Master of Library Science

- Ball State University, Department of Library, Muncie, Indiana;
- Brigham Young University, School of Library and Information Sciences, Provo, Utah;
- Emporia State University, School of Library and Information Management, Emporia, Kansas;
- Indiana University, School of Library and Information Science, Bloomington, Indiana;
- Kent State University, School of Library Science, Kent, Ohio;
- Queens College, City University of New York, Graduate School of Library and Information Studies, Flushing, New York;
- Rutgers University of School of Communication, Information and Library Studies, New Brunswick, New York;
- San Jose State University, Division of Library and Information Science, San Jose, California;
- St. John's University, Division of Library and Information Science, Jamaica, New York;
- Southern Connecticut State University, School of Library Science and Instructional Technology, New Haven;
- State University of New York, Albany School of Information Science and Policy, Albany, New York;
- State University of New York, College of Art and Science, Ganeseo, School of Library

Information Science, Geneseo, New York;
 Syracuse University School of Information Studies, Syracuse, New York;
 Texas Women's University, School of Library and Information Studies, Denton, Texas;
 University of Alabama, Graduate School of Library Service, Tuscaloosa;
 University of Arizona, Graduate Library School, Tucson;
 University of California, Los Angeles, Graduate School of Library and Information Science, Los Angeles, California;
 University of Hawaii, Graduate School of Library Studies, Honolulu;
 University of Maryland, College of Library and Information Services, College Park, Maryland;
 University of North Carolina at Greensboro, Department of Library Science/Educational Technology, Greensboro;
 University of Pittsburgh, School of Library and Information Science, Pittsburgh, Pennsylvania;
 University of Rhode Island, Graduate Library School of Kingston, Rhode Island;
 University of Southern Mississippi, School of Library Service, Hattiesburg;
 VanDerbilt University, George Peabody College for Teachers, Department of Library and Information Science, Nashville, Tennessee

6. Master of Science

: Columbia University, School of Library Services, New York;
 Drexel University, College of Information Studies, Philadelphia, Pennsylvania;
 Pratt Institute, Graduate School of Library and Information Science, Pittsburgh, Pennsylvania;
 Simmons College, Graduate School of Library and Information Science, Boston, Massachusetts;
 University of Illinois, Graduate School of Library and Information Science, Urbana, Illinois;
 North Texas State University, School of Library and Information Science, Denton, Texas

7. Master of Science in Library Science

: Alabama A&M University, School of Library Media, Normal, Alabama;
 Atlanta University, School of Library and Information Studies, Atlanta, Georgia;
 Case Western Reserve University, School of Library Science, Cleveland, Ohio;
 Catholic University of America, School of Library and Information Science, Washington D.C.;
 Clarion University, College of Library Science, Clarion Pennsylvania;
 Long Island University, Palmer School of Library and Information Science, Greenvale, New York;
 University of Kentucky, College of Library and Information Science, Lexington;
 University of North Carolina, School of Library Science, Chapel Hill;
 University of Southern California, School of Library Science, University Park, Los Angeles;
 University of Tennessee, Knoxville Graduate School of Library and Information Science, Knoxville;
 Wayne State University, Division of Library Science, Detroit, Michigan;
 Western Michigan University, School of Librarianship, Kalamazoo

MEDICINE

Australia

1. Bachelor of Medicine

: Flinder's University of South Australia;
 Monash University, Victoria;
 University of Adelaide;
 University of Melbourne;
 University of New South Wales;
 University of Queensland;
 University of Sydney;
 University of Tasmania;
 University of Western Australia

2. Bachelor of Surgery

: Flinder's University of South Australia;
 Monash University, Victoria;
 University of Adelaide;
 University of Melbourne;
 University of New South Wales;
 University of Queensland;
 University of Sydney;
 University of Tasmania;
 University of Western Australia

Bangladesh

1. Bachelor of Medicine
 2. Bachelor of Surgery

: University of Dhaka, Dhaka Medical College
 : University of Dhaka, Dhaka Medical College

Belgium

Doctor of Medicine

: Katholieke Universiteit, Lueven;
 Rijksuniversiteit Te Gent;
 Universiteit Antwerpen;
 Vrije Universiteit of Brussles

Burma

1. Bachelor of Medicine : Medical Institute (I) Mingaladon;
Medical Institute (I) Rangoon;
Medical Institute (III) Mandalay;
University of Mandalay, Medical College, Mandalay;
University of Rangoon, Rangoon Medical College, Mandalay Medical College
2. Bachelor of Surgery : Medical Institute (I) Mingaladon;
Medical Institute (I) Rangoon;
Medical Institute (III) Mandalay;
University of Mandalay, Medical College, Mandalay;
University of Rangoon, Rangoon Medical College, Mandalay Medical College

Canada

1. Bachelor of Medicine : University of Alberta, Faculty of Medicine, Edmonton;
University of British Columbia, School of Medicine, Vancouver;
University of Manitoba, Faculty of Medicine, Winnipeg
2. Doctor of Medicine : Laval University, Faculty of Medicine, Quebec;
University of Dalhousie;
University of Montreal, Faculty of Medicine, Montreal;
University of Ottawa, Faculty of Medicine, Ottawa;
University of Saskatchewan, College of Medicine, Saskatoon;
University of Toronto, Faculty of Medicine, Toronto;
University of Western Ontario, Faculty of Medicine
3. M.D.C.M. : McGill University, Faculty of Medicine, Montreal;
Queen's University, Faculty of Medicine, Kingston
4. Member : College of Physicians and Surgeons, Alberta;
College of Physicians and Surgeons, Manitoba;
College of Physicians and Surgeons, Saskatchewan
5. Licence : Medical Board, Newfoundland;
Medical Board, Nova Scotia;
Medical Council, Prince Edward Island

Egypt

1. M.B.Ch.B. : University of Cairo
2. Bachelor of Medicine : Al-Azhar University;
University Mansoura;
University of Ain Shams;
University of Alexandria;
University of Tanta;
University Zagazig
3. Bachelor of Surgery : Al-Azhar University;
University Mansoura;
University of Ain Shams;
University of Alexandria;
University of Tanta;
University Zagazig

Hong Kong

1. Bachelor of Medicine : University of Hong Kong
2. Bachelor of Surgery : University of Hong Kong

India

1. Bachelor of Medicine : All India Institute of Medical Science, New Delhi;
Allahabad University, M.L.N Medical College, Allahabad;
Amritsar Medical College;
Benaras Hindu University, Institute of Medical Sciences;
Calicut University;
Christian Medical College;
Christian Medical College, Vellore;
Devi Ahilya Vishwavidyalaya, Indore;
Gauhati University, Gauhati Medical College;
Gujarat University, B.J. Medical College, Ahmedabad;
Jammu and Kashmir University, Govt. Medical College, Srinagar;
Kanpur University, Karnatak Medical College, Hubli;
Jiwaji University, Gwalior, Gerja Raja Medical College, Gwalior;
L.N. Mithila University Darbhanga Medical College, Laherisari;
University of Nagpur, Medical College, Nagpur;
Ludhiana Medical College, Rohtak;
M.S. University of Baroda, Medical College, Baroda;

Medical College, Thanjavur;
 Osmania University, Gandhi Medical College, Hyderabad Osmania
 Medical College, Hyderabad;
 Panjab University;
 Punjabi University, Govt. Medical College, Patiala;
 Sarojini Naidu Medical College, Agra;
 Saurashtra University, Rajkot, M.P.Shah Medical College, Jamnagar;
 Sri Venkateswara University, Tirupati Medical College, Kurnool;
 University of Uktal, S.C.B Medical College, Cuttack;
 Stanley Medical College, Madras;
 University of Agra;
 University of Andhra, Andhra Medical College, Guntur;
 University of Bangalore, Bangalore Medical College;
 University of Bihar, Darbanga Medical College, Laheriasarai;
 University of Bombay, Grant Medical College, Bombay Seth G.S. Medical
 College, Bombay Topiwala, National Medical College, Bombay;
 University of Calcutta;
 University of Delhi Lady Hardinge;
 University of Dibrugarh, Assam Medical College, Dibrugarh;
 University of Kerala, Medical College, Calicut;
 University of Lucknow, King George Medical College, Lucknow, Kanpur;
 University of Madras, Madras Medical College, Madras;
 University of Madurai, Medical College, Madurai;
 University of Mangalore, Kasturba Medical College, Manglore Kasturba
 Medical College, Manipal;
 University of Mysore, College Mysore Medical College;
 University of Patna, Prince of Wales Medical College, Patna;
 University of Poona, B.J. Medical College, Poona, Armed Forces Medical
 College, Poona;
 University of Rajasthan, Sardar Patel Medical College, Bikaner;
 University of Ranchi, Rajendra Medical College, Ranchi;
 Vikram University, Ujjain, Gandhi Medical College, Bhopal;
 Bharathidasan University, Tiruchirappalli, Thanjavur Medical College,
 Thanjavur

2. Bachelor of Surgery

All India Institute of Medical Science, New Delhi;
 Allahabad University, M.L.N Medical College, Allahabad;
 Benaras Hindu University, Institute of Medical Sciences;
 Calicut University;
 Christian Medical College, Vellore;
 Devi Ahilya Vishwavidyalaya, Indore;
 Gauhati University, Gauhati Medical College;
 Gujarat University, B.J. Medical College, Ahameedabad;
 Jammu and Kashmir University, Govt. Medical College, Srinagar;
 Kanpur University, Karnatak Medical College, Hubli;
 Jiwaji University, Gwalior, Gerja Raja Medical College, Gwalior;
 Kasturba Medical College, Manipal;
 L.N.Mithila University, Darbhanga Medical College, Laherisari;
 M.S. University of Baroda, Medical College, Baroda;
 Medical College, Thanjavur;
 Osmania University, Gandhi Medical College, Hyderabad Osmania
 Medical College, Hyderabad;
 Panjab University;
 Punjabi University, Govt. Medical College, Patiala;
 Sarojini Naidu Medical College, Agra;
 Saurashtra University, Rajkot, M.P.Shah Medical College, Jamnagar;
 Sri Venkateswara University, Tirupati Medical College, Kurnool;
 University of Uktal, S.C.B Medical College, Cuttack;
 Stanley Medical College, Madras;
 University of Agra;
 University of Andhra, Andhra Medical College, Guntur;
 University of Bangalore, Bangalore Medical College;
 University of Bihar, Darbanga Medical College, Laheriasarai;
 University of Bombay, Grant Medical College, Bombay Seth G.S. Medical
 College, Bombay Topiwala, National Medical College, Bombay;
 University of Calcutta;
 University of Delhi Lady Hardinge;
 University of Dibrugarh, Assam Medical College, Dibrugarh;

3. Member

Indonesia

Doctorate(M.D.)

Iran

Doctor of Medicine

Iraq

1. Bachelor of Medicine

2. Bachelor of Surgery

3. M.B.Ch.B

Ireland

1. Bachelor of Medicine

2. Bachelor of Surgery

3. Licentiate in Medicine

4. Licentiate in Midwifery

Malaysia

1. Bachelor of Medicine

2. Bachelor of Surgery

3. Doctor of Medicine

Malta

Doctor of Medicine

New Zealand

1. Bachelor of Medicine

2. Bachelor of Surgery

Pakistan

1. Bachelor of Medicine

2. Bachelor of Surgery

University of Kerala, Medical College, Calicut;
University of Lucknow, King George Medical College, Lucknow, Kanpur;
University of Madras, Madras Medical College, Madras;
University of Madurai, Medical College, Madurai;
University of Mangalore, Kasturba Medical College, Mangalore;
University of Mysore, College Mysore Medical College;
University of Nagpur, Medical College, Nagpur;
University of Patna, Prince of Wales Medical College, Patna;
University of Poona, B.J.Medical College, Poona, Armed Forces Medical College, Poona;
University of Rajasthan, Sardar Patel Medical College, Bikaner;
University of Ranchi, Rajendra Medical College, Ranchi;
Vikram University, Ujjain, Ghandi Medical College, Bhopal;
Bharathidasan University, Tiruchirapalli, Thanjavur Medical College, Thanjavur
: College of Physicians and Surgeons, Bombay;
State Medical Faculty of West Bengal

: Universitas Airlangga Surabaya, Fakultas Kedokteran;
Universitas Andalas;
Universitas Gajah Mada, Jogjakarta;
Universitas Indonesia Fakultas Kedokteran;
Universitas Padjadjaran, Bandung;
Universitas Sumatra Utara

: University of Tehran

: University Baghdad;

University Basrah

: University Baghdad;

University Basrah

: University Al-Mustansyriyah;

University of Mosul

: National University of Ireland;

University of Dublin

: National University of Ireland;

University of Dublin

: Apothecaries' Hall of Dublin;

Royal College of Physicians of Ireland;

Royal College of Surgeons of Ireland;

University of Dublin

: Royal College of Physicians of Ireland;

Royal College of Surgeons of Ireland

: Universiti Malaya

: Universiti Malaya

: Universiti Kebangsaan Malaysia;

Universiti Sains Malaysia

: Royal University of Malta

: University of Otago

: University of Otago

: Fatimah Jinnah Medical College for Woman, Lahore;

King Edward Medical College, Lahore;

Nishtar Medical College, Multan;

University of Karachi, Dow Medical College, Karachi;

University of Sind, Liaquat Medical College, Hyderabad;

University of the Punjab

: Fatimah Jinnah Medical College for Woman, Lahore;

King Edward Medical College, Lahore;

Nishtar Medical College, Multan;

University of Karachi, Dow Medical College, Karachi;

University of Sind, Liaquat Medical College, Hyderabad;

University of the Punjab

Saudi Arabia

1. Bachelor of Medicine

: University of King Abdul Aziz;
University of King Feisal;
University of Riyadh

2. Bachelor of Surgery

: University of King Abdul Aziz;
University of King Feisal;
University of Riyadh**Singapore**

1. Bachelor of Medicine

: National University of Singapore

2. Bachelor of Surgery

: National University of Singapore

3. Licentiate in Medicine and Surgery

: King Edward VII, College of Medicine

Sri Lanka

1. Bachelor of Medicine

: Medical School in Peradeniya;
Medical School of Colombo;
University of Ceylon (Peradeniya);
University of Ceylon, Colombo Medical School of Colombo

2. Bachelor of Surgery

: Medical Institute (I) Mingaladon;
Medical Institute (I) Rangoon;
Medical Institute (III) Mandalay;
University of Mandalay, Medical College, Mandalay;
University of Rangoon, Rangoon Medical College Mandalay, Medical College**Turkey**

Doctor of Medicine

: Gulhane Military Medical Academic;
University Ankara;
University Ege;
University Istanbul;
University of Hacetteppe**Uganda**

1. Bachelor of Medicine

: University of East Africa, Makere, University College

2. Bachelor of Surgery

: University of East Africa, Makere, University College

United Kingdom

1. Bachelor of Medicine

: Nottingham University;
Queen's University of Belfast;
University of Aberdeen;
University of Birmingham;
University of Bristol;
University of Cambridge;
University of Dundee;
University of Durham;
University of Edinburgh;
University of Glasgow;
University of Leeds;
University of Liverpool;
University of London;
University of Manchester;
University of Newcastle Upon Tyne;
University of Oxford;
University of Sheffield;
University of Southampton;
University of St. Andrews;
University of Wales

2. Bachelor of Surgery

: Nottingham University;
Queen's University of Belfast;
University of Aberdeen;
University of Birmingham;
University of Bristol;
University of Cambridge;
University of Dundee;
University of Durham;
University of Edinburgh;
University of Glasgow;
University of Leeds;
University of Liverpool;
University of London;
University of Manchester;
University of Newcastle Upon Tyne;

- 3. M.B.Ch.B.
- 4. Member
- 5. Licentiate

6. Licentiate in Medicine and Surgeons

United States of America

Doctor of Medicine

- : Albany Medical College of Union University, Albany;
- : Albert Einstein, College of Medicine, Teshire University, New York;
- : Baylor University, College of Medicine Houston;
- : Boston University, School of Medicine, Boston;
- : Bowman Gray School of Medicine of Wake Forest College, Winston-Salem;
- : Case Western Reserve University, School of Medicine, Cleveland;
- : Chicago Medical College, Chicago;
- : Columbia University, College of Physicians and Surgeons, New York;
- : Cornell University, Medical College, New York;
- : Creighton University, School of Medicine, Omaha;
- : Dartmouth Medical School, Hanover;
- : Duke University, School of Medicine, Durham;
- : Emory University, School of Medicine, Atlanta;
- : George Washington University, School of Medicine, Washington;
- : Harvard Medical School, Boston;
- : Howard University, College of Medicine, Washington;
- : Indiana University, School of Medicine, Indianapolis;
- : John Hopkins University, School of Medicine, Baltimore;
- : Laylor University, Stritch School of Medicine, Chicago;
- : Loma Linda University, School of Medicine;
- : Louisiana University, School of Medicine, New Orleans;
- : Mahnemann Medical College of Philadelphia;
- : Marquette University, School of Medicine, Milwaukee;
- : Medical College of Alabama, Birmingham;
- : Medical College of Georgia, Augusta;
- : Medical College of South Carolina, Charleston;
- : Medical College of Virginia, Richmond;
- : Meharry Medical College, School of Medicine, Nashville;
- : New Jersey College of Medicine and Dentistry, Jersey City;
- : New York Medical College, New York;
- : New York University, School of Medicine, New York;
- : Northwestern University, Medical School, Chicago;
- : Ohio State University, School of Medicine, Columbus;
- : Rutgers State University, New Jersey Saint Louis University, School of Medicine, St.Louis;
- : Stanford University, School of Medicine, Palo Alto;
- : State University of New York at Buffalo, School of Medicine;
- : State University of New York, College of Medicine, Downstate Medical Center, Brooklyn;
- : State University of New York, College of Medicine, Upstate Medical Center, Syracuse;
- : Temple University, School of Medicine, Philadelphia;
- : Tufts University, School of Medicine, Boston;
- : Tulane University, School of Medicine, New Orleans;
- : University of Arkansas, School of Medicine, Little Rock;
- : University of California, Irvine California College of Medicine;
- : University of California, School of Medicine, Los Angeles;
- : University of California, School of Medicine, San Francisco;
- : University of Chicago, School of Medicine, Chicago;
- : University of Cincinnati, College of Medicine, Cincinnati;
- : University of Colorado, School of Medicine, Denver;
- : University of Florida, College of Medicine, Gainesville;
- : University of Illinois, College of Medicine;
- : University of Iowa, College of Medicine, Iowa City;
- : University of Kansas, School of Medicine, Kansas City;
- : University of Kentucky, College of Medicine, Lexington;
- : University of Maryland, School of Medicine, Baltimore;
- : University of Miami, School of Medicine, Coral Gables;

- : University of Oxford;
- : University of Sheffield;
- : University of St. Andrews;
- : University of Wales
- : University of Leicester, School of Medicine
- : Royal College of Surgeons of England
- : Royal College of Physicians and Surgeons of Glasgow;
- : Royal College of Physicians of Edinburgh;
- : Royal College of Physicians of London;
- : Royal College of Surgeons of Edinburgh
- : Society of Apothecaries of London

University of Minnesota, Medical School, Minneapolis;
 University of Mississippi, School of Medicine, Jackson;
 University of Missouri, School of Medicine, Columbia;
 University of Nebraska, School of Medicine, Omaha;
 University of New Mexico, School of Medicine, Albuquerque;
 University of North Carolina, School of Medicine, Chapel Hill;
 University of North Dakota, School of Medicine, Grand Forks;
 University of Oklahoma, School of Medicine, Oklahoma City;
 University of Oregon, Medical School, Portland;
 University of Pennsylvania, School of Medicine, Philadelphia;
 University of Pittsburgh, School of Medicine;
 University of Rochester, School of Medicine and Dentistry, Rochester;
 University of South Dakota, School of Medicine, Vermillion;
 University of Southern California, School of Medicine, Los Angeles;
 University of Tennessee, College of Medicine, Memphis;
 University of Texas, Medical Branch, Galveston;
 University of Texas, Southwestern Medical College, Dallas;
 University of Utah, College of Medicine, Salt Lake City;
 University of Vermont, College of Medicine, Burlington;
 University of Virginia, School of Medicine, Charlottesville;
 University of Wisconsin, Medical School, Madison;
 University Puerto Rico, School of Medicine, San Juan;
 University Washington, School of Medicine, Seattle;
 Vanderbilt University, School of Medicine, Nashville;
 Washington University, School of Medicine, St. Louis;
 Wayne State University, School of Medicine, Detroit;
 West Virginia University, School of Medicine, Morgantown;
 Woman's Medical College of Pennsylvania, Philadelphia;
 Yale University, School of Medicine, Washington

West Indies

- | | |
|-------------------------|-----------------------------|
| 1. Bachelor of Medicine | : University of West Indies |
| 2. Bachelor of Surgery | : University of West Indies |

MUSIC

Malaysia

- | | |
|------------------|---------------------------|
| Diploma in Music | : Institut Teknologi MARA |
|------------------|---------------------------|

United Kingdom

- | | |
|---|---|
| 1. Diploma in Music Education | : Royal Scottish Academy of Music |
| 2. Graduate of London College of Music (GLCM) | : London College of Music |
| 3. Graduate Teaching Diploma | : Birmingham School of Music;
Guildhal School of Music;
Royal Academy of Music;
Royal College of Music;
Royal Northern School of Music, Manchester;
Trinity College of Music |

NAVAL ARCHITECTURE

Australia

- | | |
|----------------------------|---------------------------------|
| B.E. in Naval Architecture | : University of New South Wales |
|----------------------------|---------------------------------|

Belgium

- | | |
|------------------------------|---|
| Degree in Naval Architecture | : University of Ghent;
University of Liege |
|------------------------------|---|

Denmark

- | | |
|------------------------------|-------------------------------|
| Degree in Naval Architecture | : Danish Technical University |
|------------------------------|-------------------------------|

France

- | | |
|------------------------------|--|
| Degree in Naval Architecture | : Ecole Nationale Superior du Gerie Maritime |
|------------------------------|--|

Holland

- | | |
|------------------------------|-------------------------------------|
| Degree in Naval Architecture | : Technological University of Delft |
|------------------------------|-------------------------------------|

India

- | | |
|--------|--|
| B.Tech | : Indian Institute Technology, Kharagpur |
|--------|--|

Japan

- | | |
|------------------------------|--|
| Degree in Naval Architecture | : University of Tokyo;
University of Kyushu |
|------------------------------|--|

Norway

Degree in Naval Architecture

: Technical University of Norway

Spain

Degree in Naval Architecture

: University of Madrid, Higher Technical School

Sweden

Degree in Naval Architecture

: Royal Institute of Technology

United States of America

Degree in Naval Architecture

: Massachusetts Institute of Technology;
University of California;
University of Michigan;
Webb Institute of Naval Architecture**OPTOMETRY****Australia**

Bachelor of Science in Optometry

: University of Melbourne

Malaysia

Degree in Optometri(Hons)

: Universiti Kebangsaan Malaysia

PARA — MEDICAL*Audiology***United Kingdom**

1. Diploma in Audiology

: The Victoria University of Manchester

*Chemical Lab Assistants***Malaysia**

Diploma in Chemical Lab Assistants

: Kementerian Kesihatan

*Dental Nursing***New Zealand**

Advanced Dental Nursing Studies Certificate

: Children's Dental Clinic and School for Dental Nurses, Washington,
New Zealand*Dental Technologist***Malaysia**

Diploma in Dentistry Technologist

: Kementerian Kesihatan

*EEG Technicians***Canada and United Kingdom**

Diploma in Electroencepathology

: EEG and Clinical Neurophysiology Education Board

*Health Inspector***Malaysia**

Diploma in Health Inspector

: Kementerian Kesihatan

*Hospital Assistants***Malaysia**

Diploma in Hospital Assistant

: Kementerian Kesihatan

*Medical Laboratory Technology***Australia**1. Certificate of Examination
2. Associateship: Australian Institute of Medical Laboratory Technology
: Australian Institute of Medical Technology**Canada**1. General Certificate Examination
2. Advanced Level Certificate: Canadian Science of Laboratory Technologists
: Canadian Society of Medical Laboratory Technologist**Denmark**

Registered Hospital Laboratory technicians

: Board of Education of Hospital Laboratory Technicians, Copenhagen

Malaysia

1. Diploma in Medical Laboratory Technology : Kementerian Kesihatan;
Universiti Kebangsaan Malaysia;
Universiti Malaya;
Universiti Sains Malaysia
2. Advanced Diploma in Medical Laboratory Technology : Kementerian Kesihatan;
Universiti Malaya

Singapore

1. Intermediate Examination in Medical Laboratory Technology : Kementerian Kesihatan
2. Final Certificate Examination in Medical Laboratory Technology : Kementerian Kesihatan

United Kingdom

1. Intermediate Examination : Institute of Medical Laboratory Technology, London
2. Army Class II Medical Laboratory Technician : Royal Army Medical
3. Highest Diploma in Medical Laboratory Technology : Medical Laboratory Technologists Association Board (MLTB)
4. Associateship Examination : Institute of Medical Laboratory, London
5. Army Class I Medical Laboratory Technicians : Royal Army Medical College

*Neuropathology Technicians***United States of America, Australia, Canada and United Kingdom**

- Diploma in Neuropathological Techniques : All Institutions

*Nursing***Malaysia**

- Diploma in Nursing : Nurses registered with the Malaysia Board of Nurses

United Kingdom

- State Registered Nurse : General Nursing Council for England and Wales

*Occupational Therapy***Australia**

- Diploma in Occupational Therapy : School of Occupational Therapy, University of Melbourne;
Royal Perth College

Belgium

- Diploma of Occupational Therapy : Higher Institute of Para Medical Profession, Ghent

Malaysia

- Diploma in Occupational Therapy : Kementerian Kesihatan

New Zealand

- Diploma of Occupational Therapy : Central Institute of Technology, Wellington;
School of Occupational Therapy, Auckland

United Kingdom

- Certificate of Competency Conjoint Board : London School of Occupational Therapy

*Pharmaceutical Assistants***Malaysia**

- Diploma in Pharmaceutical Assistants : Kementerian Kesihatan

*Physiotherapist***Australia and New Zealand**

- Diploma in Physiotherapist : Recognised Institutions

Malaysia

- Diploma in Physiotherapist : Kementerian Kesihatan

United Kingdom

1. Diploma in Physiotherapist : Prince of Wales College, London;
School of Physiotherapist, Mechester Royal Infirmary, England
2. Membership : Chartered Society of Physiotherapist, United Kingdom

*Radiography***United Kingdom**

- Diploma in Radiography : Society of Radiographers in Therapy

Australia

Certificate of Competency Conjoint Board

: Australian Institute of Radiotherapy;
: Australian College of Radiologist**Malaysia**

Diploma in X-Ray Operation

: Kementerian Kesihatan

United Kingdom

Diploma

: Society of Radiographers, United Kingdom

Arab Saudi

Sarjana

: University of Riyadh

Australia

1. Bachelor of Applied Science in Pharmacy

: Tasmanian College of Advanced Education

2. Bachelor of Pharmacy

: University of Adelaide;
: University of Queensland;
: University of South Australia;
: University of Sydney;
: University of Tasmania;
: Victorian College of Pharmacy, Melbourne;
: Victorian Institute of Colleges;
: Western Australia Institute of Technology**Canada**

Bachelor of Science Pharmacy

: Dalhousie University;
: University of Alberta;
: University of British Columbia**Egypt**

Degree in Pharmacy (Hons)

: Universiti Alexandria;
: Universiti Mansoura;
: Universiti Zagazik**India**

Bachelor of Pharmacy

: Benaras Hindu University;
: Nagpur University**Indonesia**

Doctorandus Pharmaciae

: Institute Teknologi Bandung;
: Sekolah Farmasi, Universiti Airlangga, Surabaya;
: Sekolah Farmasi, Universiti Gadjah Mada**Iraq**

Bachelor of Science Pharmacy

: Baghdad University

Ireland

Bachelor of Science (Pharmacy)

: University of Dublin, Trinity College;
: University of Ireland**Japan**

Bachelor of Pharmacy

: University of Kyoto

Malaysia

Sarjana

: Universiti Sains Malaysia

New Zealand

Bachelor of Pharmacy

: University of Otago

Pakistan

Bachelor of Pharmacy

: Punjab University

Singapore

Bachelor of Pharmacy

: National University of Singapore

Turkey

Degree in Pharmacy (Hons)

: Universiti Ankara;
: Universiti Hacettepe;
: Universiti Istanbul**United Kingdom**

1. Bachelor of Science (Pharmacy)

: Heriot-Watt University Ediburgh, Scotland;
: Polytechnic, Leicester;
: Robert Gordon's Institute of Technology, Aberdeen, Scotland;
: Sunderland Polytechnic, University of Sunderland;
: The Queen's University of Belfast, Belfast, Northern Ireland;
: University of Aston in Birmingham;
: University of Brighton;
: University of Manchester;

2. Bachelor of Pharmacy

- : University of Portsmouth
- : Liverpool Polytechnics, Liverpool;
- University of Bath;
- University of Nottingham, Nottingham
- : Kings College (University of London);
- University of Bradford, Bradford;
- University of London, School of Pharmacy;
- University of Wales, College of Cardiff

3. Bachelor of Pharmacy(Hons)

United States of America

1. Bachelor of Science (Pharmacy)

- : Butler University Indianapolis, Indiana;
- Massachusetts College of Pharmacy and Allied Health Science;
- Medical University of South Carolina;
- Ohio State University;
- University of Iowa, Iowa City;
- University of Kansas;
- University of Wisconsin, Madison
- : South Western Oklahoma State University

2. Bachelor of Pharmacy

QUANTITY SURVEYING

Australia

1. Diploma in Quantity Surveying
2. Associate Diploma in Quantity Surveying
3. Bachelor of Applied Science in Building Technology (Quantity Surveying)
4. Bachelor of Applied Science in Quantity Surveying

5. Bachelor of Building (Quantity Surveying)

- : Queensland Institute of Technology
- : Royal Melbourne Institute of Technology

6. Bachelor of Construction Economics
7. Associate Member
8. Corporate Member

- : South Australia Institute of Technology, Adelaide
- : Canberra College of Advanced Education;
- Curtin University of Technology;
- New South Wales Institute of Technology
- : University of New South Wales;
- University of Melbourne
- : Royal Melbourne Institute of Technology
- : Australia Institute of Quantity Surveyors (A.I.Q.S.)
- : Royal Institute of Surveyors

Malaysia

1. Diploma in Quantity Surveying
2. Advanced Diploma in Quantity Surveying
3. Degree in Quantity Surveying
4. Membership

- : Institut Teknologi MARA;
- Universiti Teknologi Malaysia
- : Institut Teknologi MARA
- : Universiti Teknologi Malaysia
- : The Institute of Surveyors Malaysia

Singapore

Bachelor of Science (Building)

- : National University of Singapore

United Kingdom

1. Diploma in Building Economics

2. Diploma in Construction Economics (Quantities)
3. Diploma in Quantity Surveying

- : Bristol Polytechnic;
- Leeds Polytechnic;
- Willesden College of Technology
- : Dublin College of Technology, Ireland
- : Dundee College of Technology;
- Glasgow College of Building;
- Kingston Polytechnic;
- Liverpool Polytechnic;
- Newcastle Upon Tyne Polytechnic;
- Portsmouth Polytechnic;
- Robert Gordon's College of Technology;
- Thames Polytechnic;
- Trent Polytechnic

4. B.Sc.(CNA) Building Economics or Quantity Surveying
5. B.Sc.(CNA) Degree in Quantity Surveying
6. B.Sc.(CNA) in Quantity Surveying

- : Polytechnic of the South Bank
- : Liverpool Polytechnic
- : Bristol Polytechnic; Dundee College of Technology;
- Leeds Polytechnic; Newcastle Upon Tyne Polytechnic;
- Polytechnic of Wales;
- Portsmouth Polytechnic;
- Robert Gordon's College of Technology;
- Thames Polytechnic;
- Trent Polytechnic
- : Heriot-Watt University
- : University of Aston, Birmingham

7. B.Sc. in Building (Quantity Surveying)

8. B.Sc. in Building Economics and Measurement

- 9. B.Sc. in Building Economics and Quantity Surveying : Heriot-Watt University
- 10. B.Sc. in Construction Economics : University of Salford
- 11. B.Sc. in Quantity Surveying : University of Reading, College of Estate Management
- 12. Associate Member : Institute of Quantity Surveying
- 13. Polytechnic Associateship in Construction Economics : Polytechnic of Wales
- 14. Professional Associate : Royal Institute of Chartered Surveyors (Quantity Surveying)

TOWN AND REGIONAL PLANNING

Australia

- 1. Diploma (Postgraduate Diploma) : University of Melbourne, Department of Town and Regional Planning;
University of Sydney, Department of Town and Country Planning
- 2. B.App.Sc.(Planning) with Graduate Diploma in Urban and Regional Planning : Royal Melbourne Institute of Technology
- 3. B.Sc. in Town and Regional Planning : University of Melbourne, Department of Town and Regional Planning
- 4. Bachelor of Town and Regional Planning : University of Queensland
- 5. Bachelor of Urban and Regional Planning : University of New England
- 6. M.Sc. in Town Planning : University of Adelaide, Department of Architecture and Town Planning
- 7. M.Sc.Town and Country Planning : University of Sydney, Department of Town and Country Planning

Malaysia

- 1. Diploma in Town and Regional Planning : Institut Teknologi MARA;
Universiti Teknologi Malaysia
- 2. Advanced Diploma in Town and Regional Planning : Institut Teknologi MARA
- 3. B.Sc. in Planning : Universiti Sains Malaysia
- 4. Bachelor in Housing and Planning(Hons) : Universiti Sains Malaysia
- 5. Bachelor in Town and Regional Planning : Universiti Teknologi Malaysia

United Kingdom

- 1. Diploma (Undergraduate Diploma) and Postgraduate Diploma : Bristol Polytechnic;
Central London Polytechnic;
Chelmer Institute of Higher Education, Department of Planning;
City of Birmingham Polytechnic;
Heriot-Watt University, Edinburg College of Art, Department of Town and Country Planning;
Kingston Polytechnic, School of Planning, Knights Park;
Leeds Polytechnic, School of Town Planning;
Liverpool Polytechnic;
Queen's University of Belfast;
School of Planning and Landscape, Polytechnic of North London;
Sheffield City Polytechnic;
Sunderland Polytechnic;
Trent Polytechnic, Nottingham, Department of Town and Country Planning;
University of Glasgow, Department of Town and Regional Planning;
University of Sheffield;
University of Strathclyde, Department of Urban Regional Planning
- 2. B.A.(CNA) with Honours in Planning Studies plus Diploma : Oxford Polytechnic
- 3. B.A.(CNA) with Honours in Strategic Environmental Studies : Liverpool Polytechnic
- 4. B.A.(CNA) with Honours in Town and Country Planning : Bristol Polytechnic;
Glasgow School of Art, Department of Planning;
Gloucestershire College of Arts and Technology;
Leeds Polytechnic, School of Town Planning;
Polytechnic of South Bank;
Trent Polytechnic, Nottingham, Department of Town and Country Planning;
University of Manchester;
University of Newcastle Upon Tyne
- 5. B.A.(CNA) with Urban and Regional Planning plus Diploma : Central London Polytechnic;
Coventry (Lanchester) Polytechnic, Department of Urban and Regional Planning
- 6. B.Phil in Town and Country Planning : University of Manchester
- 7. B.Sc.(CNA) in Environmental Planning : Chelmer Institute of Higher Education, Department of Planning
- 8. B.Sc. in Town Planning Studies : City of Birmingham Polytechnic;

9. B.Sc. with Honours in Town and Regional Planning : Heriot-Watt University, Edinburgh College of Art, Department of Town and Country Planning; University of Wales, Institute of Sciences and Technology, Department of Town Planning
10. M.A.(CNAA) in Town and Country Planning : Department of Town and Regional Planning, Duncan of Jordanstone, College of Art and University of Dundee
: Trent Polytechnic, Nottingham, Department of Town and Country Planning;
University of Newcastle Upon Tyne
11. M.A.(CNAA) in Town Planning Studies : Leeds Polytechnic, School of Town Planning
12. M.A. in Environmental Planning : University of Nottingham, Institute of Planning Studies
13. M.A. in Environmental Planning for Developing Countries : University of Nottingham, Institute of Planning Studies
14. M.A. in Town and Regional Planning : University of Sheffield
15. M.Phil Degree in Town and Regional Planning : University of Glasgow, Department of Town and Regional Planning
16. M.Phil Degree in Urban Design and Regional Planning : University of Edinburgh, Department of Urban Design and Regional Planning
: Bartlett School of Architecture and Planning, University of College London
17. M.Phil in Town Planning : University of Strathclyde, Department of Urban Regional Planning
18. M.Sc.Degree in Regional Planning : University of Aston, Birmingham, Department of Environmental Planning and Policy Studies
19. M.Sc.in Environmental Planning and Design : Queen's University of Belfast;
University of Wales, Institute of Sciences and Technology, Department of Town Planning
20. M.Sc. in Town Planning : University of Liverpool
21. Master's Degree in Civic Design : University of Reading, School of Planning Studies
22. Phil. Degree in Environmental Planning : Polytechnic of South Bank;
23. Postgraduate BPI,BTP,MTP Degree : University of Manchester

VALUATION

Australia

1. Diploma : Australia Institute of Valuers
2. Associate Diploma in Valuation : Royal Melbourne Institute of Technology
3. Bachelor of Business (Property Management) in Valuation Specialisation : Royal Melbourne Institute of Technology
4. Diploma in Valuation : Western Australia Institute of Technology
5. Bachelor of Business (Valuation and Land Administration) : Western Australia Institute of Technology
6. B.App.Sc. in Property Resources Management(Valuation) : South Australian Institute of Technology
7. Bachelor of Business (Land Economy) : Hawkerburg Agricultural College

Canada

1. Diploma in Urban Land Economics : University of British Columbia

Malaysia

1. Bachelor of Quantitative Surveyor : Universiti Teknologi Malaysia
2. Advanced Diploma in Estate Management : Institut Teknologi MARA
3. Membership : Institution of Surveyors Malaysia (General Practise Section)
4. Diploma in Estate Management : Universiti Teknologi Malaysia
5. Diploma in Land Management : Institut Teknologi MARA

New Zealand

1. Diploma : New Zealand Institute of Valuers
2. Diploma in Valuation : University of Auckland
3. Bachelor of Property Administration : University of Auckland
4. Bachelor of Commerce in Valuation and Property Management : Lincoln College, University of Canterbury
5. Bachelor of Business Studies(Valuation Major) : Massey University

United Kingdom

1. Diploma : The Incorporated Society of Valuers and Auctioneers (General Practise Division)
2. Diploma in Building Surveying : Glasgow College of Building;
Liverpool Polytechnic
3. Diploma in Environmental Economics : Dublin College of Technology
4. Diploma in Estate and General Surveying : Sheffield Polytechnic
5. Diploma in Estate Management : City of Liverpool College of Building Liverpool;

6. Diploma in General Surveying
 7. Diploma in Land Administration
 8. Diploma in Land Economics
9. Diploma in Rural Estate Management
 10. Diploma in Surveying (Estate Management)
 11. Diploma in Urban Estate Management
 12. B.A Hons in Land Economy
13. B.Sc.(CNA) Degree in General Practise Surveying
 14. B.Sc.(CNA) Degree in Land Economics
 15. B.Sc.(CNA) Degree in Land Management/Administration
 16. B.Sc.(CNA) Degree in Urban Estate Surveying
 17. B.Sc.(CNA) Degree in Urban Land
18. B.Sc.(CNA) Degree in Valuation and Estate Management
 19. B.Sc.(CNA) in Building Surveying
 20. B.Sc.(CNA) in Urban Estate Management
21. B.Sc. Degree in Estate Management (Valuation Option)
22. B.Sc. Degree in Land Management (Valuation Specialisation)
23. Bachelor of Land Economy
 24. College Associateship in Urban Estate Management
 25. Professional Associate
- Kingston Polytechnic;
 Liverpool Polytechnic;
 Oxford Polytechnic;
 Thames Polytechnic
 : Portsmouth Polytechnic
 : Bristol Polytechnic
 : Paisley College of Technology;
 Willesden College of Technology
 : Royal Agriculture College
 : Leicester Polytechnic
 : Polytechnic of Central London
 : University of Cambridge;
 University of Reading
 : Newcastle Upon Tyne Polytechnic
 : Paisley College of Technology
- : North East London Polytechnic
 : Thames Polytechnic
 : Portsmouth Polytechnic;
 Sheffield Polytechnic
- : Bristol Polytechnic
 : Kingston Polytechnic
 : Polytechnic of Central London;
 The Polytechnic of Wales
- : Heriot-Watt University;
 Leicester Polytechnic;
 Liverpool Polytechnic;
 Newcastle Upon Tyne Polytechnic;
 Oxford Polytechnic;
 Polytechnic of the South Bank;
 Thames Polytechnic;
 University of Cambridge;
 University of Reading
- : University of Cambridge;
 University of Reading
 : University of Aberdeen
 : The Polytechnic of Wales
 : Royal Institute of Chartered Surveyors London (General Practise Section — Valuation)

VETERINARY SCIENCE

Australia

Bachelor of Veterinary Science

- : University of Melbourne;
 University of Queensland;
 University of Sydney

Bangladesh

Bachelor of Veterinary Medicine

- : Bangladesh Agricultural University

Ceylon

Bachelor of Veterinary Science

- : University of Ceylon (Sri Lanka)

Canada

Doctor of Veterinary Medicine

- : Ontario Veterinary College, University of Guelph;
 Western College of Veterinary Medicine, University of Saskatchewan

Indonesia

Doctor of Veterinary

- : Institut Pertanian Bogor;
 Universiti Gadjah Mada, Jogjakarta (Fakulti Kedokteran Haiwan);
 Universitas Indonesia (Fakultas Kedokteran Haiwan dan Perternakan Bogor)

India

1. Graduate of Veterinary Science
 2. Graduate of Bombay Veterinary College
 3. Graduate of the Madras Veterinary College
 4. Bachelor of Veterinary Science

- : Bengal Veterinary College;
 : Bombay Veterinary College
 : Madras Veterinary College
 : Andhra Pradesh Agricultural University, Hyderabad;
 Kerala Agricultural University, Mannuthy;

Kerala Veterinary College and Research Institute;
 Tamil Nadu Agricultural University, University of Agra;
 University of Agricultural Science, Bangalore;
 University of Agricultural Science, Mysore;
 University of Calcutta;
 University of Madras;
 University of Mysore;
 University of Udaipur, Rajasthan;
 Utkal University, Orissa State;
 Uttar Pradesh Agricultural University, Pantnagar

5. Bachelor of Veterinary Science and Animal Husbandry : Assam Agricultural University;
 Bidhan Chandra Krishi Viswa Vidyalyaya (Bengal Veterinary College);
 Bihar Veterinary, College, Magadh University;
 Bombay Veterinary College (Konkan Krishi Vidyapeeth, Dapoli);
 Bombay Veterinary College (Mahatma Phule Krishi Vidyapeeth
 Agricultural University);
 Govind Ballabh Pant University of Agriculture and Technology,
 Pantnagar;
 Jawaharlal Nehru Krishi Vishwa;
 Orissa College of Veterinary Science and Animal Husbandry, Utkal
 University;
 Rajendra Agricultural University, Bihar (Bihar Veterinary College);
 University of Bombay

Malaysia

1. Diploma in Veterinary : Institut Teknologi MARA;
 Universiti Pertanian Malaysia
 2. Doctor of Veterinary Medicine : Universiti Pertanian Sains

New Zealand

- Bachelor of Veterinary : Massey University

Pakistan

1. Diploma in Veterinary Medicine and Science : Eastern Pakistan Veterinary College, University of Dacca
 2. Diploma in Veterinary Medicine and Surgery : East Pakistan Agricultural University, Mymensingh
 3. Bachelor of Science (Veterinary Science and
 Animal Husbandry) : East Pakistan Agricultural University, Mymensingh
 4. Bachelor of Veterinary Science and Animal Husbandry : College of Animal Husbandry, Lahore University of Agriculture, Lyallpur
 5. Licentiate in Veterinary(L.V) : East Pakistan Agricultural University, Mymensingh
 6. Licentiate in Veterinary Science(L.V.S) : Eastern Pakistan Veterinary College, University of Dacca
 7. Licensed Veterinary Practitioner : Punjab Veterinary College
 8. Doctor of Veterinary Medicine : University of Agriculture, Lyallpur;
 West Pakistan Agricultural University, Lyallpur

United Kingdom

1. Membership : Royal College of Veterinary Surgeons
 2. Bachelor of Veterinary Medicine : University of Cambridge;
 University of Edinburgh;
 University of Glasgow
 3. Bachelor of Veterinary Science : University of Bristol;
 University of Liverpool;
 University of London
 4. Bachelor of Veterinary Surgery : University of Edinburgh;
 University of Glasgow

CHAPTER 10

SOURCES OF FINANCIAL AID

Public Sector

1. Jabatan Perkhidmatan Awam

Type of Studies : Local/Overseas

Selection Criteria : (a) Malaysian citizens
(b) Secondary school students or civil servants

Conditions : (a) On completion of their studies, students may be required to serve the Civil Service if required.
(b) Only scholarship recipients are normally not required to repay the aid they received.

Further Information:

Ketua Pengarah
Jabatan Perkhidmatan Awam
Bahagian Latihan, Kompleks JPA
Blok B, Aras 2
Jalan Tun Ismail
50510 Kuala Lumpur

For teaching scholarships/loans only:

Ketua Setiausaha
Bahagian Pendaftar Sekolah dan Guru
Kementerian Pendidikan Malaysia
Paras1, Blok K, Pusat Bandar Damansara
50604 Kuala Lumpur

2. Johor Foundation

Type of Studies : Matriculation, Diploma and Degree

Selection Criteria : Johor citizens

Value of Award : Varies according to courses and universities that candidates have chosen

Further Information:

Yayasan Pelajaran Johor

No. 12, Bangunan YPJ
Jalan Nuri, Larkin Jaya
80350 Johor Bahru
Johor

3. Kedah Foundation

Type of Studies : Local universities

Selection Criteria : Kedah citizens

Value of Award : (a) RM600 (Polytechnic – certificate)
(b) RM600 (ITM – certificate and normal diploma courses)
(c) RM1,200 (ITM – certificate and diploma in Law and Science courses)
(d) RM1,800 (Kolej ugama – Diploma)
(e) RM3,000 (Local degree in Arts)
(f) RM3,500 (Local degree in Science)
(g) RM4,000 (Local degree in Medicine and Pharmacy)

Further Information:

Setiausaha
Lembaga Biasiswa Negeri Kedah
(Cawangan Perkhidmatan)
Pejabat Setiausaha Kerajaan Kedah
Aras 2, Blok C
Wisma Darul Aman
05503 Alor Setar
Kedah

4. Kelantan Foundation

Type of Studies : All courses

Selection Criteria : Kelantan citizens

Value of Award : (a) RM1,500 – 2,000 (One year diploma)
(b) RM3,500 per year (Local degree)
(c) RM3,500 – 7,000 (Overseas)

Further Information:

Pengarah
Yayasan Kelantan Darulnaim
No.9, Jalan Kampung Sireh
15050 Kota Bharu
Kelantan

5. Kementerian Belia dan Sukan Malaysia

Type of Studies : Diploma/Degree courses at universities overseas

Selection Criteria : (a) Excel in sports
(b) Not more than 25 years old on 1st July

Further Information:

Cawangan Latihan
Kementerian Belia & Sukan Malaysia
Aras 7, Blok K, Pusat Bandar Damansara
50570 Kuala Lumpur

6. Malacca Foundation

Type of Studies : All courses

Selection Criteria : Malacca citizens

Value of Award : (a) RM600 per year (Matriculation)
(b) RM800 – 2,500 per year (Diploma)
(c) RM3,000 – 4,200 per year (Local degree)
(d) RM5,000 per year (Postgraduate courses in local university)

Further Information:

Pengurus Besar
Yayasan Pelajaran Melaka
Bangunan Yayasan Melaka
Off Jalan Hang Tuah
75300 Melaka

7. Negeri Sembilan Foundation

Type of Studies : All courses

Selection Criteria : Negeri Sembilan citizens

Value of Award : RM1,500 – 3,500 per year

Further Information:

Lembaga Pemegang-Pemegang Amanah
Yayasan Negeri Sembilan
Tingkat 11, Bangunan Yayasan Negeri Sembilan
Jalan Yam Tuan
70000 Seremban
Negeri Sembilan

8. Pahang Foundation

Type of Studies : All courses

Selection Criteria : Pahang citizens

Values of Award : RM3,300 per year

Further Information:

Setiausaha Yayasan Pahang
Tingkat 17, Kompleks Terutun
Jalan Mahkota
25000 Kuantan
Pahang Darul Makmur

9. Perak Foundation

Type of Studies : All courses

Selection Criteria : Perak citizens

Value of Award : RM3,500 per year

Further Information:

Pejabat Setiausaha Kerajaan
P.O.Box 1004
38020 Ipoh
Perak

10. Perak State Government

Type of Studies : Degree courses overseas

Selection Criteria : (a) Perak citizens
(b) Over 30 years old
(c) Admitted by any overseas higher education institution
(d) Pass STPM with full certificate or minimum 2 good principals (excluding Art) and a pass in General paper or a recognised diploma by the Government
(e) No contract of service with any group or government agency

Deadline : April

Further Information:

Setiausaha
Lembaga Biasiswa
Kerajaan Negeri Perak
dia Pejabat Setiausaha Kerajaan
30820 Ipoh, Perak.

11. Perlis Foundation

Type of Studies : All courses

Selection Criteria : Perlis citizens

Value of Award : (a) RM1,000 per year (Only for studies in universities in Egypt and Jordan)
(b) RM1,500 per year (Temporary loan)
(c) RM3,000 per year (Study loan)

Further Information:

Setiausaha
Lembaga Pemegang Amanah
Kumpulan Wang Biasiswa Negeri Perlis
Pejabat Setiausaha Kerajaan Perlis
Ibu Pejabat kerajaan Perlis
01990 Kangar, Perlis

12. Pulau Pinang Foundation

Type of Studies : (a) All courses in local universities
(b) Islamic studies only at Islamic universities

Selection Criteria : Pulau Pinang citizens

Value of Award : (a) RM800 per year (ITM certificate and diploma)
(b) RM1,900 per year (Diploma)
(c) RM2,500 per year (Degree)

Further Information:

Pejabat Setiausaha
Lembaga Biasiswa Negeri Pulau Pinang
Pejabat Setiausaha Kerajaan
Tingkat 25, Kompleks KOMTAR
Peti Surat 3006
10850 Pulau Pinang

13. Pulau Pinang State Government

Type of Studies : All courses

Selection Criteria : Pulau Pinang citizens

Value of Award : RM3,500 per year

Further Information:

Pejabat Setiausaha
Lembaga Biasiswa Negeri Pulau Pinang
Pejabat Setiausaha Kerajaan
Tingkat 25, Kompleks KOMTAR
Peti Surat 3006
10850 Pulau Pinang

14. Sabah Foundation

Type of Studies : All courses

Selection Criteria : Sabah citizens

Value of Award : RM4,000 per year

Further Information:

Pengarah Yayasan Sabah
Ibu Pejabat Yayasan Sabah
Peti Surat 11201
88813 Kota Kinabalu
(UIP: Seksyen Pentadbiran,
Bhg. Pembangunan Pelajaran)

15. Sabah State Government

Type of Studies : Local/Overseas Diploma and Degree courses in Medicine, Science and Technology

Selection Criteria : (a) Grade I or II in SPM with 5 credits including Bahasa Malaysia and Mathematics for Diploma courses
(b) Pass in General Paper and two principals in STPM for Degree courses

Deadline : April

Further Information:

Bahagian Latihan and Kerjaya
Jabatan Ketua Menteri, Tingkat 7
Bangunan Yayasan Sabah
Kota Kinabalu
88502 Sabah

16. Sarawak State Government

Type of Studies : Diploma/Degree courses

Selection Criteria : Sarawak citizens

Value of Award : (a) RM3,000 – 3,500 per year for Diploma courses
(b) RM4,000 – 4,500 per year for Degree courses

Deadline : February

Further Information:

Setiausaha
Yayasan Sarawak
Tingkat 9 & 10 Bangunan Satok
Jalan Satok, Peti Surat 3281
93764 Kuching
Sarawak

17. Sarawak TAR Scholarship Foundation

Type of Studies : Basic degree at local universities and postgraduate study locally and abroad

Selection Criteria : Malaysian citizens

Value of Award : Full scholarship

Deadline : February

Further Information:

Secretary
Tunku Abdul Rahman Sarawak
Scholarship Foundation
c/o Sarawak Civil Service Training Centre
Jalan Simpang Tiga
93507 Kuching
Sarawak

18. Selangor Foundation

Type of Studies : All courses

Selection Criteria : Selangor citizens

Value of Award : RM3,300 per year

Further Information:

Setiausaha
Kumpulan Wang Biasiswa Negeri Selangor
Tingkat 19,
Bangunan Sultan Salahuddin Abdul Aziz Shah
40000 Shah Alam
Selangor Darul Ehsan

19. Yayasan Pelajaran Johor

- Type of Studies : Dentistry/Medicine at universities in Indonesia
- University Airlangga, Surabaya
 - University Andalas, Padang
 - University Gajah Muda, Jogjakarta
 - University Indonesia, Jakarta
 - University Padjajaran, Bandung
 - University Sumatera Utara, Medan

- Selection Criteria : (a) Johor citizens
(b) Below 28 years old
(c) A pass in Bahasa Malaysia for SPM
(d) Pass in Matriculation (Science) or doing second year in Matriculation (Science)

Value of Award : RM20,000 per year

Further Information:

Yayasan Pelajaran Johor
No.12A, Tingkat 1, Bangunan YPJ
Jalan Nuri, Larkin Jaya
80350 Johor Bahru
Johor

20. Yayasan Pelajaran Mara

Type of Studies : Local/Overseas

Selection Criteria : Bumiputeras

Further Information:

Pengarah
Bahagian Pengajaran Pelajaran MARA
Tingkat 3, Bangunan MARA
Jalan Raja Laut
50609 Kuala Lumpur
(U.P. Urusan Bimbingan Kerjaya)

21. Yayasan Tunku Abdul Rahman

Type of Studies : Local/Overseas studies at recognised institutions

Selection Criteria : (a) Malaysian citizens
(b) Good academic record

Conditions : All loans must be repaid within 60 months starting from four months after date of completing studies.

Value of Award : (a) RM3,500 per year for local studies
(b) RM5,000 for studies in Egypt, India, Indonesia, Jordan and Middle East countries
(c) RM10,000 for those intending to study in Australia, Canada, Europe, New Zealand or USA

Further Information:

Yayasan Tunku Abdul Rahman
Kementerian Pendidikan Malaysia

Paras 6, Blok J Selatan
Pusat Bandar Damansara
50640 Kuala Lumpur

Private Sector

1. Akademi Laut Malaysia

Type of Studies : (a) Kelas Dek (DR) 14 weeks
(b) Kelas Enjin (ER) 14 weeks
(c) Kelas Sajian (CR) 28 weeks

Further Information:

Bahagian Hal Ehwal Pelajar
Akademi Laut Malaysia
Peti Surat 31
78207 Kuala Sg. Baru
Melaka

2. AUAM Excellence Award

Type of Studies : All courses

Value of Award : US\$2,000

Further Information:

American Universities Alumni Malaysia (AUAM)
c/o SMS
3 Jalan Maran
Taman Tasik Titawangsa
53200 Kuala Lumpur
Tel: 03-4246410
Fax: 03-246411

3. American Universities Alumni Malaysia (AUAM) Merit Award

Type of Studies : Higher learning institutions in the United States

Selection Criteria : Accepted by institutions of higher learning in the United States as freshman for the next academic year

Value of Award : US\$1,000

Further Information:

American Universities Alumni Malaysia (AUAM)
c/o SMS
3 Jalan Maran
Taman Tasik Titawangsa
53200 Kuala Lumpur
Tel: 03-4246410
Fax: 03-4246411

4. AOTS Alumni Scholarship - Technical & Management Training Programme in Japan

Type of Studies : (a) Technical Training (Duration: 2.5 - 12 months)
(b) Management Training (Duration: 2 - 4 weeks)

Further Information:

5. ASEAN Pre-University

- Type of Studies : Pre-university studies (Science or Arts) in Singapore
- Selection Criteria : (a) Nationals of ASEAN countries except Singapore
(b) Three distinctions in GCE 'O' levels or SPM
(c) Minimum C6 for English in GCE 'O' levels or EL1119 and a minimum of D7 in Bahasa Malaysia or a second language
(d) Fluent in English
- Value of Award : S\$1,400 – 3,600 per year
- Deadline : April

Further Information:

Singapore High Commission in Malaysia
209, Jalan Tun Razak
50400 Kuala Lumpur

Singapore High Commission in Brunei
5th Floor, RBA Plaza
Jalan Sultan
Bandar Seri Begawan

Public Service Commission in Singapore
4th Storey, City Hall
St. Andrew's Road
Singapore 0617

6. ASEAN Post Graduate Scholarships

- Type of Studies : (a) Master of Business Administration
(b) Master of Arts in English, Chinese Studies, or Southeast Asian Studies
(c) Master of Medicine in Anaesthesia, Diagnostic Radiology, Internal Medicine, Ophthalmology, Paediatrics, Psychiatry, Public Health or Surgery
(d) Master of Science in Building Science, Civil Engineering, Computer and Information Sciences, Electrical Engineering, Industrial and Systems Engineering, Management of Technology, Mechanical Engineering, Project Management, Real Estate, Transportation Systems and Management
(e) Master of Social Science in Economics
(f) Others

Selection Criteria : (a) Fluent in English

(b) Nationals of ASEAN countries except Singapore

Further Information:

Registrar's Office
National University of Singapore
10 Kent Ridge Crescent
Singapore 0511
Republic of Singapore
Tel: 065-7786371

Singapore High Commission – Malaysia
209, Jalan Tun Razak
50400 Kuala Lumpur
Malaysia

7. ASEAN Secondary One & Three

- Type of Studies : Secondary education
- Deadline : April

Further Information:

Singapore High Commission in Malaysia
209, Jalan Tun Razak
50400 Kuala Lumpur

Singapore High Commission in Brunei
5th Floor, RBA Plaza
Jalan Sultan
Bandar Seri Begawan

Public Service Commission in Singapore
4th Storey, City Hall
St. Andrew's Road
Singapore 0617

8. Asian Development Bank (ADB)

- Type of Studies : (a) Postgraduate degrees (Diploma, Master's and Doctorate) in Management, Technology and other development-related disciplines
(b) MBA at Lahore University, Pakistan
- Selection Criteria : (a) Citizens of member countries of ADB
(b) Bachelor's degree or equivalent for Master's degree programmes and Master's degree for Doctorate programmes
(c) Two years related work experience
(d) Good health

Further Information:

The Scholarship Administrator
Education Division
Asian Development Bank
P.O.Box 789
1099 Manila
Philippines

The Office of Admissions
Lahore University of Management Science

9. AT & T Asian Leadership Awards

Type of Studies : All Bachelor's/Master's/Doctorate courses

Selection Criteria : (a) Must commence studies in a full-time undergraduate or graduate programme at an accredited university in the United States between January and October
(b) Must be a citizen of one of 12 Asian countries

Value of Award : US\$5,000

No. of awards : 36

Further Information:

AT & T Asian Leadership Awards
MACEE
191 Jalan Tun Razak
50400 Kuala Lumpur

10. Bank Bumiputra

Type of Studies : Degree courses in Accountancy, Administration, Banking and Computer Science, Economics and Management

Selection Criteria : STPM

Value of Award : RM3,800 per year

Further Information:

Pengurus
Jabatan Latihan Bank Bumiputera (M) Bhd
Tingkat 1, Wisma TAS
Jalan Melaka
50100 Kuala Lumpur

11. Bank Negara Education Scholarships

Type of Studies : (a) 'A' levels, Advanced Diploma
(b) Degree courses in Accountancy, Business Administration, Computer Science, Economics and Law at local universities

Selection Criteria : (a) Pass in General Paper with Grade B in 2 subjects or with Grade B in one subject and Grade C in two subjects for STPM
(b) 'A' levels with 2 A's and 1 B
(c) Diploma with minimum 3.00 Cumulative Grade Point Average
(d) Grade 'A' in matriculation
(e) Grade I in SPM - aggregate below 8 in 5 subjects excluding Art, Bahasa subjects and Religious Studies
(f) Offer of acceptance by a

university
Condition : A bond must be signed so as to serve in the bank upon completion of studies if required. For every one year of scholarship, the bond period is two years.

Value of Award : RM4,000 per year

Deadline : End February/early March

Further Information:

Pengurus
Jabatan Personel
Bank Negara Malaysia
50480 Kuala Lumpur
(UIP: Bahagian Biasiswa Unit Latihan)

12. BICC Cranfield Post-Graduate Scholarship

Type of Studies : Master's degree programme in Manufacturing Technology, Optical Communications and Polymer Science

Selection Criteria : (a) Malaysian citizens
(b) Minimum of a second class honours degree
(c) Working experience in the field of study

Deadline : May

Further Information:

Power Cables Malaysia Sdn Bhd
Jalan Kawat 15/18 Off Persiaran Selangor
P.O.Box 65
40700 Shah Alam
Selangor Darul Ehsan

The British High Commission
185, Jalan Ampang
50450 Kuala Lumpur

For applicants from the public service:

The Director
Training and Careers Division
Public Service Department
Kompleks JPA, Blok B, Aras 2
Jalan Tun Ismail
50510 Kuala Lumpur

13. Bosch Academic Scholarship

Type of Studies : Computer, Electronic, Industrial, Mechanical, Production Engineering or related discipline

Further Information:

Senior Human Resource Manager
Robert Bosch (M) Sdn Bhd
Bayan Lepas Free Industrial Zone
Phase 1 Bayan Lepas
11900 Penang

14. Bosch Toolmaker Scholarship Programme

Further Information:

Robert Bosch (M) Sdn Bhd
Bayan Lepas Free Industrial Zone
Phase 1 Bayan Lepas
11900 Penang

15. British American Insurance

Type of Studies : Local universities

Selection Criteria : (a) STPM
(b) Policy holders or children of policy holders

Value of Award : RM4,500 per year

Further information:

The Human Resources Department
British American Insurance Berhad
P.O.Box 10312
50710 Kuala Lumpur

16. British Council Fellowship

Type of Studies: Post-graduate, short courses (minimum 3 months) and special programmes in Arts Administration, Fine and Performing Arts, Language and Literature, Library and Information Studies

Further Information:

The British Council
P.O.Box 10539
50916 Kuala Lumpur

17. British Gas One-Year Postgraduate Scholarship

Type of Studies : Applied Science, Business Administration and Engineering

Further Information:

General Manager
British Gas PLC
Letter Box No. 85
30th Floor, UBN Tower
10 Jalan P Ramlee
50250 Kuala Lumpur

18. British High Commission Awards

Type of Studies : Undergraduate/Postgraduate at British institutions

Selection Criteria : (a) Passes at 'O' levels (SPM) and 'A' levels (STPM) for Undergraduate
(b) Honours degree from a recognised university or equivalent for Postgraduate

Interviews held in March/April

Further Information:

The British Council

P.O.Box 10539
50916 Kuala Lumpur

19. BSN Education Loan

Type of Studies : All courses

Selection Criteria : (a) Below 35 years old
(b) BSN account holder for at least 6 months
(c) Full-time student
(d) Obtained a place in any approved local university or institution of higher learning

Condition : Loan repayment commences six months after graduation

Value of Award : RM10,000

Further Information:

Ibu Pejabat Bank Simpanan Nasional
117, Jalan Ampang
50450 Kuala Lumpur

20. Buddhist Youth Foundation

Type of Studies : SPM/STPM

Selection Criteria : Secondary students from poor families

Further Information:

Yayasan Belia Buddhist Malaysia
129, Seang Tek Road
10400 Penang

21. Cambridge (M) Foundation

Type of Studies : All graduate studies except clinical and veterinary at University of Cambridge

Selection Criteria : (a) Malaysian citizens
(b) Below 26 years old
(c) First Class or good Second Class Honours Degree or equivalent from a recognised university
(d) Obtained a place at the University of Cambridge

Deadline : September

Further Information:

Cambridge (Malaysia) Foundation
P.O.Box 10139
50704 Kuala Lumpur

22. Capital Insurance Bhd

Type of Studies : Accountancy, Engineering, Information Technology

Selection Criteria : Candidates must gain admission into a local university and be fluent in English.

Value of Award : RM5,000 per year

Condition : Successful candidates are required to sign a contract to serve the company upon completion of studies.

Further Information:

Capital Insurance Bhd
The Director
38, Jalan Ampang
50450 Kuala Lumpur

23. Commonwealth Scholarships & Fellowship Plan (General Commonwealth Scholarships)

Type of Studies : All subjects

Further Information:

Public Services Department
Bahagian Biasiswa
Kompleks JPA, Blok B, Aras 2
Jalan Tun Ismail
50510 Kuala Lumpur

24. Commonwealth Scholarship & Fellowship for Academic Staff

Further Information:

British Council
Jalan Bukit Aman
P.O.Box 10539
50916 Kuala Lumpur

25. Confederation Of British Industry Awards

Type of Studies : Practical training with companies in Britain

Selection Criteria : Trained engineers

Further Information:

The Scholarships & Training Officer
British Council
Jalan Bukit Aman
P.O.Box 10539
50916 Kuala Lumpur

26. Datuk Paduka Hajjah Saleha Scholarship Award

For School Leavers:

Type of Studies : Degree

Selection Criteria : Satisfactory academic performance

Value of Award : RM1,000 per year

For School Teachers:

Type of Studies : Degree

Selection Criteria : (a) Minimum two years teaching experience
(b) Must still be in the profession

Value of Award : RM2,000 per year

Further Information:

Higher Education Learning Programme
BZ-2, Pusat Bandar Damansara
Damansara Heights
50490 Kuala Lumpur

27. Development and Commercial Bank (Study Loan)

Type of Studies : Degree courses in Accountancy, AgriBusiness, Business Administration, Computer Science and Economics

Selection Criteria : (a) Malaysian citizens
(b) STPM

Value of Award : RM20,000 – 100,000 (with interest charged)

Further Information:

Pengurus
Development & Commercial Bank Bhd
Peti Surat 145
No.18, Jalan Silang
50050 Kuala Lumpur

28. Drexel University Merit Awards for Freshmen and Transfer Students

Type of Studies : All courses

Selection Criteria : Grade point average equivalent to B or better at time of application

Value of Award : US\$4,000 – 8,000 per year

Further Information:

MACEE
191, Jalan Tun Razak
50400 Kuala Lumpur

29. Dr Goh Keng Swee (GKS) Scholarship Fund

Type of Studies : Undergraduate studies in areas of Accountancy, Actuarial Science, Arts, Business Administration, Science, Social Sciences and other approved courses

Selection Criteria : (a) Below 25 years old
(b) Fluent in English
(c) Good GCE 'A' levels or equivalent

Further Information:

Singapore High Commission – Malaysia
209 Jalan Tun Razak
50400 Kuala Lumpur
Malaysia

30. East-West Centre Graduate Student Awards

Further Information:

MACEE
191 Jalan Tun Razak
50400 Kuala Lumpur

31. Edaran Otomobil Nasional Bhd Scholarship Awards

Type of Studies : Degree/Diploma at local universities/institutions

Value of Award : (a) RM4,000 per year (Diploma)
(b) RM6,000 per year (Degree)

Further Information:

Manager,
Manpower Planning and Development
Edaran Otomobil Nasional Bhd
Peti Surat 7095
40926 Shah Alam
Selangor

32. Engineering Alumni Association of University Malaya

Type of Studies : Degree in Engineering at the University of Malaya

Selection Criteria : Poor and needy Malaysian students

Value of Award : RM2,000 per year

Conditions : Recipient shall start repaying loan after 1 month after commencement of employment. Monthly payment is RM200 until the full amount is repaid. An interest charge at the prevailing base lending rate of Malayan Banking Berhad shall be levied on any outstanding sum if recipient fails to repay the full loan sum within 15 months of commencement of employment.

Further Information:

Dean's Office
Faculty of Engineering
University of Malaya
59100 Kuala Lumpur

33. European Union and Association of South East Asian Nations Scholarship Programme

Type of Studies : Agriculture, Banking, Computing, Consumer Electronics, Engineering, Environmental, Food Processing, Health Science, Industrial Design, Interpreting, Journalism & Public Relations, Management, Maritime Transport

Further Information:

British Council
Jalan Bukit Aman
P.O. Box 10539
50916 Kuala Lumpur

34. FELDA

Type of Studies : Degree/Diploma at local universities

Selection Criteria : (a) SPM/STPM
(b) Students from FELDA schemes

Value of Award : RM2,500 per year

Application forms are available at all local universities.

35. Financial Institutions' Fellowship for Journalism (Knight-Bagehot Fellowship)

Type of Studies : Economic and Business Journalism at School of Journalism, Columbia University, New York

Selection Criteria : (a) Malaysian citizens
(b) Affiliated to a Malaysian owned publication

Further Information:

The Secretary
Financial Institutions "Fellowship For Journalism"
Public Affairs Unit
Bank Negara Malaysia
P.O. Box 10922
50929 Kuala Lumpur

36. FMM Tunku Tan Sri Mohamed Study Loan Scheme

Type of Studies : Certificate/Diploma/Degree in Accountancy, Business Studies, Economics, Engineering, Management, Management Information Systems and Science

Further Information:

Corporate Affairs Division
Federation of Malaysian Manufacturers (FMM)
17th Floor, Wisma Sime Darby
Jalan Raja Laut
50350 Kuala Lumpur

37. Guinness-Leeds University Postgraduate Scholarships

Type of Studies : Master's Degree

Further Information:

Management Development Manager
Guinness Anchor Bhd
Sungai Way Brewery
P.O. Box 144
46710 Petaling Jaya
Selangor

38. Harris Advanced Technology (M) Sdn Bhd

Type of Studies : Certificate/Diploma in Communication, Computer Technology, Electronics, General Engineering

Selection Criteria : Polytechnic students

Value of Award : RM3,000 per year
Further Information:

*Harris Training & Development
Harris Advanced Technology (M) Sdn Bhd
73, Lorong Enggang
Ulu Klang Free Trade Zone
54200 Kuala Lumpur*

39. Harrison Plantations

Type of Studies : Degree courses in Accountancy,
Economics, Engineering at local
universities

Selection Criteria : (a) STPM
(b) Bumiputeras

Deadline : September

Further Information:

*Personnel Manager
Harrison Plantations Bhd.
Menara PNB, Jalan Tun Razak
50400 Kuala Lumpur*

40. Harvard Business School Alumni Club Of Malaysia Postgraduate Scholarship

Type of Studie : Business Studies or other related
courses

Further Information:

*Hon. Secretary
Harvard Business School Alumni Club Of Malaysia
Tingkat 19, Menara Sambungan UMBC
Jalan Sultan Sulaiman
50000 Kuala Lumpur*

41. Hewlett Packard Scholarship Award

Type of Studies : Computer, Electrical, Electronic,
Mechanical Engineering

Further Information:

*Staffing Manager
Human Resource Department
Hewlett-Packard (M) Sdn Bhd
Phase 3 Bayan Lepas F12
11900 Penang*

42. Higher Education Learning Programme Scholarship

Type of Studies : All courses offered at HELP Institute

Further Information:

*Higher Education Learning Programme Scholarship
clo Higher Education Learning Programme
BZ-2 Pusat Bandar
Damansara Heights
50490 Kuala Lumpur*

43. Hitachi Semiconductor

Type of Studies : Degree in Applied Science, Electrical

or Electronics Engineering, Industrial
Technology Engineering, Mechanical
Engineering

Value of Award : RM5,000 per year

Condition : One year bond for each year of
scholarship

Further Information:

*The Human Resources Manager
Hitachi Semiconductor (M) Sdn Bhd
Bayan Lepas Free Industrial Zone
11900 Penang*

44. Hornby Education Trust

Type of Studies : Training schemes

Selection Criteria : English teacher

Further Information:

*The British Council
P.O.Box 10539
50916 Kuala Lumpur*

45. Hubert H Humprey Fellowship Program

Type of Studies : Master's Degree

Further Information:

*MACEE
191 Jalan Tun Razak
50400 Kuala Lumpur*

46. IDP Education Australia

Type of Studies : All courses

Value of Award : A\$5000

Selection Criteria : (a) Must be Malaysian students
(b) Must not have the intention of
migrating to Australia or seek
permanent resident status
(c) Must be applying for a new
course and not seeking support
through the bursary for a course
that has already commenced in
Australia

Further Information:

*IDP Education Australia
6th Floor, West Block
Wisma Selangor Dredging
142C, Jalan Ampang
50450 Kuala Lumpur*

Branch offices:

*IDP Education Australia
No. 18, Ground Floor
Jalan SS 15/8
Subang Jaya
47500 Petaling Jaya*

ANZGAM Penang
Suite 705, 7th Floor
Chinese Town Hall
22 Jalan Masjid Kapitan Keling
10200 Penang

Dynaed Services
No. 37 2nd Floor
Jalan Tunku Osman
P.O.Box 141
96000 Sibu
Sarawak

47. IJM Corporation Berhad Scholarship Award 1995

Type of Studies : Commerce & Economics (majoring in areas of Accountancy, Commercial Law, Computer Science, Economics, Finance, Human Resource Management, Information Systems, Industrial Relations, Management Science, Marketing or Operations Research)

Further Information:

Personnel Manager
IJM Corporation Bhd
Wisma IJM
Jalan Yong Shook Lin
46050 Petaling Jaya

48. Illinois Institute of Technology International Scholarships

Type of Studies : Bachelor's Degree

Further Information:

Education Information Centre
MACEE
191 Jalan Tun Razak
50400 Kuala Lumpur

49. Indian Trust Fund Scholarship Award

Type of Studies : Undergraduate

Selection Criteria : Malaysians of Indian origin

Value of Award : RM1,000 – 1,200 (renew on a year to year basis)

Further Information:

The High Commission of India
(Education Section)
No. 2 Jalan Taman Duta
50480 Kuala Lumpur

50. Indian General Cultural Scholarship Scheme

Type of Studies : Postgraduate/Undergraduate courses in all subjects/fields

Further Information:

The Indian High Commission
No.2, Jalan Taman Duta

50480 Kuala Lumpur
Ketua Pengarah
Jabatan Perkhidmatan Awam
Bahagian Latihan dan Kemajuan Kerjaya
Kompleks JPA, Blok B, Aras 2
Jalan Tun Ismail
50510 Kuala Lumpur
(UIP: Cawangan Latihan Pra Perkhidmatan A)

51. Indo-Malaysian Cultural Exchange Programme

Type of Studies : Postgraduate courses in research/training except for medicine in India

Further Information:

The Indian High Commission
No.2, Jalan Taman Duta
50480 Kuala Lumpur

52. Industrial Concrete Products Sdn Bhd

Type of Studies : Civil, Manufacturing and Mechanical Engineering

Further Information:

Administration Manager
Industrial Concrete Products Sdn Bhd
P.O.Box 191
46720 Petaling Jaya

53. Institute Engineer Malaysia Study Loan

Further Information:

Hon. Secretary
Institution of Engineers
Bangunan Ingenieur
Lot 60 & 62
Jalan 52/4
46200 Petaling Jaya

54. Intel Technology

Type of Studies : Computer Science, Electronics, Electrical/Mechanical Engineering and Management

Value of Award : (a) RM2,500.00 for private diploma
(b) RM3,000 for government diploma
(c) RM3,500 for advanced diploma
(d) RM5,000 for degree

Conditions : Candidates will have to serve the company for each year that they take the scholarship. In the case if they do not want to work in Intel, they will have to pay the full amount given to them in one sum. There is no interest charged.

Further Information:

Intel Technology Sdn Bhd
P.O.Box 121
Kawasan Perdagangan Bebas
Bayan Lepas

Deadline : May/June

55. Inti College American University Program Scholarships

Type of Studies : Bachelor's Degree in Applied Science, Business Administration, Computer Science, Engineering, Liberal Arts, Social Science

Further Information:

*Inti College
No.3, Jalan SS15/B
47500 Subang Jaya
Petaling Jaya*

56. International Fellowships for Women Only

Type of Studies : Studies of women and girls in their country of origin

Selection Criteria : Full-time graduates or postgraduate study or research in the United States for women who are not US citizens or permanent residents.

Value of Award : US\$15,160

Further Information:

*MACEE
191 Jalan Tun Razak
50400 Kuala Lumpur*

57. Japan Information Service, Embassy of Japan

Type of Studies : (a) Diploma courses in Agriculture, Business, Economics, and Engineering
(b) Degree courses in Economics, Engineering, Finance and Management in Japan

Further Information:

*JPA, Bahagian Latihan & Kemajuan Kerjaya
Ting. 19, Bangunan Perkim
Jalan Ipoh
50510 Kuala Lumpur*

58. Jardine Foundation/Jardine Scholarship Award

Further Information:

*The Jardine Foundation
Suite 6.01 Wisma Inai
241 Jalan Tun Razak
50400 Kuala Lumpur*

59. Kassim Chan Management Training

Type of Studies : Overseas

Selection Criteria : (a) Below 21 years old
(b) SPM, STPM or equivalent
(c) 525 points for TOEFL

Further Information:

*The Registrar
Kassim Chan Management Training Sdn Bhd
Suite 1908, 19th Floor
Wisma HLA, Jalan Raja Chulan
50200 Kuala Lumpur*

60. Koperasi Tentera Higher Education

Type of Studies : Degree/Diploma at local or overseas institutions

Selection Criteria : Members with minimum five years continuous membership or their children

Value of Award : (a) RM2,500 – 3,000 per year for local institutions
(b) RM12,000 – 48,000 per year for overseas institutions

Further Information:

*General Manager
Koperasi Tentera
7th Floor, Plaza IGB
Jalan Kampar, Off Jalan Tun Razak
50400 Kuala Lumpur*

61. Kuala Lumpur – Kepong (Taiko Plantation Sdn Bhd)

Type of Studies : Degree courses in Engineering (Chemical and Mechanical) at local universities

Selection Criteria : (a) STPM
(b) Male Malaysian students

Value of Award : RM3,400 per year

Further Information:

*Yayasan KLK
Wisma Taiko
1, Jalan S.P Seenivasagam
30000 Ipoh, Perak*

62. Kumpulan Perubatan (Johor) Sdn Bhd (KPJSB) Scholarship

Type of Studies : Pharmacy in local universities or abroad

Further Information:

*Administration and Personnel Dept.
Kumpulan Perubatan (Johor) Sdn Bhd
7 Persiaran Titivangsa 3
Kuala Lumpur*

63. Kuok Foundation

Type of Studies : Postgraduate in Economics, Engineering and Law in the United Kingdom

Selection Criteria : (a) First Class Honours degree in any of the above courses from a recognised university

- (b) Admitted by any of the following:-
 - Cambridge University
 - Imperial College, London University
 - Oxford University

Lever Brothers (M) Sdn Bhd
 55, Jalan Bangsar
 P.O.Box 11015
 50990 Kuala Lumpur
 Tel: 03-2821143, 03-2849768

- Value of Award : (a) RM4,500 per year (Malaysian university)
 (b) RM12,000 per year (Singapore university)
- Type of Award : (a) Interest-free study loan
 (b) Half loan and half grant awards

Further Information:

The Administrative Officer
Kuok Foundation
 14th Floor, Wisma Jerneh
 No.38, Jalan Sultan Ismail
 50250 Kuala Lumpur

64. Lembaga Letrik Negara

- Type of Studies : Pre-university/Degree courses in Architecture, Computer Science, Electrical Engineering and Mechanical Engineering
- Selection Criteria : (a) Below 19 years old as of 1st July
 (b) Bumiputera students
 (c) Grade I for SPM with minimum credits in Additional Mathematics, Chemistry, English, Mathematics and Physics
- Value of Award : Includes air fare, living expenses, tuition fees and related expenses

Further Information:

Penolong Pengurus Besar
(Pengurusan Sumber Manusia)
Latihan Tenaga Nasional Bhd.
Tenaga Nasional
 129, Jalan Bangsar
 P.O.Box 11003
 50732 Kuala Lumpur

65. Lever Brothers Scholarship Award

- Type of Studies: All undergraduates/matriculation courses
- Selection Criteria: All students who are studying in local universities
- Value of Award: RM5,500 per year

Conditions: 5 years of bondage with the company upon graduation. During the semester holidays, recipients are required to work in the company as industrial trainees.

Deadline: April

Further Information:

The Corporate Affairs and Personnel Director

66. Lion-ASM Foundation

- Type of Studies : Accountancy, Business Marketing, Economics or Finance, Engineering or Information Technology, Physical Science and Technology
- Selection Criteria : (a) STPM
 (b) Not granted any other scholarships or education loans from any organisation
- Value of Award : (a) Educational loan – RM4,000 for each academic year
 (b) Scholarship – RM5,000 for each academic year
- Conditions : (a) Scholarship – successful candidates are required to serve a compulsory service period with Lion Group of Companies upon graduation
 (b) Educational loan – successful candidates are required to re-pay the interest-free loan by monthly instalments

Further Information:

The Lion Group Human Resources Division
(Lion – ASM Foundation)
 Level 44, Menara Lion
 165 Jalan Ampang
 50450 Kuala Lumpur

67. MACPA Education Trust Fund

- Type of Studies : Accountancy
- Value of Award : RM3,500 per year

Further Information:

The Secretary
MACPA Educational Trust Fund
 15, Jalan Medan Tuanku
 50300 Kuala Lumpur

68. Malayan Nature Society/Nagao Natural Environmental Scholarship Programme

- Type of studies : All courses

Further Information:

Malayan Nature Society
 485, Jalan 5/53
 46000 Petaling Jaya
 Selangor Darul Ehsan

69. Malaysian Dental Association/Colgate Study Loan Fund

- Type of Studies : Local/Overseas in Dentistry

Further Information:

*Malaysian Dental Association/
Colgate Study Loan Fund
P.O.Box 237
46720 Petaling Jaya
Selangor Darul Ehsan*

70. Malaysian Institute of Management

Type of Studies : Business Studies, Management Programme, Secretaryship and Supervisory Management

Further Information:

*Services Department
Malaysian Institute of Management
7th Floor, Wisma HLA
Jalan Raja Chulan
50200 Kuala Lumpur*

71. Malaysian National Reinsurance Bhd

Type of Studies : Insurance related courses such as Actuarial Science, Risk Management, etc.

Further Information:

*Malaysian National Reinsurance Bhd
8th Floor, Menara PNB
Locked Bag 11068
Jalan Tun Razak
50990 Kuala Lumpur*

72. Malaysian Sheet Glass

Type of Studies : Accountancy, Business Administration, Economics, Engineering and Science

Value of Award : Full academic fees, board and lodging

Further Information:

*The Secretary
Malaysian Sheet Glass Scholarship and
Education Foundation
21km, 4700 Sungai Buloh
Selangor Darul Ehsan*

73. Markas Angkatan Tentera Malaysia, Jabatan Pelajaran

Type of Studies : Dentistry and Medicine

Further Information:

*Jabatan Pelajaran, Bahagian Perkhidmatan Anggota
Markas Angkatan Tentera Malaysia
Wisma Pertahanan
Jalan Padang Tembak
50634 Kuala Lumpur*

74. Maybank Scholarship Awards

Type of Studies : Accountancy, Banking, Business Administration, Computer Science, Economics, Finance and Marketing

Further Information:

*Manpower & Organisation Development Unit
Human Resource Department, Maybank
15th Floor, Menara Maybank
100 Jalan Tun Perak
50050 Kuala Lumpur*

75. Melbourne University – Master's Degree Scholarship

Type of Studies : All courses

Value of Award : A\$15,000

No. of Awards : 150 international scholarships

Further Information:

*Education Australia
6th Floor, West Block
Wisma Selangor Dredging
142-C Jalan Ampang
50450 Kuala Lumpur
Tel: 03-2623755*

*IDP Education Australia
20, 1st Floor
Jalan SS 15/8
47500 Subang Jaya
Tel: 03-7365548*

*Dynaed Services
No. 37, 2nd Floor
Jalan Tunku Osman
P.O. Box 141
96000 Sibul
Sarawak
Tel: 084-320317*

**76. Monash University – (a) Malaysian Scholarship
(b) Music Scholarship**

Type of Studies : (a) Undergraduate
(b) Bachelor of Music (Honours) and double degrees which combine Music with Arts, Commerce, Engineering or Law

Value of Award : A\$1,000 (Music Scholarship)

Further Information:

*Education Australia
6th Floor, West Block
Wisma Selangor Dredging
142-C Jalan Ampang
50450 Kuala Lumpur*

77. Monboshu (Japan)

Type of Studies : All courses

Selection Criteria : STPM(Full Certificate) or Diploma

Value of Award : Full cost of the course

Further Information:

*Monbasha Scholarships
c/o Embassy of Japan
11, Persiaran Stoner
Off Jalan Tun Razak
50450 Kuala Lumpur*

78. Motorola Malaysia Sdn Bhd

Type of Studies : Accountancy, Computer Science, Engineering

Selection Criteria : (a) Malaysians only
(b) Full-time students
(c) Students who have not received any financial aid elsewhere

Value of Award : RM5,000 per year

Condition : Recipients will be required to undergo training at Motorola during vacations.

Further Information:

*Training Dept
Motorola Malaysia Sdn Bhd
Phase 3 Bayan Lepas Free Industrial Zone
11900 Penang*

79. NST Press

Type of Studies : Degree/Diploma in Arts, Economics, Journalism at local universities

Selection Criteria : (a) Malaysian citizens
(b) STPM
(c) Candidates must already have been accepted at local universities

Value of Award : (a) RM4,700 per year for Degree
(b) RM4,200 per year for Diploma

Conditions : (a) Bonded Diploma/Degree – Double the sponsored period
(b) Bonded Master's – 4 years
(c) Bonded Doctorate – 7 years
If recipients choose to work somewhere else, they will be required to repay the fund monies spent on them at an interest of 8% per annum.

Further Information:

*Training and Development Dept
Training Centre
Balai Berita
New Strait Times Press Sdn Bhd
Bangsar, 59100 Kuala Lumpur*

80. NST Scholarship Fund

Type of Studies : Professional courses

- The Chartered Association of Certified Accountants
- The Chartered Institute of Management Accountants
- Malaysian Association of Certified Public Accountants (Stream I and II)
- Malaysian Insurance Institute

Further Information:

*The Secretary
The New Straits Times Scholarship Fund
c/o The New Straits Times Press (M) Bhd
Box No. D074 NST
50708 Kuala Lumpur*

81. NST Scholarship Fund-Printing Management

Further Information:

*The New Straits Times Scholarship Fund
c/o The New Straits Times Press (M) Bhd
Box No. A135 NST
50708 Kuala Lumpur*

82. Oriental Bank Berhad

Type of Studies : (a) Accountancy, Economics and Finance in universities
(b) Pre-university related courses

Selection Criteria : (a) SPM with a minimum aggregate of 15
(b) STPM distinction at STPM level

Value of Award : (a) RM960 per year for pre-university
(b) RM5,000 per year for universities

Condition : Successful candidates for university studies will be required to serve Oriental Bank Berhad for a period of 5 years upon completion of their studies.

Further Information:

*Senior Manager
Human Resources Department
Oriental Bank Berhad
8th Floor, Menara Promet
Jalan Sultan Ismail
50250 Kuala Lumpur
Tel: 03-2024600*

83. Osborne & Chappel International

Further Information:

*Jabatan Perkhidmatan Awam Malaysia
Cawangan Biasiswa Latihan dan Kemajuan Kerjaya
Tingkat 9,10,11 Bangunan Perkim
Jalan Ipoh
50510 Kuala Lumpur*

84. Oversea Chinese Banking Corporation

Type of Studies : Undergraduate studies in Accountancy, Business Administration, Economics, Finance

and other related courses in local universities

Selection Criteria : (a) Malaysian citizens
(b) Proven scholastic and extra-curricular records

Value of Award : RM5,000 per year

Deadline : April

Further Information:

*The Selection Committee
OCBC Scholarships – Malaysia
Oversea – Chinese Banking Corporation Ltd
P.O.Box 10197
50911 Kuala Lumpur*

85. Overseas Development Administration Shared Scholarship Scheme (ODASSS)

Type of Studies : Priority to Economic and Social Development of the country

Further Information:

*British Council
Jalan Bukit Aman
P.O.Box 10539
50916 Kuala Lumpur*

86. Overseas Research Students Awards Scheme

Further Information:

*British Council
Jalan Bukit Aman
P.O.Box 10539
50916 Kuala Lumpur*

87. Petronas

Type of Studies : Degree in Engineering, Law, Medicine at local universities

Selection Criteria : (a) Malaysian citizens
(b) STPM

Further Information:

*Jabatan Penganjuran Pendidikan
Sektor Pengurusan Sumber Tenaga Manusia
Tingkat 22 Manara Dayabumi
Jalan Sultan Hishamuddin
P.O.Box 12444
50778 Kuala Lumpur*

88. Petronas Marine Sdn Bhd Scholarship

Further Information:

*Educational Sponsorship Dept
Human Resource Management Sector
22nd Floor, Menara Dayabumi
Jalan Sultan Hishamuddin
P.O.Box 12444
50778 Kuala Lumpur*

89. PMBM Scholarship Fund Board

Type of Studies : Secondary, Post-secondary and Tertiary

Selection Criteria : Singapore parentage

Further Information:

*P.M.B.M Scholarship Fund Board
583 Geylang Road
Singapore 1438*

90. Port of Singapore Authority Scholarship (PSA)

Type of Studies : Degree courses at Singapore Universities in Arts, Engineering and Information Technology, Science, Social Science

Further Information:

*Director (Personnel)
Port of Singapore Authority
P.O.Box 300
PSA Building Post Office
Singapore 9111*

91. Puteri Nursing School Sdn Bhd

Type of Studies : Diploma in Nursing

Selection Criteria : SPM candidates with 5 credits

Further Information:

*The Principal
Puteri Nursing College
23 Jalan Pahang
53000 Kuala Lumpur*

92. RCA Sdn Bhd

Type of Studies : Degree and Postgraduate courses in Electronics, Engineering and Physics

Further Information:

*RCA Sdn Bhd
P.O.Box 12311
50774 Kuala Lumpur*

93. Renong Group

Type of Studies : Matriculation/Bachelor Degree programme in Accountancy or Business Studies at selected universities abroad

Selection Criteria : (a) Malaysian citizens
(b) Below 20 years old
(c) Grade I for SPM with a minimum aggregate of 12 or equivalent
(d) Distinction in English 322
(e) A good credit in Additional Mathematics and English 1119
(f) Free from any bond or scholarship programmes

- Condition** : Required to enter into an agreement to serve the Renong Group for a minimum of 5 years upon completion of studies
- Value of Award** : Air-fare, allowances for board, books, full academic fees and lodging

Further Information:

*Renong Group Scholarship Trust Fund
Renong Berhad
2nd Floor, MCOBA Building
42, Jalan Syed Putra
50460 Kuala Lumpur*

94. Resorts World Berhad Scholarship Award

- Type of Studies** : Accountancy, Business Management/Administration, Computer Science, Culinary Skills (Chef), (Civil/Electrical/Electronic/Mechanical) Engineering, Finance, Hotel Management, Marketing, Statistics/Mathematics, Social Science

Further Information:

*Assistant Manager
Human Resource Development
Resorts World Bhd
Genting Highlands Resort
69000 Genting Highlands
Pahang*

95. Revans' Scholarships

- Type of Studies** : MBA/Doctor of Business Administration

- Selection Criteria** : (a) Malaysian managers
(b) Over 30 years of age on commencement
(c) At least 5 years managerial experience at senior level
(d) Self-motivated

Value of Award : RM11,000 each

No. of Awards : 20

- Condition** : Candidates will be required to sit for a competitive aptitude test and a psychometric test and thereafter appear for an interview.

Further Information:

*Action Learning Centre
48 - 2 Jalan Medan Setia 2
Plaza Damansara, Bukit Damansara
50490 Kuala Lumpur
Tel: 03-2554020, 2554090*

96. Rhodes

- Type of Studies** : All courses at the University of Oxford

- Selection Criteria** : (a) Malaysian citizens

- (b) Honours degree
(c) Between 19 and 25 years old
(d) Single

- Value of Award** : All fees and monthly allowance for living expenses

Further Information:

*The British Council
Jalan Bulkit Aman
P.O. Box 10539
50916 Kuala Lumpur*

97. Rotary Ambassadorial Scholarship

- Type of Studies** : Chinese (Mandarin), Environmental Studies, French, German, Journalism, Teacher of the Handicapped (Community Disability Studies)

Further Information:

*The Chairman
Rotary District Scholarship Sub-Committee
P.O.Box 10632
50720 Kuala Lumpur*

98. Rotary Club of Kuala Lumpur

- Type of Studies** : Lower and Higher Secondary

Value of Award : RM150 - 450 per student

Further Information:

*Rotary Club of Kuala Lumpur
P.O.Box 10581
50718 Kuala Lumpur*

99. Rotary Club of Malacca

- Type of Studies** : Universities in Malaysia or Singapore

- Selection Criteria** : (a) STPM
(b) Malaysian citizens and Malacca residents

Value of Award : RM2,000

Further Information:

*Rotary Club of Malacca
P.O.Box 47
75700 Malacca*

100. Royal School of Music Scholarship

- Type of Studies** : Music

Further Information:

*Royal School of Music Scholarship
c/o The Chief Executive
Associated Board of the Royal School of Music
14 Bedford Square
London WC1B 3JB*

101. SAAG Corporation Bhd Scholarship Awards

Type of Studies : Electrical/Mechanical Engineering

Further Information:

SAAG Corporation Bhd Scholarship Awards
P.O.Box 11649
50752 Kuala Lumpur

102. Samsung Electronic

Type of Studies : Master's Degree at Korea University

Selection Criteria : (a) Degree in Engineering with good honours majoring in Electronics/Electrical/Mechanical or
(b) Academic performance among the top 10 per cent in the University
(c) Graduating this semester
(d) Minimum 550 points for TOEFL

Value of Award : Air-fare, fixed living allowance, free hostel and full academic fees

Conditions : (a) 2 year course in business related subjects and Korean studies (culture, history and language) at Korea University
(b) To serve Samsung Electronics (M) Sdn Bhd for 4 years upon completion of studies

Further Information:

Personnel Manager
Samsung Electronics (M) Sdn Bhd
Lot 2, Lebu 2, North Klang Straits
Area 21, Industrial Park
42000 Port Klang
Selangor Darul Ehsan

103. Sanwa Bank

Type of Studies : Degree/Master's/Doctorate in Economics at University Malaysia

Selection Criteria : (a) STPM
(b) Bumiputeras

Value of Award : RM3,000 per year

Further Information:

University Malaysia
59100 Kuala Lumpur

104. Scholarship for Teacher's Training Programme

Type of Studies : Training for Certificate/Diploma

Further Information:

The Advertiser Box No.3564
c/o Star Publication (M) Bhd
No.13, Jalan 13/16
46200 Petaling Jaya

105. SIA Group

Type of Studies : Undergraduate at universities in Malaysia, Singapore or overseas

Selection Criteria : 6A1s in SPM or GCE 'O' levels and 4 distinctions in the trial or final examinations for STPM or GCE 'A' levels

Condition : Serve in SIA Group for six years for those who studied in Malaysia/Singapore and eight years for those who studied in any other country.

Value of Award : (a) For studies in Singapore

- per year for Architecture and Building
- per year for Accountancy, Arts and Social Sciences, Business Administration and Law

(b) For studies outside Singapore

- approved examination, tuition and other compulsory fees
- books and baggage allowance, clothing and return economy air ticket

Further Information:

Personnel Executive
(Career Development)
Singapore Airlines Limited
Transit Centre
P.O.Box 501
Singapore 9181

106. Singapore Press Holdings

Type of Studies : Undergraduate at the National University of Singapore

Selection Criteria : (a) Malaysian citizens
(b) Below 22 years old
(c) Outstanding SPM results with minimum 4 distinctions in the STPM

Condition : Required to sign a bond to serve The New Straits Times Press Ltd. for a period of 6 years upon completion of studies

Value of Award : (a) S\$11,690 per year for laboratory based course
(b) S\$10,690 per year for non-laboratory based course

Deadline : April

Further Information:

The Assistant General Manager (HRDI)
Personnel and Administration Department
The Strait Times Press (1975) Ltd
#13-06 PUB Building
111 Somerset Road
Singapore 0923

107. Skim Perantis PetronasFurther Information:

Pengurus, Institut Latihan Perindustrian Petroleum
Peti Surat 138
20710 Kuala Terengganu
Terengganu

108. Star Education Fund Diploma Scholarship Awards

Type of Studies : All courses

Value of Award : (a) RM4,500 per year for diploma
(b) RM5,000 per year for degree
(c) RM100,000

Conditions : Bonded on a year to year basis. The bond will be effective 3 months after the completion of the recipients' studies.

Further Information:

The Secretary
The Star Education Fund
c/o Star Publication (M) Bhd
13 Jalan 13/6
46200 Petaling Jaya

109. St Mary (Old Girls) Association

Type of Studies : Counselling, Occupational Therapy, Physiotherapy, Psychology, Social Work, Special Education and Speech Therapy

Further Information:

The Treasurer
Persatuan St. Mary Education Fund
c/o 5, Jalan Bankung
Bukit Bandaraya
59100 Kuala Lumpur

110. Sunway College Twinning Degree Programme Entrance Scholarship

Value of Award : (a) 25% - 50% of tuition fees (Twinning)
(b) 25% - 100% of tuition fees (Pre-university programme)

Condition : Applicants are self-financing Malaysian students enrolled full time in Sunway College.

Further Information:

Sunway College
Marketing Department
Level 1, Sunway College
No. 5 Jalan Kolej
Bandar Sunway
Kuala Lumpur

111. Suruhan Pelabuhan Pulau Pinang

Type of Studies : Local/Overseas Degree and Postgraduate courses in Computer

Science, Marine and Navigational Studies

Further Information:

Suruhan Pelabuhan Pulau Pinang
P.O.Box 143
10710 Penang

112. Swedish-Malaysian Postgraduate Scholarship Fund (SMSF)

Type of Studies : Management of Production - Digital Communication Systems and Technology, Physics and Engineering Physics, Processes in Manufacturing Industries, Material Science and Engineering, Structural Engineering

Selection Criteria : Malaysian citizens with a Bachelor's degree or equivalent and fluent in English

Further Information:

The Scholarship Fund
The Embassy of Sweden
6th Floor, Wisma Angkasa Raya
123 Jalan Ampang
P.O.Box 10239
50708 Kuala Lumpur

113. Sze Ya Temple Kuala Lumpur

Type of Studies : First year undergraduate degree in local, Singapore and Taiwan universities

Selection Criteria : Residents of Wilayah Persekutuan and Selangor

Further Information:

The Scholarship Committee
Sze Ya Temple
14A, Leboh Pudu
50050 Kuala Lumpur

114. Tan Sri Dato' Dr Jeffrey Cheah Scholastic Awards

Type of Studies : (a) University and Pre-university programmes
(b) Professional and Financial courses

Value of Award : RM2,000

Further Information:

Marketing Department
Level 1 Sunway College
No. 5 Jalan Kolej
Bandar Sunway
Petaling Jaya

115. Tan Sri Manickavasagam

Type of Studies : Degree at local universities/Diploma at polytechnics in Ipoh, Kuantan

and TAR college

Selection Criteria : (a) Malaysian students of Indian origin

(b) SPM/STPM

Value of Award : RM2,000 per year for Degree

Further Information:

*Tan Sri Manickavasagam Fund
Bangunan MIC
1st Floor, No.1 Jalan Rahmat
Off Jalan Tun Ismail
50350 Kuala Lumpur*

116. Taufik Ali Memorial

Type of Studies : Certificate/Diploma/Degree/
Postgraduate at the University of
Hong Kong

Selection Criteria : Bachelor's Degree with Honours
from an approved university

Value of Award : HK\$3,500 per month

Further Information:

*Academic Secretary
University of Hong Kong
Hong Kong*

117. Taylor's College – Melbourne Scholarship

Type of Studies : Year 12 (VCE)

Further Information:

*The Student Service Centre
Suite 2.37 2nd Floor
Wisma Stephens
Jalan Raja Chulan
50200 Kuala Lumpur*

118. Taylor's College

1. Tan Sri Dato Loy Hean Heong Merit Scholarships are awarded for outstanding Taylor's College students who have achieved 7 to 10 distinctions in their SPM or 'O' levels.
2. Inaugural Merit Scholarships for British Engineering Programme for students who excel in their STPM, UCE and pre-university exams are offered either a full or partial scholarships for their duration of studies at Taylor's College.
3. President's Merit Scholarships for American Degree Program are given out to students from Chinese Independent Schools. Outstanding and deserving students are nominated by the respective schools for the said scholarships.
4. Inaugural Merit Scholarships for British Engineering Programme are given out to students from Chinese Independent Schools. Outstanding and deserving students are nominated by the respective schools for the said scholarships.
5. Taylor's College/UTS Twinning Programme Board of

Governors' Scholarships are given out to 3 top students from the UTS Twinning Programme based on their performance at Taylor's College.

6. Taylor's College/UTS Twinning Programme Board of Governors' Scholarships are given to one top student for Law and one top student for Business from the Sheffield Twinning Programme based on their performance at Taylor's college.

119. Technical Cooperation Training Programme (TCPT)

Further Information:

*British Council
Jalan Bukit Aman
P.O.Box 10539
50916 Kuala Lumpur*

120. Tenaga Nasional

Type of Studies: Pre-university and Degree courses for the following:-

- Akitek
- Ekonomi
- Kejuruteraan Alam Sekitar
- Kejuruteraan Awam
- Kejuruteraan Elektrik (Perhubungan)
- Kejuruteraan Elektrik (Kuasa)
- Kejuruteraan Elektronik
- Kejuruteraan Kimia
- Kejuruteraan Komputer
- Kejuruteraan Mekanikal
- Kejuruteraan Pembuatan
- Kejuruteraan Perindustrian
- Kejuruteraan Seramil
- Pemasaran
- Pengurusan Harta
- Pengurusan Perniagaan
- Perakaunan
- Perundangan
- Robotik
- Sains Komputer

Selection Criteria : (a) Grade I SPM/SPVM with a minimum aggregate of 12
(b) Distinction or a strong credit in the relevant subject

Deadline : 2 weeks after SPM/SPVM results

Further Information:

*Pengurus Besar
(Pengurusan Sumber Manusia)
Tenaga Nasional Bhd
Peti Surat 11003
50732 Kuala Lumpur*

*Secretariat Yayasan Tenaga Nasional
Corporate Training Dept
10th Floor TNB Headquarters
129 Jalan Bangsar
59200 Kuala Lumpur*

121. Telekom Malaysia

Type of Studies : Diploma/Degree at local universities/institutions for the

following:-

- Accountancy
- Business Management/Marketing
- Computer Science
- Electronic Engineering
- Human Resources Management
- Industrial Engineering
- Information Technology
- Telecommunications Engineering

Selection Criteria : Malaysian citizens

Value of Award : (a) RM3,000 for Diploma
(b) RM3,600 for Advanced Diploma/Degree

Further Information:

*Education Sponsorship Division
Telekom Malaysia Berhad
3rd Floor, Wisma Telekom
Jalan Desa Utama, Taman Desa
58100 Kuala Lumpur*

122. Texchem Group of Companies Scholarship Awards

Type of Studies : Accountancy, Business Administration, Economics, Engineering, Environmental Studies, Science

Further Information:

*Public Affairs Manager
Texchem Scholarship Award
P.O.Box 1146
10850 Penang*

123. Tuanku Jaafar Metropolitan College

Type of Studies : Bachelor's Degree

Selection Criteria : (a) Malaysian citizens
(b) Good STPM/A-levels results or equivalent

Further Information:

*The Chief Executive
Metropolitan College
No. 1, Jalan Subang Utama
47500 Subang Jaya
Selangor Darul Ehsan*

124. United Overseas Bank Group

Type of Studies : Accountancy, Business Administration, Computer Science, Economics, Law

Value of Award : RM5,000 per year

Further Information:

*Vice President
Human Resources Division
10th Floor, Lee Wah Bank Building
10-12 Medan Pasar
P.O.Box 11212
50738 Kuala Lumpur*

125. United States International University and Presidential Scholarship

Type of Studies : All courses

Selection Criteria : Grade point average or above (high school or transfer). Scholarships are awarded at the time of admission.

Value of Award : Tuition credit of 30%

Further Information:

*MACEE
191 Jalan Tun Razak
50400 Kuala Lumpur*

126. University of Liverpool

Type of Studies : Local Degree courses in Arts and Science and for Law at University of Liverpool

Further Information:

*University of Liverpool
c/o British Council
Jalan Bukit Aman
P.O.Box 10539
50916 Kuala Lumpur
Tel: 03-2987555*

127. University of Technology, Sydney - Taylor's College Twinning Programme Scholarship

Type of Studies : Business

Further Information:

*Taylor's College
1 Jalan SS15/B
47500 Subang Jaya
Selangor*

128. VV Chellam Memorial

Type of Studies : Local universities

Selection Criteria : Malaysian citizens

Deadline : April

Further Information:

*Chairman
V.V. Chellam Memorial Scholarship
Rotary Club of Johor Baru
P.O.Box 54
80730 Johor Baru*

129. Wesleyan Freeman Asian Scholars Program

Type of Studies : All courses

Selection Criteria : Academically outstanding students who have completed secondary schooling by August 1997. Must be citizens or permanent residents from one of the ten Asian countries

Value of Award : Cost of board, room and tuition for 4 years and limited travel expenses

No. of Awards : 2 for each Asian country

Further Information:

Wesleyan Freeman Scholarship
MACEE
191 Jalan Tun Razak
50400 Kuala Lumpur

130. Western Digital Scholarship Award

Type of Studies : Computer Science, Engineering (Chemical/Electrical/Mechanical) Science (Chemistry/Physics)

Further Information:

Section Head - Human Resource Development
Western Digital Malaysia
P.O.Box 6547
Kg Tunku
47307 Petaling Jaya

131. WIEN International Scholarship Program

Further Information:

Wesleyan Freeman Scholarship
MACEE
191 Jalan Tun Razak
50400 Kuala Lumpur

132. Yayasan Bumiputra Pulau Pinang and Motorola Scholarship

Type of Studies : Degree in Technical discipline

Further Information:

General Manager
Yayasan Bumiputra Pulau Pinang Bhd
47th Floor Komtar Building
10000 Penang

133. Yayasan CCM

Type of Studies : (a) Arts (Business Administration/ Commerce/Economics/Finance), Engineering (Chemical/ Electrical/Mechanical/ Information Technology, Science (Agriculture, Polymer Chemistry) and Social Science
(b) Matriculation courses in local universities (Bumiputeras only)

Selection Criteria : Malaysian citizens who possess a full STPM or equivalent matriculation qualifications

Further Information:

The Human Resource Manager
Yayasan CCM
P.O.Box 10284
50708 Kuala Lumpur

134. Yayasan ICI

Type of Studies : Agricultural Science, Engineering, Pharmacy, Polymer Science and Science studies at local universities

Value of Award : RM5,000

Further Information:

Yayasan ICI
P.O.Box 10284
50708 Kuala Lumpur

Deadline : April

135. Yayasan KLK

Type of Studies : First year Diploma/Degree in Agricultural Science or Agriculture/Chemical/Mechanical Engineering at Malaysian universities/institutions

Selection Criteria : Malaysian citizens

Conditions : (a) Must undertake practical training during the university vacations in Yayasan or with any of the estates/mills
(b) Required to serve the Yayasan or any estate or palm oil mill for a minimum of 2 years upon completion

Value of Award : (a) RM3,400 per year for Diploma
(b) RM4,000 per year for Degree

Deadline : July

Further Information:

Yayasan KLK
Wisma Taiko
1, Jalan S.P.Seenivasagam
30000 Ipoh
Perak

136. Yayasan Pelajaran MARA Japanese Matriculation/Undergraduate Program Scholarship

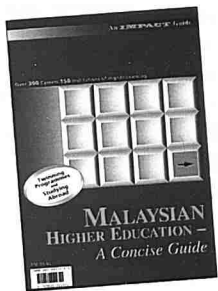
Type of Studies : Engineering and Science

Further Information:

Bahagian Pemasaran and Penempatan
Yayasan Pelajaran MARA
3rd Floor Wisma PKNS
Jalan Raja Laut
P.O.Box 13464
50810 Kuala Lumpur

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