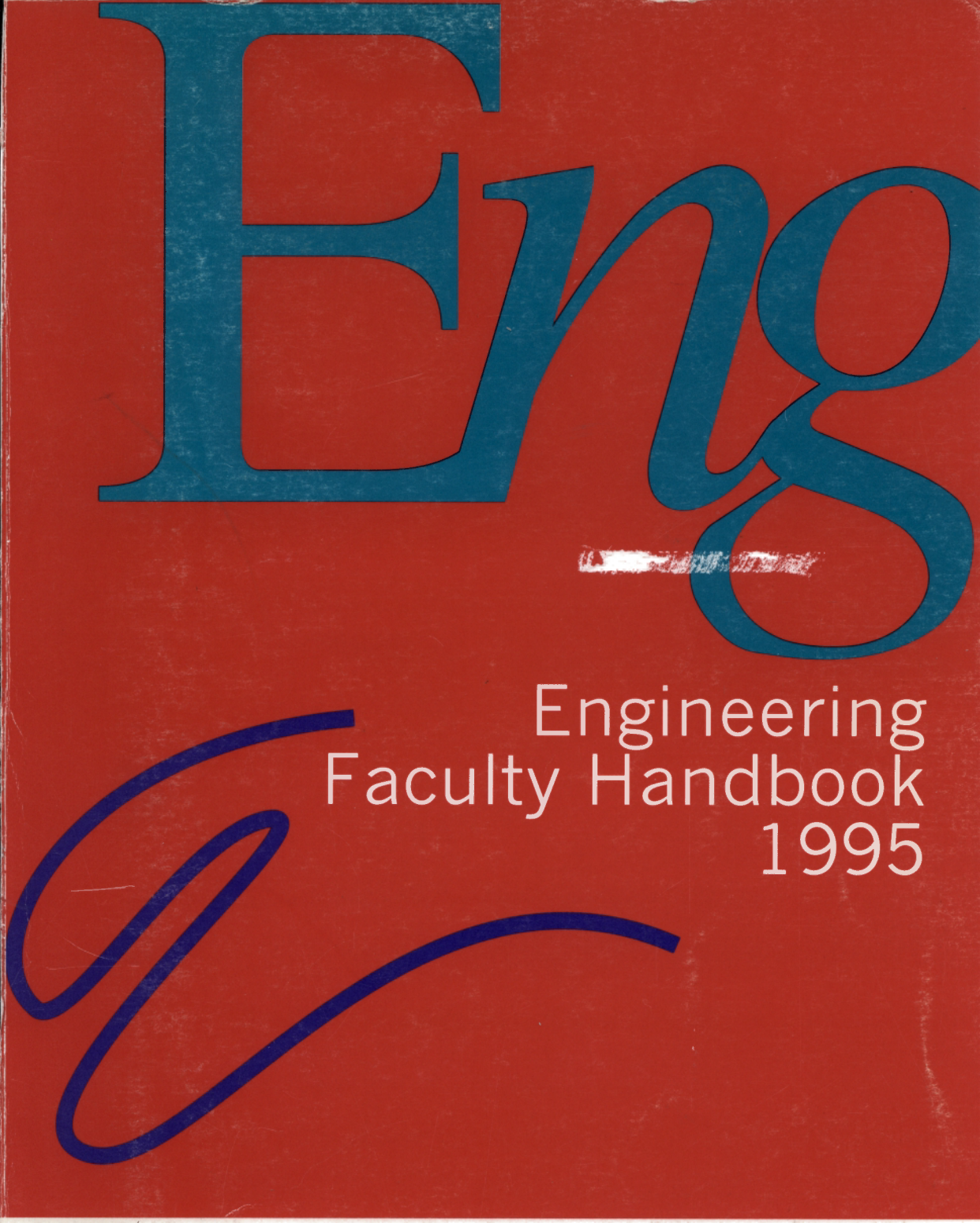


Engineering Faculty Handbook 1995

UTS

Engineering Faculty Handbook **1995**

The University attempts to ensure that the information contained in the handbook is correct as at 4 November 1994. The University reserves the right to vary any matter described in the handbook at any time without notice.

Equal opportunity

It is University policy to provide equal opportunity for all, regardless of race, sex, marital status, physical ability, sexual preference, age, political conviction or religious belief. The University also has an ethnic affairs policy to ensure that the University community is sensitive to the multicultural nature of Australian society and the cultural diversity within the University.

Free speech

The University supports the right to freedom of speech and the rights of its members to contribute to the diversity of views presented in our society.

Non-discriminatory language

UTS has adopted the use of non-discriminatory language as a key strategy in providing equal opportunity for all staff and students. Guidelines for the use of non-discriminatory language have been developed and all members of the University community are encouraged to use them.

Editorial and production:

Corporate Responsibilities Unit
University Secretary's Division

Design:

UTS News and Design Services

UNIVERSITY OF TECHNOLOGY, SYDNEY
ADDRESSES AND TELEPHONE NUMBERS

POSTAL ADDRESS

PO Box 123
Broadway
NSW 2007 Australia

Telephone – all campuses except School of Legal Practice: (02) 330 1990
International: +61 2 330 1990
Fax: (02) 330 1551
Telex: AA 75004

STREET ADDRESSES

City campus

- Broadway
  No. 1 Broadway, Ultimo
  702–730 Harris Street, Ultimo
- Haymarket
  Corner Quay Street and Ultimo Road, Haymarket, Sydney
- Blackfriars
  Blackfriars Street, Chippendale
- Smail Street
  3 Smail Street, Ultimo
- Wembley House
  839–847 George Street, Sydney
- 645 Harris Street, Ultimo
- Bulga Ngurra, 23–27 Mountain Street Ultimo
- 82–84 Ivy Street, Chippendale

Kuring-gai campus

Eton Road
Lindfield
(PO Box 222, Lindfield NSW 2070)

St Leonards campus

- Dunbar Building
  Corner Pacific Highway and Westbourne Street, Gore Hill
- Clinical Studies, Centenary Lecture Theatre and West Wing
  Reserve Road, Royal North Shore Hospital
- Gore Hill Research Laboratories
  Royal North Shore Hospital
- School of Legal Practice (College of Law)
  Corner Chandos and Christie Streets
  St Leonards
  Telephone: (02) 965 7000

Yarrawood Conference and Research Centre

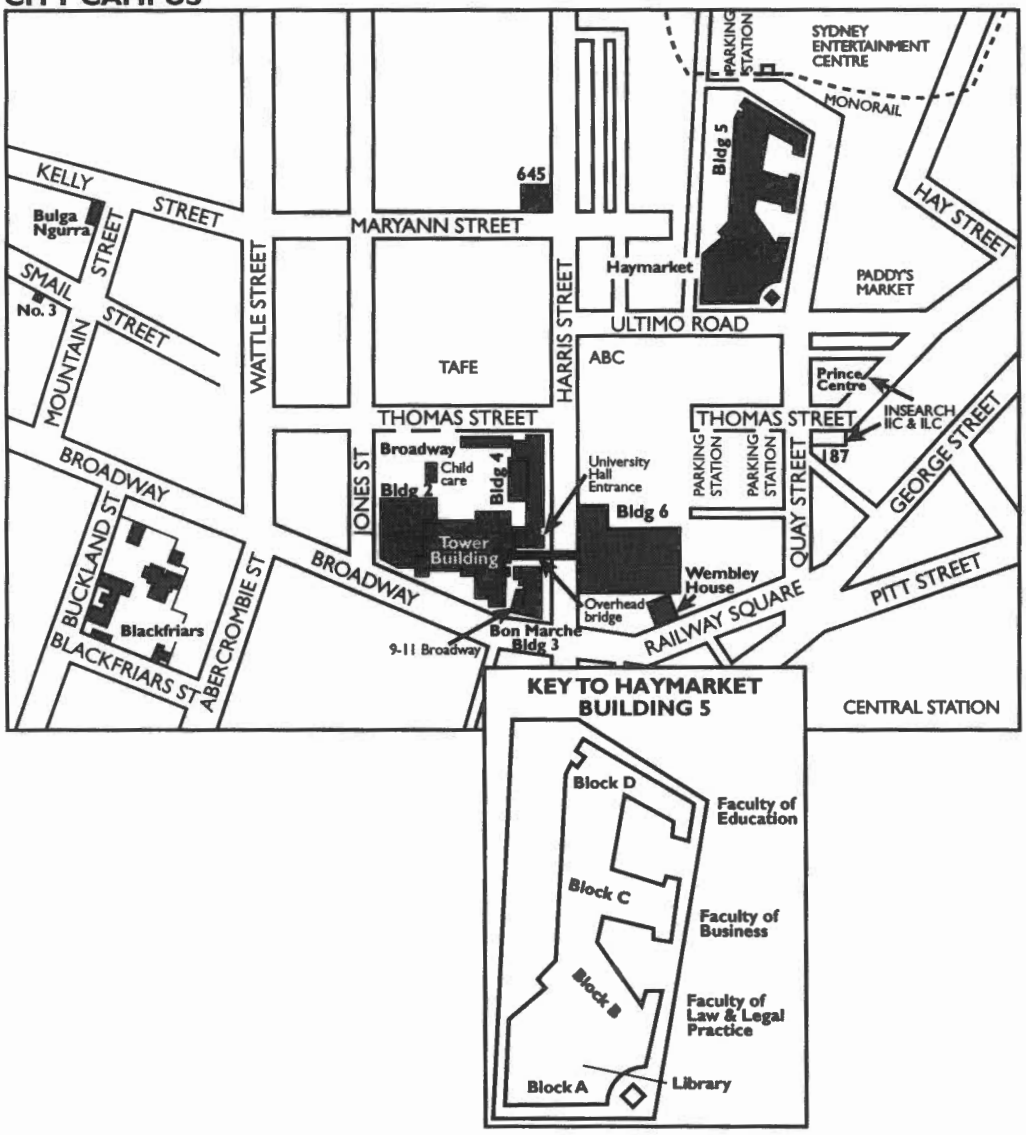
Hawkesbury Road
Yarramundi 2753

Stroud

Lot AFP 161894
The Bucketts Way
Booral 2425

CAMPUS MAPS

CITY CAMPUS



City campus

- Broadway
  No. 1 Broadway, Ultimo
  702–730 Harris Street, Ultimo
- Haymarket
  Corner Quay Street and Ultimo Road
  Haymarket, Sydney
- Smail Street
  3 Smail Street, Ultimo
- Wembley House
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  Sydney
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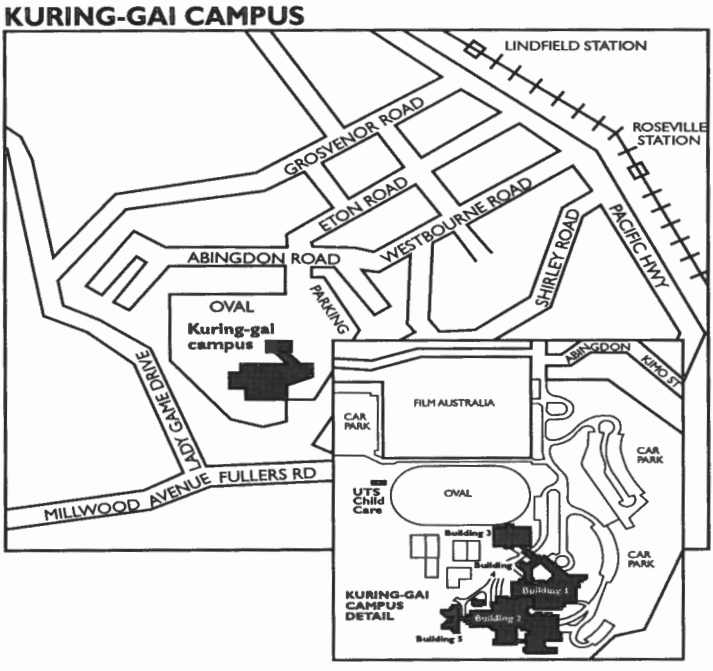
CAMPUS MAPS

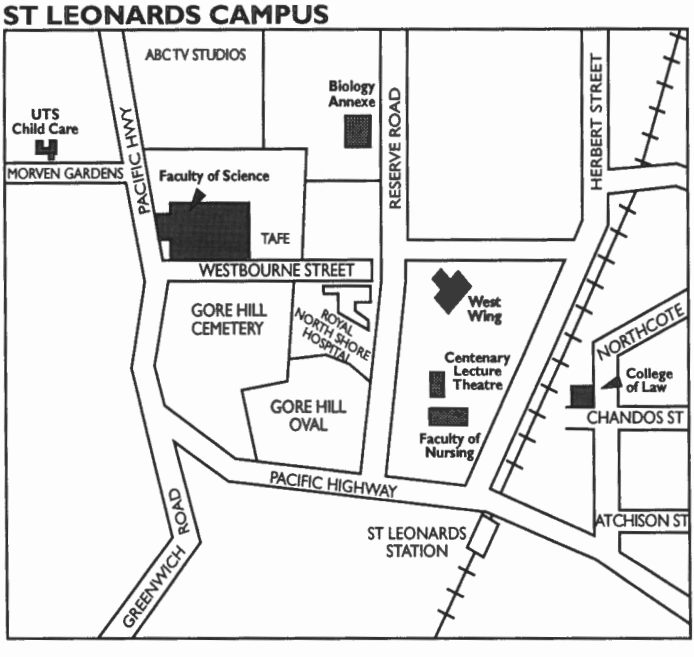
Kuring-gai campus

Eton Road
Lindfield



St Leonards campus

- School of Biological and Biomedical Sciences
  Dunbar Building
  Corner Pacific Highway and Westbourne Street
  Gore Hill
- Clinical Studies, Centenary Lecture Theatre and West Wing
  Reserve Road, Royal North Shore Hospital
- Gore Hill Research Laboratories
  Royal North Shore Hospital
- School of Legal Practice (College of Law)
  Corner Chandos and Christie Streets
  St Leonards



CONTENTS

PREFACE

This handbook is one of a suite of twelve publications comprising the University *Calendar*, the *Student Information Guide* and ten handbooks: Business; Design, Architecture and Building; Education; Engineering; Humanities and Social Sciences; International Studies; Law and Legal Practice; Mathematical and Computing Sciences; Nursing; and Science. Each handbook provides general information about the faculty as well as detailed information on the courses and subjects offered.

The *Calendar* contains the University By-law, which all students should read. It also contains a list of the University's courses, giving the name, abbreviation and title as indicated on the testamur. Copies of the *Calendar* are held in the University Library and in faculty offices, and may be purchased at the Co-op Bookshop.

Copies of the *Student Information Guide* are provided free to students at enrolment. You should make sure that you read the student rules published in the guide. Information on the rights and responsibilities of students and on the services and facilities available is also given. The guide will assist you in your dealings with the University's administration and tell you whom to contact if you have a problem or need advice. Other publications providing information of a general nature are the UAC *Guide*, and the UTS Undergraduate and Postgraduate Studies Guides, all of which are available from the UTS Information Service.

For further information not provided in any of the publications mentioned e.g. additional information on courses, methods of assessment and book lists, you should contact the UTS Information Service or your Faculty office. If in doubt, don't hesitate to ask.

We hope you will enjoy your time as a student at UTS and wish you well in your studies.

FACULTY MISSION STATEMENT

The Faculty's purpose is to develop and teach that combination of intellectual capability and practical knowledge essential to the professional practice of engineering and the furtherance of engineering enterprise. This requires commitment to quality not only in engineering science and technology, but equally in the process of engineering – the application and management of technology to produce commercially, economically, environmentally and socially viable goods and services.

The Faculty promotes these ideals through its undergraduate courses, its postgraduate and continuing professional education programs, and the research programs and professional activities of its staff and students; and through its continuing commitment to the Women in Engineering program and its contribution to the Australian Graduate School of Engineering Innovation. It seeks to interact continually and closely with industry and the practising profession, to be dynamic in both its contributions and its responses to professional and public developments, and to support the wellbeing of Australia as a member of the international community.

The Faculty seeks to engage all of its staff and students in the pursuit of these corporate aims. It tries to maintain a dynamic balance between the organisation of managed group programs with specified goals, the encouragement of initiatives by individual members of staff, and the establishment of diverse yet selective linkages with other disciplines, academic institutions and enterprises in Australia and overseas.

The Faculty believes this statement of purpose and aims to be in accordance with the corresponding statements by the University.

PRINCIPAL DATES FOR 1995 [1]

AUTUMN SEMESTER

January

3 Enrolment day for Summer schools
4 School of Legal Practice enrolment day at St Leonards campus
9 Release of HSC results
13 Formal supplementary examinations for 1994 Spring semester students
17 Closing date for changes of preference to the Universities Admissions Centre (UAC) from 1994 NSW HSC applicants (by 4.30 p.m.)
19–31 Enrolment of postgraduate students, continuing undergraduate students and new direct entry students at City campus
26 Australia Day – public holiday
27 Public school holidays end

February

1–6 Enrolment of new undergraduate (UAC) students at City campus
7–17 Enrolment of postgraduate students, continuing undergraduate students and new direct entry students at City campus
27 Classes begin

March

10 Last day to enrol in a course or add subjects
Last day to change to 'pay now/up-front' HECS payment
24 Last day to apply for leave of absence without incurring student fees/charges
31 HECS Census Date
Last day to withdraw from a subject without financial penalty

April

7 Last day to withdraw from a course or subject without academic penalty [2]
14 Public school holidays begin
Good Friday
17 Easter Monday
18–21 Vice-Chancellors' Week (non-teaching)
19 Graduation period begins
21 Public school holidays end
Provisional examination timetable available
25 Anzac Day
28 Last day to apply to graduate in Spring semester 1995

May

5 Graduation period ends
12 Examination Masters due
26 Final examination timetable available
31 Closing date for undergraduate and postgraduate applications for Spring semester

June

12 Queen's Birthday – public holiday
13–29 Formal examination period
30 Autumn semester ends

[1] Information is correct as at 15 November 1994. The University reserves the right to vary any information described in Principal Dates for 1995 without notice.

[2] HECS/Postgraduate course fees will apply after the HECS Census Date.

SPRING SEMESTER

July

3 Public school holidays begin
3–7 Vice-Chancellors' Week (non-teaching)
10–14 Formal alternative examination period for Autumn semester students
14 Public school holidays end
21 Release of Autumn semester examination results
24 Formal supplementary examinations for Autumn semester students
24–28 Confirmation of Spring semester programs
25–26 Enrolment of new and readmitted students and students returning from leave/concurrent study
31 Classes begin

August

1 Applications available for undergraduate and postgraduate courses
4 Last day to withdraw from full year subjects without academic penalty [2]
11 Last day to enrol in a course or add subjects
Last day to change to 'pay now/up-front' HECS payment
25 Last day to apply for leave of absence without incurring student fees/charges (Spring enrolments only)
31 HECS Census Date
Last day to withdraw from a subject without financial penalty
Last day to apply to graduate in Autumn semester 1996

September

8 Last day to withdraw from a course or subject without academic penalty [2]
22 Provisional timetable available
25 Public school holidays begin
Graduation period begins
25–29 Vice-Chancellors' Week (non-teaching)
29 Closing date for undergraduate applications via UAC (without late fee)
Closing date for inpUTS Special Admission Scheme applications
Graduation period ends
Closing date for postgraduate applications (*to be confirmed*)

October

2 Labour Day – public holiday
6 Public school holidays end
13 Examination Masters due
27 Final examination timetable available
31 Closing date for postgraduate research and course award applications
Closing date for undergraduate applications via UAC (with late fee)
Closing date for undergraduate applications direct to UTS (without late fee)

November

13–30 Formal examination period

December

1 Spring semester ends
11–15 Formal alternative examination period for Spring semester students
18 Public school holidays begin
22 Release of Spring semester examination results

[2] HECS/Postgraduate course fees will apply after the HECS Census Date.

THE FACULTY OF ENGINEERING

The Faculty of Engineering has a strong vocational orientation. Its courses have been designed to achieve standards of education and professional competence which equip graduates to play an effective role in industry immediately upon gaining their qualification.

The Faculty's most important distinguishing feature is its commitment to the philosophy of cooperative education, that is, the belief that the development of fully professional engineers requires both academic and industrial training and that these should be experienced concurrently. Industrial experience is therefore an essential feature of all undergraduate engineering courses. Graduate programs and other activities also involve close association with industry and the engineering profession, and the Faculty maintains working contacts with many hundreds of employers of engineers.

COURSES OFFERED

The Faculty has four Schools. They offer these courses:

School of Civil Engineering

Bachelor of Engineering in Civil Engineering
Bachelor of Engineering in Civil and Environmental Engineering
Bachelor of Engineering in Structural Engineering

School of Electrical Engineering

Bachelor of Engineering in Electrical Engineering
Bachelor of Engineering in Computer Systems Engineering
Bachelor of Engineering in Telecommunications Engineering

School of Mechanical Engineering

Bachelor of Engineering in Mechanical Engineering
Bachelor of Engineering in Manufacturing Systems Engineering
Bachelor of Engineering in Mechanical or Manufacturing Systems Engineering and Master of Design

The Graduate School of Engineering

Doctor of Philosophy
Master of Engineering (by thesis)
Master of Engineering (by coursework)
Master of Engineering in Telecommunications Engineering
Master of Engineering in Groundwater Management
Master of Engineering Practice
Master of Engineering Management
Master of Technology
Master of Local Government Management
Graduate Diploma in Engineering and Graduate Certificate in Engineering
Graduate Diploma in Local Government Engineering
Graduate Diploma in Engineering in Groundwater Management
Graduate Certificate in Environmental Engineering and Management

Faculty-based courses

Bachelor of Engineering/Bachelor of Arts in International Studies
Bachelor of Technology in Manufacturing Engineering

WOMEN IN ENGINEERING

The Faculty has set up a Women in Engineering program to increase the number of women enrolling and graduating in engineering schools at the University. The program aims to foster a learning environment which promotes the interests and needs of women students. Special support is offered in liaising with academic staff, meeting with practising engineers, organising social meetings, and in seeking industrial experience placements.

EXCHANGE PROGRAMS

UTS Engineering students have the opportunity to study at an overseas university and gain industrial work experience by participating in the Faculty's Student Exchange Program. Subject to conditions, students gain academic credit for studies completed at an overseas university, and may obtain overseas work experience which satisfies UTS Engineering course requirements.

The Student Exchange program operates between the Faculty of Engineering and the following universities:

- Institut National des Sciences Appliquées de Lyon (France)
- The University of Waterloo (Canada)
- California State University, Sacramento (USA)
- The Technical University of Budapest (Hungary)
- The University of Electro-Communications, Tokyo (Japan)
- King Mongkut's Institute of Technology, Thonburi (Thailand)
- Mahidol University, Bangkok (Thailand)

Each university participating in the Student Exchange Program has particular strengths. Selection of a particular university requires careful consideration and planning well in advance. Some require participating students to develop foreign language skills prior to departure from Australia.

Students participating in the exchange program are exempt from paying tuition fees at the host university, but are required to pay the usual UTS fees (such as Union fees) and Australian HECS. They are also required to take out appropriate general and health insurances, and to meet their own living and travel costs. In some cases students can obtain paid work.

Faculty staff can provide advice about student exchange opportunities and on ways to develop appropriate language skills and cultural awareness. For further information students should contact the Faculty office or their Academic Adviser.

ENGINEERING CLUBS AND SOCIETIES

Engineering clubs and societies at UTS include:

- The Faculty of Engineering Speakers Club
- UTS Engineering Society
- Civil and Structural Engineering Society (CASES)
- Electrical Engineering Society (EES)
- Mechanical and Production Engineering Society (MECHPAS)
- UTS Amateur Radio Society

For more information contact the Faculty office.

PRIZES

Prizes and scholarships are awarded each year to students in the Faculty for meritorious work. These are made available through the generosity of private individuals and public organisations. The prizes and scholarships offered are listed below. Full details are published in the University *Calendar*.

General

- IEAust MEM Prize
- James N Kirby Foundation Bequest
- Francis E Feledy Memorial Prize
- The Institution of Engineers, Australia Award
- United Associations of Women Prize

School of Civil Engineering

- Smorgon ARC Engineering Prize
- Association of Consulting Structural Engineers Prizes
- Trevor Buchner Design Prize
- The George J Haggarty Civil Engineering Prize
- The George J Haggarty Civil Engineering Scholarship
- Hardie's 'Pipeline Systems' Award
- Jack Kaganer Prize
- Leica Instruments Pty Ltd Prize

- Institute of Municipal Engineering Australia (IMEA) – NSW Division Medal
- Pioneer Concrete (Stage 5) Prize
- Ove Arup Bursary

School of Electrical Engineering

- CSE Forum Prize for Outstanding Industrial Experience
- Electricity Supply Engineers' Association of New South Wales Prize
- Institution of Electrical Engineers NSW International Centre Prize
- The Institution of Electrical Engineers, UK Prize
- The Institute of Instrumentation and Control, Australia Prize
- The Sydney Electricity Prize in Power Engineering
- Optus Medal

School of Mechanical Engineering

- The Institution of Electrical Engineers – E C Parkinson Prize
- The L H Baker Medal
- Eldred G Bishop Prize
- Compumod Prize in Solid Mechanics
- The Institute of Instrumentation and Control, Australia Prize
- MTIA John Heine Memorial Prizes
- Society of Manufacturing Engineers (Stage 7) Prize
- Society of Manufacturing Engineers (Stage 8) Prize

LOCATION AND STAFF

Faculty office

Level 4, Building 2
Broadway, City campus

The Faculty office is moving to Level 7, Building 2 in 1995.

Postal address:
PO Box 123
Broadway NSW 2007
Telephone: 330 2604

School of Civil Engineering

Level 5, Building 2
Broadway, City campus
Telephone: 330 2630

School of Electrical Engineering

Level 24, Building 1
Broadway, City campus
Telephone: 330 2433

School of Mechanical Engineering

Level 6, Building 2
Broadway, City campus
Telephone: 330 2669

Until the end of 1994, the office of the Dean of Engineering and Faculty office are located on Level 4 of the Engineering Building, Broadway. The Women in Engineering office is also located on this level opposite the Faculty office. These offices will be moving to Level 7 in 1995. Staff associated with these offices are:

	Room	Ext
Dean of Engineering		
P J Parr	426B	2599
Faculty Administrator		
D J Carraro	426A	2594
Secretary to the Dean		
E Tu	426	2596
Professor		
A Pattison	424A	2591
Associate Professor and Director, Bachelor of Technology in Manufacturing Engineering		
C T Mathews	628	2686
Associate Professor and Director, Management Studies in Engineering		
J V Parkin	520	2638
Director, Bachelor of Engineering and Arts program		
Dr S Parsanejad	504	2620
Director, Industrial Liaison		
J G Crowe	424B	2592
Assistant Director, Industrial Liaison		
K Fiddy	429B	2603
Women in Engineering Coordinator		
M Boman	412	2602 2601
Graduate Studies Officer		
B Buckenmaier	433	2606
Administrative Officer – Finance and Operations		
M G Rothery	429C	2600
Administrative Secretary		
L B M Smith	433	2604

Industrial Liaison Officers
(Part-time)
M R Collison
P J Doyle 433 2605

COURSE CODES

Course codes for **undergraduate courses:**

EC00 Bachelor of Engineering in Civil Engineering (cross-institution)
EC03 Bachelor of Engineering in Civil Engineering
EC04 Bachelor of Engineering in Structural Engineering
EC07 Bachelor of Engineering in Civil and Environmental Engineering
EE00 Bachelor of Engineering in Electrical Engineering (cross-institution)
EE03 Bachelor of Engineering in Electrical Engineering
EE04 Bachelor of Engineering in Computer Systems Engineering
EE06 Bachelor of Engineering in Telecommunications Engineering
EM00 Bachelor of Engineering in Mechanical Engineering (cross-institution)
EM03 Bachelor of Engineering in Mechanical Engineering
EM04 Bachelor of Engineering in Manufacturing Systems Engineering
E003 Bachelor of Engineering/Bachelor of Arts in International Studies
E010 Bachelor of Technology in Manufacturing Engineering

Course codes for **research degree programs:**

EC55 Doctor of Philosophy (Civil)
EE53 Doctor of Philosophy (Electrical)
EM55 Doctor of Philosophy (Mechanical)
E055 Doctor of Philosophy in Engineering (Groundwater Management)
EC51 Master of Engineering (by thesis) (Civil)
EE51 Master of Engineering (by thesis) (Electrical)
EM51 Master of Engineering (by thesis) (Mechanical)
E056 Master of Engineering (by thesis) (Groundwater Management)

Please note that course codes for graduate programs by coursework for commencing students are different from those for continuing students, except for the following three programs:

EB52 Master of Local Government Management
E061 Graduate Diploma in Engineering in Groundwater Management
E057 Master of Engineering in Groundwater Management

Course codes for graduate programs by coursework for **continuing students** are as follows:

EC57 Graduate Certificate in Engineering (Civil)
EE57 Graduate Certificate in Engineering (Electrical)
EM57 Graduate Certificate in Engineering (Mechanical)
EC58 Graduate Certificate in Environmental Engineering and Management
EC53 Graduate Diploma in Local Government Engineering
E051 Graduate Diploma in Engineering
EC54 Graduate Diploma in Engineering (Civil)
EE52 Graduate Diploma in Engineering (Electrical)
EM54 Graduate Diploma in Engineering (Mechanical)
EE54 Master of Engineering in Telecommunications Engineering
E052 Master of Engineering Management
E053 Master of Engineering Practice

Course codes for graduate programs by coursework for **commencing students from 1995**:

EP81 Master of Engineering (by coursework)
EP82 Master of Engineering (by coursework) (Energy Planning and Policy)
EP83 Master of Engineering (by coursework) (Software Engineering)
EP84 Master of Engineering in Telecommunications Engineering

EP85 Master of Engineering Management
EP86 Master of Engineering Practice
EP71 Master of Technology
EP72 Master of Technology (Energy Planning and Policy)
EP73 Master of Technology (Software Engineering)
EP61 Graduate Diploma in Engineering
EP62 GradDipEng (Energy Planning and Policy)
EP63 GradDipEng (Software Engineering)
EP64 GradDip in Local Government Engineering
EP51 Graduate Certificate in Engineering
EP52 GradCertEng (Energy Planning and Policy)
EP53 GradCertEng (Software Engineering)
EP54 GradCert in Environmental Engineering and Management

UNDERGRADUATE COURSES

Bachelor of Engineering

DESCRIPTION

Undergraduate courses are available in Civil, Structural, Civil and Environmental, Electrical, Computer Systems, Telecommunications, Mechanical, and Manufacturing Systems Engineering, and lead to the award of Bachelor of Engineering (BE).

Each course incorporates the principles of cooperative education in which classroom and laboratory work are developed with the needs of professional practice in mind. All students are required to undertake at least 90 weeks of approved work in industry during their course enrolment. Work experience is accumulated in blocks of at least 22 weeks' duration and must satisfy a number of rules covering its quality and timing (see *Industrial Experience Requirements* on p.11). The attendance patterns which provide for this are sandwich or part-time. There are no full-time students.

Joint programs in Engineering and Arts (BE BA), and in Engineering and Industrial Design (BE MDes) are also available.

HONOURS

The Bachelor of Engineering degree may be awarded with First or Second Class Honours for meritorious performance in the course as a whole.

ADMISSION

(See also the *Student Information Guide 1995.*)

Each course has an intake of students in March each year. Courses offered by the Schools of Civil, Electrical and Mechanical Engineering may consider a mid-year intake. Applications for admission in March are made through the Universities Admissions Centre (UAC). Enquiries for admission mid-year should be directed to the Head of School.

Entry from HSC: Selection is based on a Tertiary Entrance Rank (TER). For admission based on the 1993 NSW HSC examination the required levels of TER were 75.0 for Civil/Structural Engineering, 77.0 for Electrical Engineering, 92.0 for Computer Systems Engineering, and 72.0 for Mechanical/Manufacturing Systems Engineering. For the new courses required levels of TER have been set at 82.0 for Civil and Environmental, 87.0 for Telecommunications Engineering.

Although there are no formal subject prerequisites, UTS engineering courses are taught on the assumption that students will have passed 3-unit Mathematics, 2-unit Physics and 2-unit Chemistry. It is recommended that 2-unit General English be completed as well.

Entry with TAFE awards: Applicants holding approved TAFE awards will satisfy the University's general matriculation requirement. Selection to a particular course will depend, among other things, upon the level of achievement in the appropriate qualification.

Other qualifications: Applications from holders of other qualifications, including TAFE Certificates/Associate Diplomas, will be considered individually on merit.

Advice to applicants: Schools of the Faculty will offer advice to applicants who have failed to reach the necessary standard for selection, on steps they might take to improve their prospects of admission in a future year.

ADVANCED STANDING

Students who have pursued relevant studies at another tertiary institution may be admitted to a course with advanced standing and exempted from certain subjects. Holders of appropriate TAFE Certificates/Associate Diplomas with results of high standard may also qualify for advanced standing. Extensive industrial experience gained prior to admission may qualify a student for exemption from part of the industrial experience requirements.

TAFE studies: UTS has an articulated credit transfer policy with TAFE (NSW) covering advanced standing in engineering undergraduate courses. Holders of a TAFE Associate Diploma in a relevant field of engineering, at Distinction level, will be accorded 25 per cent credit towards the BE degree, subject to the following: the student has passed specified subjects within the Associate Diploma, or has obtained nominated marks in specified subjects in the Higher School Certificate prior to undertaking the Associate Diploma. In offering this arrangement, the Faculty reserves the right to advise any student who is admitted with 25 per cent credit, and who is not succeeding in the course, to undertake some or all of the subjects from which exemption had been granted.

Exemptions/advanced standing based on completed TAFE Associate Diplomas are listed in Schedule 1 at the back of this handbook. Completion of particular TAFE qualifications does not necessarily mean that applicants with those qualifications will be offered a place at UTS.

Students holding an Associate Diploma in an appropriate field, which is not of Distinction level but is of sufficient standard to admit them to a UTS BE course through the normal competitive admissions process, will be given credit in accordance with the Faculty's published guidelines, varying from 12 per cent to 18 per cent in particular courses.

Partially-completed BE studies: Students with partially-completed studies in a BE course at another Australian university, accredited by the Institution of Engineers, Australia, who are admitted to a UTS BE course, will be guaranteed full proportional for credit up to 50 per cent of the academic requirements for the degree. This will be on a specified-credit, case-by-case basis. They may be allowed further credit, on a discretionary basis, up to a maximum of 75 per cent of the academic requirements for the degree. These students may also be accorded credit for up to 75 per cent of the industrial experience requirements for the BE degree, provided their

prior industrial experience matches UTS guidelines. The academic and industrial requirements of the UTS BE have to be individually satisfied, and credit towards one does not imply pro rata exemption from the other. Students seeking to transfer to UTS from a full-time course elsewhere will be invited to seek advice.

The Faculty will continue its case-by-case examination of applications for advanced standing from entrants in all other circumstances.

ATTENDANCE PATTERNS

The structure of each course provides for both sandwich and part-time attendance patterns. Combined sandwich and part-time attendance is also possible.

A semester consists of 14 weeks of teaching, a one-week study period prior to exams and a two-week examination period. The actual weekly contact hours for a subject are denoted by semester hours – the hours of attendance each week for one semester.

Sandwich attendance requires the completion of eight academic semesters plus at least 90 weeks of approved work experience. Part-time students must be employed in work relevant to their course for the duration of their course. Part-time students are required to attend university for up to 15 hours per week, which includes one full day (or equivalent) release from employment each week.

With approval from the Head of School, students are permitted to change their attendance pattern from part-time to sandwich or vice versa to suit their circumstances, provided that industrial experience requirements are met.

DURATION OF COURSE

Normally, the sandwich attendance program will provide for students to complete the course in eight academic semesters plus four blocks of work experience with an overall duration of six years. The first two academic semesters (Stages 1 and 2) are usually completed in the first year of enrolment. The first period of work experience would normally be undertaken in the second year of enrolment. Sandwich pattern students who choose to undertake additional subjects on a part-time basis during periods of work experience and can satisfy work experience requirements in three blocks each of at least 30 weeks' duration, can complete the course in a minimum period of five years.

The part-time attendance program provides for an overall course duration of 14 academic semesters or seven years. Part-time students are encouraged to reduce the overall duration of the course by planning for periods of sandwich attendance as they progress through the course.

ENGINEERING CO-OP SCHOLARSHIPS

About 20 Engineering Co-op Scholarships are expected to be awarded in 1995. The scholarships will be awarded to students who are successful at the 1994 HSC examinations (or equivalent) and entering any of the Bachelor of Engineering courses at UTS in 1995. Selection will be based on a combination of achievements at the trial and actual HSC examinations and personal attributes relevant to a career in professional engineering such as an interest in engineering, communication skills, leadership, and creativity.

Main features of the scholarship:
Scholarships are only available to applicants who satisfy requirements for admission to the sandwich program of any of the Bachelor of Engineering courses at UTS.

Each scholarship is valued at between $5,000 and $10,000.

Scholarships are tenable in the first academic year of the course only.

An initial payment (10 per cent of total value) is made to each scholar at the time of enrolment. This is followed by fortnightly payments commencing in the second week of the Autumn semester. Payments conclude at the end of the Spring semester examination period.

Following the first academic year, each scholar will be given the opportunity to undertake one period of work experience with the sponsor of his/her scholarship.

Sponsors: In 1994 sponsors of the Engineering Co-op Scholarship program were: BP Australia, Canon Australia Ltd, Clough Engineering Group, Gutteridge Haskins & Davey Pty Ltd, IBM Australia, Leighton Contractors Pty Ltd, Ove Arup & Partners, Pacific Power, Rose Consulting Group, Sydney Electricity and Vodafone Pty Ltd.

Applications: Application forms will be available from Careers Advisers by August for the following year's intake of students.

COOPERATIVE EDUCATION IN ACTION

Employment arrangements for sandwich students usually fall into three categories:

Cadetships: These are made available by employers for student engineers. Some cadets are selected by employers on the basis of HSC results and are then directed to study engineering at UTS. Others are selected after completing the early stages of their course at UTS. Cadets are usually paid while studying during their academic semesters as well as during periods of work experience. A cadet would work for the same employer during each work experience period. Cadetships are also available for part-time students.

Sponsorship: This tends to be a verbal understanding between an employer and a student which means that regular employment will be offered in each industrial semester, subject to work availability and satisfactory performance in the job. Salary is usually paid only during the industrial semesters. The type of work offered will often be a productive job rather than a training program.

Freelance: This means that a student may be employed by the same or a different employer during successive industrial experience semesters.

While each student is responsible for finding suitable industrial experience, the Faculty's Industrial Liaison Unit and advisers in each school will help with information and advice. **It is not necessary for a student to have arranged a job before enrolling in the course.**

In contrast to sandwich students, part-time students are continuously employed for the duration of their course enrolment, and usually have a job before commencing their studies.

Students attending on either the sandwich or part-time pattern take exactly the same subjects, and all course requirements are identical except for timetabling details. The two patterns are seen as alternative ways of meeting the cooperative education ideal and it is normally possible to transfer between attendance patterns to meet the needs of students and employers.

Progression through each course is governed by subject prerequisites and it is not necessary to pass all subjects in one stage before going on to the next stage. This allows students with special circumstances to take reduced or accelerated programs, with the approval of their Head of School, and still maintain progress in the course. A sandwich student who has failed a subject may repeat it in an evening class during the next industrial semester, with the approval of the Head of School and employer.

INDUSTRIAL EXPERIENCE REQUIREMENTS

The following regulations have been confirmed by the Faculty Board in Engineering and are based on the Board's policy document, *Undergraduate Industrial Experience Requirements*. The regulations apply from Autumn semester 1992.

1. **Work experience:** Engineering students must gain relevant work experience throughout their course. This experience must satisfy requirements relating to the type of work, its amount and timing. Also, various enrolment procedures

relating to industrial experience need to be followed. Credit will be awarded for work experience only if these requirements and procedures are satisfied.

2. **Type of work experience:** During work experience, students are expected to be engaged on activities and projects relevant to their academic studies. The final period of industrial experience should involve work approaching that likely to be experienced after graduation. Schools publish specific requirements relating to the type of experience required.

3. **Amount of work experience:** The minimum amount of approved industrial experience to be accumulated prior to graduation is 90 weeks. However, most students will obtain more than 90 weeks.

   Students enrolled in engineering courses prior to Autumn 1992 will be required to obtain credit for between 90 and 144 weeks of work experience, the actual duration being determined by the effect of these regulations.

   Students must enrol in Industrial Experience prior to undertaking work experience for credit.

4. **Periods of work experience:** For sandwich students, work experience will normally include four blocks of approximately 24 weeks' duration. However, students may elect to obtain their experience in longer blocks, but must take at least three blocks. Periods shorter than 22 weeks will not receive credit unless specifically approved by the Faculty Board. Each period of industrial experience for sandwich students must be preceded and followed by at least one academic semester. Sandwich students whose employers wish them to commence their course with an industrial experience period may do so with the prior approval of the Head of School.

   Sandwich students will not be permitted to enrol in more than three consecutive academic semesters.

   Sandwich students may in suitable circumstances study academic subjects during a period of industrial experience. Students need, however, to give a high level of commitment to their industrial experience and will be allowed to enrol in academic studies only with the written approval of their employer and the approval of the Head of School. Enrolment in academic subjects during an industrial semester normally will be limited to six hours per week but in no case should exceed two evening sessions.

   Part-time students should be employed in work relevant to their course throughout their enrolment. Students who need time either to find initial employment or arrange a change of employment should seek a short exemption from this requirement. Students who remain part-time throughout the course will accumulate much more than the minimum 90 weeks of work experience.

   Requirements concerning enrolment in Industrial Experience must be followed by all students. These will be identified by individual schools.

5. **Advanced standing:** Students who have had relevant work experience prior to entering their course can seek advanced standing in Industrial Experience. The level of advanced standing granted will be influenced by factors such as the quality of previous work experience and the level of advanced standing granted for academic studies. Normally advanced standing for Industrial Experience will not exceed 30 weeks. For students granted advanced standing all other regulations will continue to apply.

6. **Recording industrial experience:** Each student will be issued with a log book in which to record industrial experience. This must be kept up-to-date and submitted for assessment when required by the School. These records and their assessment carry the same weight as academic subjects in determining students' progress. False or misleading claims of work experience will be treated as academic malpractice.

   Schools will require students to submit comprehensive reports on work experience. Report assessments will be included in students' academic records.

INDUSTRIAL LIAISON OFFICE

The Faculty's Industrial Liaison office maintains contact with industry, registers students' intentions of seeking work experience, files students' resumes, advises students and assists them in obtaining industrial experience. Students seeking work experience should register with the Faculty office in the semester preceding their intended period of work.

PROFESSIONAL RECOGNITION

All Bachelor of Engineering courses offered by the Faculty have been accorded recognition by the Institution of Engineers, Australia.

Membership of the Institution of Engineers, Australia

The Institution's requirement for membership in the grade of Professional Engineer, in addition to a recognised degree, is a minimum of three years of post-graduation experience of an approved nature in professional engineering employment. UTS graduates, in general, are likely to be able to meet this requirement without difficulty, since the industrial experience gained during their course equips them to undertake immediate professional responsibility.

The Institution's regulations also contain provision, in special cases, for industrial experience gained prior to graduation to be counted towards eligibility for corporate membership. This is normally rated at half-value and to a maximum of 12 months' reduction of the post-graduation requirement, and it is emphasised that the experience must be of a suitable nature. The Faculty of Engineering maintains close contact with the Institution on this and other matters, and will advise students whether their proposed experience appears likely to be considered by the Institution as counting towards a reduction in the post-graduation professional experience requirement. The Institution will also advise students directly in this regard; it is suggested, however, that the request for advice can best be made with Faculty support.

Bachelor of Engineering/ Bachelor of Arts in International Studies

DESCRIPTION

The Faculty of Engineering offers a combined degree program leading to the award of a Bachelor of Engineering (BE) degree in one of the Faculty's fields of specialisation and a Bachelor of Arts (BA) degree in International Studies. The program is offered in collaboration with the UTS Institute for International Studies.

The purpose of the program is to provide skills appropriate to a leadership role in the professional practice of engineering in an international or global setting. It is offered in the belief that engineering is increasingly international in character, and that Australian professionals can benefit from the early development of an international perspective and a fluency in cross-cultural interactions.

The BE BA program links traditional engineering studies with the study of a foreign language, the culture in which that language is spoken, and the practice of engineering in a foreign country or countries. It is available in association with the Bachelor of Engineering course in any of the fields already offered:

Civil Engineering;
Civil and Environmental Engineering;
Computer Systems Engineering;
Electrical Engineering;
Manufacturing Systems Engineering;
Mechanical Engineering;
Structural Engineering;
Telecommunications Engineering.

ADMISSION

Students normally enter the program direct from high school and are admitted on the basis of their academic performance, a demonstrated level of proficiency in one of the target languages, commitment to a career in engineering and prospect of leadership in their profession.

The proficiency in language may have been developed at high school, through private study, or through the student's family background.

Entry requirements of the relevant Bachelor of Engineering course, including its minimum TER cut-off, must be met. The minimum TER for the BE BA program has been set at 80. Selection is through the UAC (University Admissions Centre) and a UTS interview. Applicants must also submit a completed Admission Questionnaire direct to the Faculty of Engineering at UTS.

Quotas will be set for each engineering and culture specialisation based on expected support of industry.

Exemptions: Under normal circumstances, no exemption is allowed in the BE BA program. The aim will be to develop each student's capabilities to the fullest possible extent.

ATTENDANCE

The program is offered only on a sandwich attendance basis, although students will be able to transfer to part-time attendance for periods during the course if their circumstances make this desirable.

The overall duration of the program is a minimum of six years. The program requires satisfactory completion of eight semesters of academic work, plus at least 60 weeks of appropriate industrial experience in Australia (refer to the *Industrial Experience Requirements* in this handbook) plus a year of academic study and work experience overseas. The overseas year will normally count as one semester of academic work and 30 weeks of industrial experience. For the purpose of calculating HECS, the course is deemed to be equivalent to five years' full-time study.

COURSE STRUCTURE

Students will be required to complete a total of 240 credit points comprising 144 credit points of BE Studies, 48 credit points of international studies and 48 credit points of international practice of engineering. Engineering and international studies are integrated throughout the program, and the combined degree is awarded on completion. It is not possible to complete either degree separately at an intermediate point.

The program requires each student to spend a full year overseas, normally in the fourth year of enrolment. This will be preceded by preparatory courses in the language and culture of the country to be visited, undertaken during the second and third years alongside the engineering curriculum at UTS. The overseas year includes further intensive exposure to language and culture, the study of academic subjects at a host university, and a study of the practice of engineering in the country concerned, preferably in conjunction with a period of employment in industry. UTS is developing a network of partner universities and industry contacts in several countries, and will extend the network as circumstances permit.

Overseas travel and living costs are the responsibility of each student. In general, students' earnings during their period of overseas work experience will assist significantly in meeting these costs. In addition, UTS is establishing a series of industry sponsorship schemes in support of the program. Students may expect that their overseas costs will be partly or wholly covered from these sources. However this is not guaranteed, and students should recognise that they may have to bear some costs themselves.

Students who fail to complete either engineering or arts subjects at an overseas location to a satisfactory standard will be required to complete additional studies at UTS.

Within the integrated program, subjects principally associated with the Bachelor of Arts component are planned as follows:

		CP	HPW
Stages 1, 2			
	Group meetings	0	
Stage 3			
99011	Language and Culture 1	8	7
Stage 4			
99012	Language and Culture 2	8	7
Stage 5			
99013	Language and Culture 3	8	7
99015	Contemporary Society 1	8	
Stage 6			
99014	Language and Culture 4	8	7
Stage 7			
48501	International Practice of Engineering 1 (Overseas university/ industry)	8	
Stage 8			
48502	International Practice of Engineering 2 (Overseas university)	24	
Stage 9			
48503	Review of Overseas Experience	3	2
Stage 10			
99016	Contemporary Society 2	8	
Stage 11			
--	--	-	-
Stage 12			
48504	Australian Engineering on the International Scene	3	2
48505	Project	10	

The program will focus principally, but not exclusively, on Pacific rim countries. Languages initially approved for study are Japanese, Chinese (Mandarin), Indonesian, Thai, French and Spanish. Others may be added in future years.

The program is expected to gain full accreditation by the Institution of Engineers, Australia.

Bachelor of Technology in Manufacturing Engineering

DESCRIPTION

The Bachelor of Technology degree in Manufacturing Engineering is an initiative of the Faculty of Engineering. The course aims to develop the skills of middle-level engineering technologists in manufacturing industry and builds on work already completed in selected NSW TAFE Associate Diploma courses. One-and-a-half years of full-time academic credit is given for the Associate Diploma.

The program requires three years of part-time study and is designed to articulate with the engineering services or manufacturing groups of Associate Diploma programs. Coursework will cover four main areas: commercial skills and management, computing and CADCAM, communication and engineering documentation and quality manufacturing.

The course is not designed to articulate with a Bachelor of Engineering degree, although progression to that degree is possible.

ADMISSION

The entry requirement is a NSW TAFE Associate Diploma in Computer Integrated Manufacturing, Control, Electrical, Industrial, Mechanical, Manufacturing or Production Engineering. Applicants with an Associate Diploma in another technology area or an equivalent qualification will be considered for admission.

Selection: It is anticipated that 40 places will be made available in 1995. Students will be selected on the strength of their previous academic performance in Associate Diploma courses. Previous industrial experience and an indication of support from a current employer will also be of importance.

Industrial experience: At least 12 months' experience in manufacturing industry prior to entry is required. Preference will be given to students who are working in this sector at the time of their enrolment and who are supported by their employer.

Exemptions: No exemptions will be granted. Students who can show that they have satisfactorily completed work equivalent to one of the subjects in this program will be required to undertake an alternative subject.

ATTENDANCE PATTERN

One afternoon and evening and another evening for each of 14 weeks during each semester. Overall course length is three years.

USE OF COMPUTERS

Students will be expected to have personal access to an appropriate computer. They will be encouraged to have their own computer early in the course.

MEMBERSHIP OF THE INSTITUTION OF ENGINEERS, AUSTRALIA

UTS expects that holders of the Bachelor of Technology degree should qualify for membership of the Institution of Engineers, Australia in the grade of Engineering Technologist. However, this will not be known with certainty until the course has completed formal accreditation by the Institution. The Course Director will be happy to discuss this with students.

ENQUIRIES

General enquiries can be made by telephone during office hours on 330 2664 or 330 2666. Applications for admission should be made using the appropriate form which can be obtained from the UTS Information Service, No. 1 Broadway NSW 2007.

COURSE STRUCTURE

		CP	HPW
Stage 1			
48010	Introduction to Manufacturing	4	3
48011	Computing for Manufacturing and Management	4	4
65026	Chemistry	4	3
Stage 2			
48020	Communication in Manufacturing and Management	4	3
48021	Numerical Methods	4	4
48022	Materials for Manufacturing	4	3
Stage 3			
48030	The Industrial Environment	4	3
48031	Computer-aided Drawing and Design	4	4
48040	Management for Manufacturing	4	3
Stage 4			
48041	Computer-aided Manufacturing	4	4
24221	Principles of Marketing	4	3
25310	Financial Management for Manufacturing Engineering	4	3
Stage 5			
48050	Engineering Documentation	3	3
48051	Metrology and Inspection	3	3
48053	Technological Change and Strategic Planning	3	2
79370	Law and Contracts for Manufacturing	3	2
Stage 6			
48060	Quality for Manufacturing	3	3
48061	Design for Manufacture	3	3
48062	Terotechnology (Maintenance Management)	3	2
48052	Professional Review	3	2

STAFF AND LOCATION OF FACILITIES

The office of the Bachelor of Technology in Manufacturing Engineering program is located in the Engineering Building (Building 2), City campus, Broadway. The enquiries office and academic staff offices are on Level 6. Laboratories and classrooms are on Levels 2, 3 and 6.

The names, office locations of academic and support staff are set out below. The University's telephone number is 330 1990 and staff may be reached at the extensions below. Messages may be left, either in person or by telephone, at the enquiries office ext 2664 or 2666.

	Room	Ext
Director, Bachelor of Technology in Manufacturing Engineering		
Assoc Prof C T Mathews	628	2686
Associate Lecturer		
Ms C Killen	629	2697
Support Staff		
Administrative Secretary		
Ms R Ciudad	630	2664

SCHOOL OF CIVIL ENGINEERING

The School offers Bachelor's degrees in Civil Engineering, Structural Engineering and Civil and Environmental Engineering.

Civil engineers are professionals who develop and manage the major infrastructure of society, such as roads networks, buildings and water supplies. While building these things, they must strive for efficiency and safeguard the environment.

Civil Engineering covers a broad range of activities and working styles. Civil engineers may work on the design, construction, management or renovation of buildings, infrastructure development, transportation, water resources and waste management. A combination of scientific, technical and problem-solving skills and a desire to serve society are the characteristics of most engineers. They search for cost-effective, safe and environmentally appropriate solutions.

UTS offers two specialisations in the field of civil engineering. The courses in Structural Engineering and Civil and Environmental Engineering cover these fields in greater depth.

Structural Engineering involves the design, construction and operation of the structural framework or elements making up bridges, high-rise buildings, reservoirs and other facilities which carry loads or resist forces. Stresses and structural behaviour under loads must be determined for structures ranging from the fuselage of an aeroplane to an offshore platform for oil drilling.

Environmental Engineering is a new and evolving field, concerned with tasks such as environmental assessments and audits, remediation of contaminated sites and design of wastewater treatment systems. The Civil and Environmental Engineering course has been introduced to meet the rapidly increasing demand for civil engineers with the range of expertise needed to plan and implement measures for the protection and management of the environment.

The degree in Civil and Environmental Engineering has a sound environmental engineering specialisation integrated with the civil engineering program.

All three degrees provide a thorough foundation in the physical sciences and applied engineering sciences which underpin the engineering practice subjects undertaken in the latter stages of each course. Emphasis is placed on the role of the profession in society and the contexts in which engineering is practised. The courses foster the development of communication skills and the ability to work in multidisciplinary teams with other engineering professionals and technicians, as well as architects, economists and social planners.

The professional experience undertaken throughout the course enables students to combine academic studies with practice experience, and to graduate as mature and aware engineers. Through electives and project work students can choose to undertake additional studies in areas of special interest to them.

Bachelor of Engineering in Civil Engineering

SANDWICH ATTENDANCE PATTERN

Academic requirements[1]

		CP	HPW
Stage 1			
33121	Engineering Mathematics 1A	3	3
47110	Introduction to Civil Engineering	3	3
47112	Computer Applications	3	3
47113	Computer Programming	3	3
47117	Statics	4	3
47118	Surveying 1A	3	3
68021	Engineering Physics (Civil)	6	6
Stage 2			
33122	Engineering Mathematics 1B	3	3
47120	Graphics	4	3

47127	Mechanics of Solids 1	4	3
47128	Surveying 1B	3	3
51131	Communications 1	3	3
65023	Engineering Chemistry	6	6
67022	Materials Science for Engineers	3	3

Stage 3

33221	Engineering Mathematics 2A	3	3
47131	Structural Mechanics	3	3
47133	Numerical Methods in Engineering	3	3
47134	Construction Materials	3	3
47137	Mechanics of Solids 2	3	3
47142	Environmental Engineering	3	3
66032	Geology for Engineers	3	3

Stage 4

47135	Fluid Mechanics	4	3
47140	Concrete Design 1	3	3
47141	Structural Analysis 1	3	3
47144	Timber Design	3	3
47146	Soil Mechanics	4	3
47149	Construction	3	3
47152	Public Health Engineering	3	3
51161	Communications 2	3	3

Stage 5

47145	Hydraulics	3	3
47150	Concrete Design 2	4	3
47151	Structural Analysis 2	4	3
47153	Probability and Statistics	3	3
47154	Concrete Technology	3	3
47156	Soil Engineering	3	3
47159	Project Planning	3	3
47168	Surveying 2	3	3

Stage 6

47155	Hydrology	3	3
47161	Steel Design 1	3	3
47160	Concrete Design 3	3	3
47162	Advances in Pollution Control	3	3
47164	Metals Technology	3	3
47166	Geotechnical Engineering	3	3
	or		
47176	Ground Modification	3	3
47167	Road Engineering	3	3

Stage 7

47171	Steel Structures and Concept Design	4	3
47175	Water Resources Engineering	3	3
47177	Transportation Engineering	3	3
47178	Project Economics	3	3
47179	Construction Contracts	3	3
	Electives[2]		
	Project[3]		

Stage 8

47189	Management for Engineers	4	3
	Electives[2]		
	Project[3]	6	

PART-TIME ATTENDANCE PATTERN

Academic requirements[1]

		CP	HPW
Year 1			
Autumn semester			
33121	Engineering Mathematics 1A	3	3
47117	Statics	4	3
47120	Graphics	4	3
68022	Engineering Physics (part-time)	3	3
Spring semester			
33122	Engineering Mathematics 1B	3	3
47112	Computer Applications	3	3
47113	Computer Programming	3	3
68022	Engineering Physics (part-time)	3	3
Year 2			
Autumn semester			
47110	Introduction to Civil Engineering	3	3
47127	Mechanics of Solids 1	4	3
47118	Surveying 1A	3	3
47133	Numerical Methods in Engineering	3	3

51131	Communications 1	3	3

Spring semester

65023	Engineering Chemistry	6	6
33221	Engineering Mathematics 2A	3	3
47142	Environmental Engineering	3	3
47128	Surveying 1B	3	3

Year 3

Autumn semester

47137	Mechanics of Solids 2	3	3
47149	Construction	3	3
66032	Geology for Engineers	3	3
67022	Materials Science for Engineers	3	3

Spring semester

47135	Fluid Mechanics	4	3
47131	Structural Mechanics	3	3
47134	Construction Materials	3	3
47146	Soil Mechanics	4	3

Year 4

Autumn semester

47140	Concrete Design 1	3	3
47144	Timber Design	3	3
47152	Public Health Engineering	3	3
47153	Probability and Statistics	3	3

Spring semester

47145	Hydraulics	3	3
47141	Structural Analysis 1	3	3
47150	Concrete Design 2	4	3
47154	Concrete Technology	3	3

Year 5

Autumn semester

47151	Structural Analysis 2	4	3
47156	Soil Engineering	3	3
47159	Project Planning	3	3
47168	Surveying 2	3	3

Spring semester

47161	Steel Design 1	3	3
47160	Concrete Design 3	3	3
51161	Communications 2	3	3
47162	Advances in Pollution Control	3	3

Year 6

Autumn semester

47164	Metals Technology	3	3
47166	Geotechnical Engineering	3	3
	or		
47176	Ground Modification	3	3
47167	Road Engineering	3	3
	Elective[2]		

Spring semester

47155	Hydrology	3	3
47171	Steel Structures and Concept Design	4	3
47175	Water Resources Engineering	3	3
47179	Construction Contracts	3	3
	Elective[2]		
	Project[3]		

Year 7

Autumn semester

47177	Transportation Engineering	3	3
47178	Project Economics	3	3
	Elective[2]		
	Project[3]		

Spring semester

47189	Management for Engineers	4	3
	Elective[2]		
	Project[3]		

[1] Industrial Experience, 47997 (Sandwich) and 47999 (Part-time) to be undertaken in accordance with the Faculty's Industrial Experience Regulations.

[2] Electives to be between 12 and 18 credit points such that the course requirements of 192 credit points is met. Electives can be selected from the School's postgraduate subjects. Any subjects offered by other Schools of the University may also be taken up to a maximum of 6 credit points.

[3] Project to be between 9 and 15 credit points over a maximum of three semesters.

Project subject numbers:

47002	Project	2	3
47003	Project	3	3
47004	Project	4	4
47006	Project	6	6
47009	Project	9	9
47012	Project	12	12
47015	Project	15	15

Bachelor of Engineering in Structural Engineering

SANDWICH ATTENDANCE PATTERN

Academic requirements[1]

		CP	HPW
Stage 1			
33121	Engineering Mathematics 1A	3	3
47110	Introduction to Civil Engineering	3	3
47112	Computer Applications	3	3
47113	Computer Programming	3	3
47117	Statics	4	3
47118	Surveying 1A	3	3
68021	Engineering Physics (Civil)	6	6
Stage 2			
33122	Engineering Mathematics 1B	3	3
47120	Graphics	4	3
47127	Mechanics of Solids 1	4	3
47128	Surveying 1B	3	3
51131	Communications 1	3	3
65023	Engineering Chemistry	6	6
67022	Materials Science for Engineers	3	3
Stage 3			
33221	Engineering Mathematics 2A	3	3
47131	Structural Mechanics	3	3
47133	Numerical Methods in Engineering	3	3
47134	Construction Materials	3	3
47137	Mechanics of Solids 2	3	3
47142	Environmental Engineering	3	3
66032	Geology for Engineers	3	3
Stage 4			
47135	Fluid Mechanics	4	3
47140	Concrete Design 1	3	3
47141	Structural Analysis 1	3	3
47144	Timber Design	3	3
47146	Soil Mechanics	4	3
47149	Construction	3	3
47237	Domestic Building Design and Construction	3	3
51161	Communications 2	3	3
Stage 5			
47150	Concrete Design 2	4	3
47151	Structural Analysis 2	4	3
47153	Probability and Statistics	3	3
47154	Concrete Technology	3	3
47156	Soil Engineering	3	3
47159	Project Planning	3	3
47161	Steel Design 1	3	3
Stage 6			
47160	Concrete Design 3	3	3
47164	Metals Technology	3	3
47171	Steel Structures and Concept Design 1	4	3
47265	Finite Element Analysis	3	3
47267	Approximate Methods in Structural Analysis	3	3
47268	Dynamics of Structures	3	3
	Elective[2]		
Stage 7			
47178	Project Economics	3	3
47179	Construction Contracts	3	3
47270	Concrete Design 4	3	3
47275	Bridge Design	3	3
47277	Loading on Building Structures	3	3
47278	Structural Stability	3	3
47281	Steel Structures and Concept Design 2	3	3
	Project[3]		
Stage 8			
47189	Management for Engineers	4	3
47285	Design Project	6	6
47287	Structural Testing	3	3
47288	High-rise Buildings	3	3
	Elective[2]		
	Project[3]		

PART-TIME ATTENDANCE PATTERN

Academic requirements[1]

		CP	HPW
Year 1			
Autumn semester			
33121	Engineering Mathematics 1A	3	3
47117	Statics	4	3
47120	Graphics	4	3
68022	Engineering Physics (part-time)	3	3

Spring semester

33122	Engineering Mathematics 1B	3	3
47112	Computer Applications	3	3
47113	Computer Programming	3	3
68022	Engineering Physics (part-time)	3	3

Year 2

Autumn semester

47110	Introduction to Civil Engineering	3	3
47127	Mechanics of Solids 1	4	3
47118	Surveying 1A	3	3
47133	Numerical Methods in Engineering	3	3
51131	Communications 1	3	3

Spring semester

65023	Engineering Chemistry	6	6
33221	Engineering Mathematics 2A	3	3
47142	Environmental Engineering	3	3
47128	Surveying 1B	3	3

Year 3

Autumn semester

47137	Mechanics of Solids 2	3	3
47149	Construction	3	3
66032	Geology for Engineers	3	3
67022	Materials Science for Engineers	3	3

Spring semester

47135	Fluid Mechanics	4	3
47131	Structural Mechanics	3	3
47134	Construction Materials	3	3
47146	Soil Mechanics	4	3

Year 4

Autumn semester

47140	Concrete Design 1	3	3
47144	Timber Design	3	3
47153	Probability and Statistics	3	3
47237	Domestic Building Design and Construction	3	3

Spring semester

47141	Structural Analysis 1	3	3
47150	Concrete Design 2	4	3
47154	Concrete Technology	3	3
51161	Communications 2	3	3

Year 5

Autumn semester

47151	Structural Analysis 2	4	3
47156	Soil Engineering	3	3
47164	Metals Technology	3	3
47159	Project Planning	3	3

Spring semester

47161	Steel Design 1	3	3
47160	Concrete Design 3	3	3
47179	Construction Contracts	3	3
47265	Finite Element Analysis	3	3
47268	Dynamics of Structures	3	3

Year 6

Autumn semester

47267	Approximate Methods in Structural Analysis	3	3
47178	Project Economics	3	3
47277	Loading on Building Structures	3	3
47287	Structural Testing	3	3

Spring semester

47171	Steel Structures and Concept Design 1	4	3
47189	Management for Engineers	4	3
47270	Concrete Design 4	3	3
47275	Bridge Design	3	3

Year 7

Autumn semester

47278	Structural Stability	3	3
47281	Steel Structures and Concept Design 2	3	3
	Elective[2]		
	Project[3]		

Spring semester

47285	Design Project	6	6
47288	High-rise Buildings	3	3
	Elective[2]		
	Project[3]		

[1] Industrial Experience, 47997 (Sandwich) and 47999 (Part-time) to be undertaken in accordance with the Faculty's Industrial Experience Regulations.

[2] Electives to be between 6 and 9 credit points so that the course requirements of 192 credit points is met.

[3] Project to be between 6 and 9 credit points over a maximum of three semesters.

Project subject numbers:

47002 Project	2	2
47003 Project	3	3
47004 Project	4	4
47006 Project	6	6
47009 Project	9	9

Bachelor of Engineering in Civil and Environmental Engineering

SANDWICH ATTENDANCE PATTERN

Academic requirements[1]

		CP	HPW
Stage 1			
33121	Engineering Mathematics 1A	3	3
47110	Introduction to Civil Engineering	3	3
47112	Computer Applications	3	3
47117	Statics	4	3
47118	Surveying 1A	3	3
65023	Engineering Chemistry	6	6
68021	Engineering Physics	6	6
Stage 2			
33122	Engineering Mathematics 1B	3	3
47113	Computer Programming	3	3
47127	Mechanics of Solids 1	4	3
47128	Surveying 1B	3	3
51131	Communication 1	3	3
67022	Materials Science for Engineers	3	3
91650	Introduction to Environmental Biology	3	3
Stage 3			
33221	Engineering Mathematics 2A	3	3
47120	Graphics	4	3
47133	Numerical Methods in Engineering	3	3
47134	Construction Materials	3	3
47137	Mechanics of Solids 2	3	3
47142	Environmental Engineering	3	3
66032	Geology for Engineers	3	3
91651	Environmental Microbiology for Engineers	3	3
Stage 4			
47131	Structural Mechanics	3	3
47135	Fluid Mechanics	4	3
47140	Concrete Design 1	3	3
47144	Timber Design	3	3
47146	Soil Mechanics	4	3
47149	Construction	3	3
47449	Introduction to Environmental Economics and Law	3	3
Stage 5			
47141	Structural Analysis 1	3	3
47145	Hydraulics	3	3
47152	Public Health Engineering	3	3
47153	Probability and Statistics	3	3
47154	Concrete Technology	3	3
47159	Project Planning	3	3
47450	The Built Environment	3	3
47452	Pollution Control and Management	3	3
Stage 6			
47151	Structural Analysis 2	4	3
47155	Hydrology	3	3
47156	Soil Engineering	3	3
47161	Steel Design 1	3	3
47162	Advances in Pollution Control	3	3
47168	Surveying 2	3	3
47465	Environmental Hydraulics	3	3
51161	Communications 2	3	3
Stage 7			
47160	Concrete Design 3	3	3
47167	Road Engineering	3	3
47175	Water Resources Engineering	3	3
47178	Project Economics	3	3
47179	Construction Contracts	3	3
47476	Land Conservation	3	3
	Project[3]	3	
Stage 8			
47177	Transportation Engineering	3	3
47189	Management for Engineers	4	3
47482	Waste Minimisation	3	3
	Electives[2]	7	
	Project[3]	7	

PART-TIME ATTENDANCE PATTERN

Academic requirements[1]

		CP	HPW
Year 1			
Autumn semester			
33121	Engineering Mathematics 1A	3	3
68022	Engineering Physics (part-time)	3	3
47117	Statics	4	3
47120	Graphics	4	3
Spring semester			
47112	Computer Applications	3	3
47113	Computer Programming	3	3
33122	Engineering Mathematics 1B	3	3
68022	Engineering Physics (part-time)	3	3
Year 2			
Autumn semester			
47110	Introduction to Civil Engineering	3	3
47118	Surveying 1A	3	3
47133	Numerical Methods in Engineering	3	3
47127	Mechanics of Solids 1	4	3
51131	Communications 1	3	3
Spring semester			
47128	Surveying 1B	3	3
33221	Engineering Mathematics 2A	3	3
65023	Engineering Chemistry	6	6
91650	Introduction to Environmental Biology	3	3
Year 3			
Autumn semester			
47137	Mechanics of Solids 2	3	3
47149	Construction	3	3
67022	Materials Science for Engineers	3	3
66032	Geology for Engineers	3	3
91651	Environmental Microbiology for Engineers	3	3
Spring semester			
47142	Environmental Engineering	3	3
47131	Structural Mechanics	3	3
47134	Construction Materials	3	3
47135	Fluid Mechanics	4	3
Year 4			
Autumn semester			
47140	Concrete Design 1	3	3
47144	Timber Design	3	3
47153	Probability and Statistics	3	3
47449	Introduction to Environmental Economics and Law	3	3
Spring semester			
47146	Soil Mechanics	4	3
47141	Structural Analysis 1	3	3
47145	Hydraulics	3	3
47450	The Built Environment	3	3
Year 5			
Autumn semester			
47152	Public Health Engineering	3	3
47156	Soil Engineering	3	3
47159	Project Planning	3	3
47168	Surveying 2	3	3
47476	Land Conservation	3	3
Spring semester			
47161	Steel Design	3	3
47162	Advances in Pollution Control	3	3
47452	Pollution Control and Management	3	3
47154	Concrete Technology	3	3
Year 6			
Autumn semester			
47151	Structural Analysis 2	4	3
47167	Road Engineering	3	3
47178	Project Economics	3	3
47482	Waste Minimisation	3	3
Spring semester			
51161	Communications 2	3	3
47160	Concrete Design 3	3	3
47155	Hydrology	3	3
47179	Construction Contracts	3	3
47465	Environmental Hydraulics	3	3
Year 7			
Autumn semester			
47177	Transportation Engineering	3	3
	Electives[2]	7	
	Project[3]	7	

Spring semester

47175	Water Resources Engineering	3	3
47189	Management for Engineers	4	3
	Project[3]	6	

[1] Industrial Experience, 47997 (Sandwich) and 47999 (Part-time) to be undertaken in accordance with the Faculty's Industrial Experience Regulations.

[2] Electives to be between 6 and 9 credit points so that the course requirements of 192 credit points is met.

[3] Project to be between 6 and 9 credit points over a maximum of three semesters.
Project subject numbers:

47002 Project	2	2
47003 Project	3	3
47004 Project	4	4
47006 Project	6	6
47009 Project	9	9

ELECTIVES

Subject to approval by the School of Civil Engineering, students may take elective subjects from the following sources (class sizes permitting):

- special undergraduate elective subjects offered as part of their course,
- subjects offered by other schools in the Faculty of Engineering (with the permission of these schools),
- subjects offered by other faculties within UTS, including language subjects, business studies and science (up to the six-credit-point limit set by the School of Civil Engineering),
- subjects offered through other BE degree courses and which are not a compulsory part of the student's UTS course,
- postgraduate subjects which are available to undergraduates as electives.

Students in the Bachelor of Engineering in Civil Engineering may take as electives, core subjects from the Bachelor of Engineering courses in Structural Engineering and Civil and Environmental Engineering.

Similarly, students in the latter two courses may take subjects from the Civil Engineering course.

Electives are offered from time to time, subject to availability of suitable lecturers and student demand. A particular elective class may be run if sufficient numbers are enrolled.

Undergraduate electives proposed for 1995:

		CP	HPW
47301	Railway Engineering	3	3
47302	Welding	3	3
47304	Coastal Engineering	3	3
47305	Risk and Reliability	3	3
47306	Geomechanics	3	3
47307	Construction Management	3	3
47308	Road Materials	3	3

Postgraduate subjects which may be available to undergraduate students in 1995:

49111	Coastal Engineering	6	3
49112	Urban Stormwater Flood Management	6	3
49113	Urban Stormwater Pollution Management	6	3
49130	Marine Structures	6	3
49132	Stability of Structures	6	3
49133	Steel and Composite Design	6	3
49134	Structural Dynamics	6	3
49135	Wind Engineering	6	3
49141	Advanced Geomechanics	6	3
49142	Advanced Ground Modification	6	3
49151	Advanced Concrete Technology	6	3
49152	Damages and Repair of Concrete Structures	6	3

Descriptions of these subjects appear in the postgraduate section of this handbook. Other postgraduate subjects may also be offered in 1995. For further information contact the Graduate School of Engineering on 330 2606.

STAFF AND LOCATION OF FACILITIES

The School of Civil Engineering is located in the Engineering Building (Building 2), City campus, Broadway. The School office and academic staff offices are on Level 5. Laboratories and classrooms are on Levels 1, 2 and 5.

The names, office locations and professional interests of academic and senior support staff are listed below. The University's telephone number is 330 1990 and staff can be reached at the extension numbers given below. Messages may be left, either in person or by telephone, at the School Office, Room 2/511 ext 2615.

	Room	Ext
Head of School		
Associate Professor G G O'Loughlin Water Engineering	511C	2644
Deputy Head of School		
Mr E A Brady Surveying	511A	2627
Professors of Civil Engineering		
Emeritus Professor K A Faulkes Structural Engineering	526	2646
Professor S L Bakoss Structural Mechanics	528	2629
Associate Professors		
Mr T A Anderson Construction and Management	521	2639
Dr M R Hausmann Soil Engineering	527	2645
Dr B Samali Structural Dynamics and Structural Mechanics	513	2632
Dr S Vigneswaran Environmental Engineering	523	2641
Academic staff		
Dr S C Beecham Water Engineering	507	2623
Dr H W Chung Construction Materials	519	2637
Mr K Crews Timber Engineering	503	2619
Mr K Halstead Local Government Engineering	522	2640
Dr P A Hazelton Environmental Engineering	512	2661
Dr J W Ivering Civil Engineering Design	529	2647
Dr M R Karim Structural Mechanics	505	2621
Mr P J Kenny Roads and Transport	502	2618
Dr K L Lai Structural Mechanics Design and Construction	510	2626
Mr P C Liu Civil Engineering Design	508	2624
Dr S Parsanejad Design of Steel Structures Structural Analysis	504	2620
Dr M Patarapanich Water Engineering	524	2642
Mr W G Peters Civil Engineering Design	518	2636
Dr R Sri Ravindrarajah Concrete Technology	509	2625
Dr G L Ring Soil Engineering	506	2622
Dr A Saleh Structural Mechanics and Analysis	517	2635
Mr K B Shafiuddin Water Engineering	501	2617
Academic staff Fractional-time		
Mrs A P Gardner	536	2648
Mr E Jankulovski Structural Dynamics, Seismic Design	525	2021
Mr C Wilkinson Structural Mechanics – Fabric Structures	536	2648
General staff		
Secretary to Head of School		
Mrs L Venglinsky	511	2630

Office Manager		
Mr B Blakeway	511	2615
General Secretary		
Mrs S Ali	511	2650
P/T Word Processor Operator		
Ms J Chetcuti	511	2616
Project Engineering Manager		
Mr M J Taragel	114C	2519
Engineer in Charge		
Mr I A Hutchings	116J	2512
Engineers		
Mr D A Tapner	116K	2513
Mr A Lah	560A	1338
Ms L Punton Engineering Research and Development	116L	2524
Senior Technical Officers		
Mr J Holmes	542	2514
Mr M Benitez	116M	2516
Mr P M Chatfield	560A	1024
Mr J P Martinus	1/2A252	1029
Mr H H Ngo	547	2653
Technical Officers		
Mr H Hefka	116N	2515
Mr D R Hooper	116N	2518
Mr W Howse	102B	2502
Mr J McMahon	204	2537
Mr St J Parmigiani	116M	2517
Senior Laboratory Craftsmen		
Mr H Myers	1/2A253B	1026
Mr S Graham	253	1026
Stores Officer		
Mr S E Gabor	205B	2536

SCHOOL OF ELECTRICAL ENGINEERING

The School offers Bachelor's degrees in Electrical Engineering, Computer Systems Engineering, and Telecommunications Engineering.

The Electrical Engineering course prepares students for careers in three main areas: electrical power, electronic instrumentation and control, and electrical communication.

The practice of electrical engineering has changed dramatically over the last few decades. Instrumentation systems have always been vital in electrical engineering since electricity itself cannot be seen. Modern computer-based instruments have in-built sophisticated design tools which enable the engineer to deal effectively and efficiently with electronic and software systems of enormous complexity.

Most engineering activities are of sufficient scope to call on the talents of teams of people from varying professions. The individual engineer must therefore work effectively with such teams. Understanding and acceptance of discipline, management and leadership qualities and competence in written and spoken communications are essential.

A typical graduate electrical engineer working in electronics would develop sub-systems. This involves selection of components, designing circuits (often using computer graphics packages), simulating the circuits using computers to ensure correct operation, designing the layout of conducting tracks on printed circuit boards using further computer packages, populating the boards with components and then testing for correct operation.

The Computer Systems Engineering course prepares students for a career in the application of computers for engineering purposes such as industrial control, data acquisition, storage, retrieval and transmission, or computer-aided design and manufacture.

A computer systems engineer is a highly trained professional, who needs to have

knowledge of not only software programming, but electronics, mathematics and physics. Because of this breadth of training, a computer systems engineer can also work as a software engineer or an electronics engineer.

As we enter the information age there is intense demand for engineers who understand the technology of telecommunications. The Telecommunications Engineering degree has been introduced to meet this need in a new specialisation in engineering. The degree incorporates studies both in the technology of telecommunications and in the associated social, legal and commercial issues. The course is designed to produce graduates who are highly skilled in the leading edge technologies, yet also have an understanding of policy issues.

All students in the Electrical Engineering, Computer Systems Engineering, and Telecommunications Engineering degrees at UTS are required to complete approved industrial experience as they progress through their course.

Bachelor of Engineering in Electrical Engineering

SANDWICH ATTENDANCE PATTERN

Academic requirements[1]

		CP	HPW
Stage 1			
35101	Mathematics 1	6	6
35111	Discrete Mathematics	3	3
45113	Digital Techniques	3	3
45115	Engineering Practice[2]	3	3
45116	Electrical Engineering 1	3	3
68031	Engineering Physics 1	6	6
Stage 2			
35102	Mathematics 2	6	6
45123	Software Development 1	6	6
45124	Electrical Engineering 2	6	6
45125	Engineering Discovery[2]	3	3
68032	Engineering Physics 2	3	3
Stage 3			
33310	Engineering Mathematics 3	6	6
45133	Software Development 2	3	3
45134	Network Theory	6	6
45135	Engineering Communication	3	3
67023	Materials Technology	3	3
68033	Engineering Physics 3	3	3
Stage 4			
45141	Continuous and Discrete Systems	6	6
45143	Computer Hardware	3	3
45144	Electronic Devices and Circuits	6	6
45145	Engineering Statistics	3	3
45242	Electromagnetics	3	3
	Elective 1	3	3

Subjects in Stages 5 to 8 of the Electrical Engineering degree are selected from one of the following strands:

Telecommunications
Power and Machines
Instrumentation and Control

Requirements for each strand are set out below.

Telecommunications strand

		CP	HPW
Stage 5			
45151	Signal Theory 1	3	3
45154	Contextual Studies	3	3
45252	Power Apparatus and Systems	6	6
45155	Project A	3	3
45264	Fields and Waves	3	3
45153	Analogue Electronics	6	6
Stage 6			
45163	Real-time Software and Interfacing	3	3
45152	Signal Theory 2	3	3
45166	Project Management	3	3
68035	Communications Physics	3	3
45663	Digital Transmission	3	3
45265	Numerical Methods	3	3
45661	Communications Networks	3	3

Stage 7

45662	Signal Processing	3	3
45678	Project B (Tel)	3	3
45182	Thesis 1	3	3
45664	Communications Engineering	3	3
45668	Teletraffic Engineering	3	3
45176	Systems Engineering	4	3
45274	Physical Design and Production	3	3
	Electives	6	6

Stage 8

45681	Communications Systems	6	6
45183	Thesis 2	8	3
	Social Science Elective	6	3

Power and Machines strand

		CP	HPW

Stage 5

45151	Signal Theory 1	3	3
45154	Contextual Studies	3	3
45252	Power Apparatus and Systems	6	6
45153	Analogue Electronics	6	6
45155	Project A	3	3
45265	Numerical Methods	3	3

Stage 6

45163	Real-time Software and Interfacing	3	3
45264	Fields and Waves	3	3
45166	Project Management	3	3
45461	Power Circuit Theory	3	3
45481	Dynamics of Electric Machines	3	3
45274	Physical Design and Production	3	3
45482	Power Equipment Design	3	3
45462	Power Electronics	3	3

Stage 7

45152	Signal Theory 2	3	3
45182	Thesis 1	3	3
45176	Systems Engineering	4	3
45472	Project B (P&M)	3	3
	Electives	6	6

Stage 8

45483	Power Systems Analysis and Protection	6	6
45484	Electrical Variable Speed Drives	3	3
45183	Thesis 2	8	3
68034	Electrical Power Generation	3	3

Instrumentation and Control strand

		CP	HPW

Stage 5

45151	Signal Theory 1	3	3
45154	Contextual Studies	3	3
45252	Power Apparatus and Systems	6	6
45153	Analogue Electronics	6	6
45155	Project A	3	3
45264	Fields and Waves	3	3

Stage 6

45163	Real-time Software and Interfacing	3	3
45152	Signal Theory 2	3	3
45166	Project Management	3	3
45561	Digital Systems Design	3	3
45581	Analogue and Digital Control	6	6
45265	Numerical Methods	3	3
	Elective 2	3	3

Stage 7

45562	Data Acquisition and Distribution Systems	6	6
45662	Signal Processing	3	3
45577	Project B (I&C)	3	3
45182	Thesis 1	3	3
45176	Systems Engineering	4	3
45274	Physical Design and Production	3	3
	Elective 3	3	3

Stage 8

45583	Adaptive and Multivariable Control	3	3
45582	Computer-aided Design of Electronic Circuits	3	3
45183	Thesis 2	8	3
	Social Science Elective	6	3

PART-TIME ATTENDANCE PATTERN

Academic requirements[1]

		CP	HPW
Stage 1			
Autumn semester			
35101	Mathematics 1	6	6
68031	Engineering Physics 1	6	6
45115	Engineering Practice[2]	3	3
Spring semester			
35111	Discrete Mathematics	3	3
45113	Digital Techniques	3	3
68032	Engineering Physics 2	3	3
45116	Electrical Engineering 1	3	3
45125	Engineering Discovery[2]	3	3
Stage 2			
Autumn semester			
35102	Mathematics 2	6	6
45123	Software Development 1	3	3
Spring semester			
45124	Electrical Engineering 2	6	6
68033	Engineering Physics 3	3	3
45135	Engineering Communication	3	3
45133	Software Development 2	3	3
Stage 3			
Autumn semester			
33310	Engineering Mathematics 3	6	6
45134	Network Theory	6	6
67023	Materials Technology	3	3
Spring semester			
45144	Electronic Devices and Circuits	6	6
45145	Engineering Statistics	3	3
45242	Electromagnetics	3	3
Stage 4			
Autumn semester			
45141	Continuous and Discrete Systems	6	6
45143	Computer Hardware	3	3
45151	Signal Theory 1	3	3
45154	Contextual Studies	3	3
Spring semester			
45153	Analogue Electronics	6	6
45252	Power Apparatus and Systems	6	6
45155	Project A	3	3
Stage 5			
Autumn semester			
45152	Signal Theory 2	3	3
45163	Real-time Software and Interfacing	3	3
45166	Project Management	3	3
Spring semester			
	Subjects selected from Strand		
45265	Numerical Methods	3	3
Stage 6			
Autumn semester			
	Subjects selected from Strand		
45274	Physical Design and Production	3	3
	Social Science Elective	3	3
Spring semester			
	Electives		
45176	Systems Engineering Project B	4 3	3 3
45182	Thesis 1	3	3
Stage 7			
Autumn semester			
	Subjects selected from Strand		
45183	Thesis 2	12	6

[1] Industrial Experience, 45997 (Sandwich) and 45999 (Part-time) to be undertaken in accordance with the Faculty's Industrial Experience Regulations.

[2] Group 2 students (those who gained admission other than from the HSC) undertake the subject 59325 Science Technology and Human Values instead of Engineering Practice and Engineering Discovery.

Bachelor of Engineering in Computer Systems Engineering

SANDWICH ATTENDANCE PATTERN

Academic requirements[1]

		CP	HPW
Stage 1			
35101	Mathematics 1	6	6
68031	Engineering Physics 1	6	6
45115	Engineering Practice[2]	3	3
35111	Discrete Mathematics	3	3
45113	Digital Techniques	3	3
45116	Electrical Engineering 1	3	3
Stage 2			
68032	Engineering Physics 2	3	3
45125	Engineering Discovery[2]	3	3
35102	Mathematics 2	6	6
45123	Software Development 1	6	3
45124	Electrical Engineering 2	6	6
Stage 3			
45143	Computer Hardware	3	3
45133	Software Development 2	3	3
45135	Engineering Communication	3	3
33310	Engineering Mathematics 3	6	6
45134	Network Theory	6	6
67023	Materials Technology	3	3
Stage 4			
45144	Electronic Devices and Circuits	6	6
45145	Engineering Statistics	3	3
45163	Real-time Software and Interfacing	3	3
45141	Continuous and Discrete Systems	6	6
45342	Electromechanical Systems	3	3
	Elective 1	3	3
Stage 5			
45353	Operating Systems	6	6
45151	Signal Theory 1	3	3
45364	Digital Systems	3	3
45153	Analogue Electronics	6	6
45155	Project A	3	3
45363	Software Engineering	3	3
Stage 6			
45154	Contextual Studies	3	3
45152	Signal Theory 2	3	3
45166	Project Management	3	3
45372	Computer Systems Analysis	3	3
45626	Mathematical Modelling	3	3
31141	Database Structures and Management	3	3
	Social Science Elective	3	3
Stage 7			
45661	Communications Networks	3	3
45182	Thesis 1	3	3
45176	Systems Engineering	3	3
45562	Data Acquisition and Distribution Systems	6	6
	Electives	9	9
Stage 8			
45382	Computer Systems Design	3	3
31926	Paradigms for Artificial Intelligence	4	3
45183	Thesis 2	12	6
45387	Project B (CSE)	3	3
	Elective	3	3

PART-TIME ATTENDANCE PATTERN

Academic requirements[1]

		CP	HPW
Stage 1			
Autumn semester			
35101	Mathematics 1	6	6
68031	Engineering Physics 1	6	6
45115	Engineering Practice[2]	3	3
Spring semester			
35111	Discrete Mathematics	3	3
45113	Digital Techniques	3	3
45116	Electrical Engineering 1	3	3
68032	Engineering Physics 2	3	3
45125	Engineering Discovery[2]	3	3
Stage 2			
Autumn semester			
35102	Mathematics 2	6	6
45123	Software Development 1	6	3

Spring semester

45124	Electrical Engineering 2	6	6
45143	Computer Hardware	3	3
45133	Software Development 2	3	3
45135	Engineering Communication	3	3

Stage 3

Autumn semester

33310	Engineering Mathematics 3	6	6
45134	Network Theory	6	6
67023	Materials Technology	3	3

Spring semester

45144	Electronic Devices and Circuits	6	6
45145	Engineering Statistics	3	3
45163	Real-time Software and Interfacing	3	3

Stage 4

Autumn semester

45141	Continuous and Discrete Systems	6	6
45342	Electromechanical Systems	3	3
45353	Operating Systems	6	6

Spring semester

45151	Signal Theory 1	3	3
45364	Digital Systems	3	3
45153	Analogue Electronics	6	6
45155	Project A	3	3

Stage 5

Autumn semester

45152	Signal Theory 2	3	3
45154	Contextual Studies	3	3
45363	Software Engineering	3	3
45166	Project Management	3	3

Spring semester

31141	Database Structures and Management	3	3
45372	Computer Systems Analysis	3	3
	Electives	6	6

Stage 6

Autumn semester

45661	Communication Networks	3	3
45562	Data Acquisition and Distribution Systems	6	6
45626	Mathematical Modelling	3	3

Spring semester

45182	Thesis 1	3	3
45176	Systems Engineering	4	3
45387	Project B (CSE)	3	3

Stage 7

45382	Computer Systems Design	3	3
45183	Thesis 2	12	6

[1] Industrial Experience, 45997 (Sandwich) and 45999 (Part-time) to be undertaken in accordance with the Faculty's Industrial Experience Regulations.

[2] Group 2 students (those who gained admission other than from the HSC) enrol in the subject 59325 Science Technology and Human Values instead of Engineering Practice and Engineering Discovery.

Bachelor of Engineering in Telecommunications Engineering

SANDWICH ATTENDANCE PATTERN

Academic requirements[1]

		CP	HPW
Stage 1			
35101	Mathematics 1	6	6
35111	Discrete Mathematics	3	3
68031	Engineering Physics 1	6	6
45113	Digital Techniques	3	3
45116	Electrical Engineering 1	3	3
45115	Engineering Practice[2]	3	3
Stage 2			
35102	Mathematics 2	6	6
45123	Software Development 1	6	3
68032	Engineering Physics 2	3	3
45124	Electrical Engineering 2	6	6
45125	Engineering Discovery[2]	3	3
Stage 3			
33310	Engineering Mathematics 3	6	6
45133	Software Development 2	3	3
45143	Computer Hardware	3	3
67023	Materials Technology	3	3
45134	Network Theory	6	6
45135	Engineering Communication	3	3
Stage 4			
45145	Engineering Statistics	3	3
45265	Information Issues in Telecommunications	6	3
45363	Software Engineering	3	3
45163	Real-time Software and Interfacing	3	3
45144	Electronics Devices and Circuits	6	6
45141	Continuous and Discrete Systems	6	6
Stage 5			
45353	Operating Systems	6	6
45364	Digital Systems	3	3
45155	Project A	3	3
45363	Software Engineering	3	3
45152	Signal Theory 1	3	3
45626	Mathematical Modelling	3	3
	Social Science Elective	3	3
Stage 6			
45661	Communication Networks	3	3
31141	Database Management	3	3
45152	Signal Theory 2	3	3
45241	Electromagnetics	3	3
45166	Project Management	3	3
27001	Commercial Issues in Telecommunications	6	3
	Social Science Elective	3	3
Stage 7			
45668	Teletraffic Engineering	3	3
45667	Broadband Telecommunications Networks	3	3
45182	Thesis 1	3	3
45264	Fields and Waves	3	3
45662	Signal Processing	3	3
45663	Digital Transmission	3	3
79371	Legal Issues in Telecommunications	6	3
Stage 8			
45183	Thesis 2	8	3
45176	Systems Engineering	4	3
45681	Communications Systems	6	6
	Electives	3	3

[1] Industrial Experience, 45997 (Sandwich) and 45999 (Part-time) to be undertaken in accordance with the Faculty's Industrial Experience Regulations.

[2] Group 2 students (those who gained admission other than from the HSC) enrol in the subject 59325 Science Technology and Human Values instead of Engineering Practice and Engineering Discovery.

ELECTIVES

The Social Sciences elective is chosen from subjects offered by the Faculty of Humanities and Social Sciences. In 1995 a six credit point elective will be offered by the Faculty of Education (T5115, Introducing Aboriginal Cultures and Philosophies). Students enrolling in electives offered by other schools should first seek approval from the School of Electrical Engineering.

A new elective will be offered in 1995 for all strands (Stages 7/8) of the School of Electrical Engineering, 45780 Engineering Research: The Cutting Edge, for more details please see the School.

STAFF AND LOCATION OF FACILITIES

The School of Electrical Engineering is located in the Tower Building (Building 1), City campus, Broadway and occupies Levels 18 to 25 together with specialist laboratories on Levels 3 and 9. The School office is on Level 24.

The names, office locations, and professional interests of academic and selected support staff are given below. The University's telephone number is 330 1990 and staff can be reached on the extensions listed. Each staff member publishes times of availability for consultation with students. The consolidated list is on the Level 24 noticeboard. Messages for staff may be left either in person or by telephone at the School office, ext 2433.

	Room	Ext
Head of School		
Professor K W Yates Communication System Theory, Signal Processing, Digital Radio Transmission and Multiple Access, Spread Spectrum Communications	2427	2436
General office		
Enquiries	2424	2432
Academic staff		
Mr T Aubrey Analogue Electronics, Communication Systems, Microwave Electronics	2019	2359
Professor W R Belcher Antenna and Microwave Systems, Communication Systems, Systems Engineering	2419C	2423
Mr A J Boswell Robotics, Software Engineering	2212	2382
Associate Professor P Bryce Microhydroelectricity, Appropriate Technology, Fibre Optic Communications, Electromagnetic Theory	2420A	2425
Adjunct Associate Professor T Buczkowska Microcomputer System Design, Software Engineering, Computer Networks, Data Communications	2542	2458
Dr J D Carmo Electromagnetics, Reliability Theory, Numerical Methods and Optimisation	1921	2338
Mr N J Carmody Microcomputer System Design, Operating Systems, Computer Architecture, VLSI, Digital Control Systems	2221C	2391
Professor C R Drane Satellite Positioning Systems, Multimedia Telecommunications, Software Engineering	2221B	2390
Mr K K Fung Parallel Processing, Software Engineering	2225	2394
Mr G I Gedgovd Power Systems, Computer Applications, Operations Research, Numerical Methods and Optimisation, Education Research and Cooperative Education	2420E	2429
Associate Professor A Ginige Digital Systems, Systems Engineering, Image Processing Real-time Systems, Computer Networks, Rehabilitation Engineering	2224B	2393
Ms T Ginige Telecommunications	2323B	1911
Mr W G Hooper Power Systems, Electromagnetic Theory, Educational Psychology, Electrical Plant Design	2428	2438
Mr J R M Leaney System Engineering, Software Engineering, Computer System Design, Real-time Computing, Microprocessor-based Instrumentation, Industrial Control	2221A	2389
Mr P G Lewis Professional Development, Engineering Education	2420C	2431
Dr D Lowe Software Engineering, Image Processing	2211	2526
Ms V McKain Biomedical Engineering	2433	2443
Mr P McLean Power Systems	1921	2339
Dr R Meegoda CASE Tools and Expert Systems, Communications and Protocol Design, CSI, MAP, TOP, Computer Integrated Manufacture and Robotics, CAD/CAM, Control Systems	2227	2396
Mr S Murray Computer Hardware	2520A	1553

Associate Professor
H T Nguyen 2517 2451
Control Systems Theory, Power Electronics, Control Theory, Instrumentation, Machine Control, Production Processes, Real-time Signal Processing, Computer Simulation, Computer Systems

Dr J G Nicol 2431 2370
Control Theory, Optimal Control, Multivariable Control

Associate Professor
C E Peterson 2220A 2392
Computer Integrated Manufacturing, Image Analysis, Process Control, Robotics, Artificial Intelligence

Dr V E Ramaswamy 2417A 2418
Power Electronics, Electrical Machines, Computer Systems

Professor V S Ramsden 2417C 2420
Electrical Machines, Electrical Variable Speed Drives, Rehabilitation Engineering, Field Theory, Electromagnetics

Associate Professor
S Reisenfeld 2512B 2448
Communication Systems, Satellite Communication, Information Theory, Modulation Channel Coding, Synchronisation

Dr B S Rodanski 2420 2426
Device Modelling for CAD, Numerical Methods, Computer-aided Design, Software Engineering

Dr A M Sanagavarapu 2512A 2447
Electromagnetic Compatibility, Antennas

Associate Professor
A P Seneviratne 2431 2441
Data Communications, Protocol Design, Software Engineering Computer Networks

Dr D Sharma 2419C 2422
Energy Economics, Planning and Policy, Energy Management, Decision Process Modelling, Institutional Restructuring Project Planning and Performance

Dr T J Stevenson 2545 2460
Signal Processing, Communication Systems, Electromagnetics

Ms E A Taylor 2432 2442
Sociology and Engineering, Engineering Education, Appropriate Technology, Law and Engineering

Dr K Yasukawa 2225 2393

Mr J G Zhu 1823 2318
Electrical Machines, Electrical Variable Speed Drives, Field Theory, Electromagnetics

Industrial Training Advisers
Mr P G Lewis
Ms E A Taylor

Support staff
Mrs E With 2423 2432
Student Administration

Mr W A Symons 2210B 2379
Research Computing Centre Manager

Mr W M Holliday 1814 2315
Engineer (P&M)

Mr R Jarman 1927 2368
Engineer (PD)

Mr P Mallon 2210C 2380
Engineer (CSE)

Mr R Nicholson 2118 2369
Engineer (Instrumentation and Control)

Mr A C Curgenven 2021 2364
Senior Technical Officer, Power and Machines

Mr G Evans 2313 2398
Senior Technical Officer, Communications

Mr P Gimes 2017 2347
Senior Technical Officer, (Telecom)

Mr S Y Shoon 2520C 2454
Engineer

Mr L Weber 2520D 2455
Senior Technical Officer, Instrumentation and Control

Mr R Moore 2033 2366
Senior Technical Officer, Mechanical Workshop

SCHOOL OF MECHANICAL ENGINEERING

The School offers Bachelor's degrees in Mechanical Engineering and Manufacturing Systems Engineering and a joint Bachelor of Engineering (in Mechanical or Manufacturing Systems Engineering) and Master of Design.

Mechanical engineers are responsible for the design, manufacture, development, installation, testing, control and maintenance of machinery. They provide technical input and management for a wide range of industrial projects, processes and systems, including power generation and transport. In collaboration with other professionals they have an important responsibility for protecting the environment and for the efficient use of energy and natural resources. Mechanical engineers cooperate with production workers to create safe, efficient and pleasant working conditions.

Manufacturing Systems Engineering includes the design, development and optimisation of product, process and system technologies in manufacturing industries. It prepares students for careers in a wide range of industries, including those producing leisure products and processing food and drugs. Manufacturing systems engineers interact with a variety of other professionals, including market researchers and industrial designers.

The courses in Mechanical and Manufacturing Systems Engineering provide a thorough grounding in the physical sciences, especially mathematics and physics. Accompanying this is a strong emphasis on the development of creativity and problem-solving skills. Analysis, design and experimentation are central aspects of professional activity in these branches of engineering. Oral, written, graphic and mathematical communication and documentation skills are also essential. The importance of sensitivity to the social, economic and environmental context of engineering is emphasised in subjects throughout the courses.

The quality and effectiveness of design support to Australian manufacturing is central to industry success. There is a demand for professional engineers who understand how industrial designers work and can cooperate effectively with them in design teams to produce innovative and attractive products for both Australian and international markets. The Bachelor of Engineering (in Mechanical or Manufacturing Systems Engineering) and Master of Design program has been introduced to meet this need.

All students in the Mechanical and Manufacturing Systems Engineering degrees at UTS are required to complete approved industrial experience as they progress through their course. The Professional Orientation stream of subjects integrates this experience with the academic program. The sandwich program normally takes six years to complete and the part-time program seven years. With optimum work experience patterns, however, it is possible to complete the Mechanical degree in five-and-a-half years, and the Manufacturing Systems Engineering degree in five years, including the full 90 weeks of work experience.

The Mechanical Engineering degree was restructured in 1994 to reduce the number of separate subjects from 48 to 39. The time allocated to individual subjects was correspondingly increased. At the same time, the Manufacturing Engineering degree became Manufacturing Systems Engineering, to be progressively introduced as the 1995 intake moves through the program.

Bachelor of Engineering in Mechanical Engineering

SANDWICH ATTENDANCE PATTERN

Academic requirements[1]

		CP	HPW
Stage 1			
33121	Engineering Mathematics 1	6	6
46310	Introduction to Engineering	4	3
46311	Engineering Graphics	4	3
46810	Introduction to Computing	4	3
65023	Engineering Chemistry	6	6
Stage 2			
33220	Engineering Mathematics 2	6	6
46110	Mechanics 1	6	4.5
46710	Materials Processing	4	3
46811	Computing 2	4	3
68011	Engineering Physics (Mechanical)	4	4
Stage 3			
46122	Mechanics 2	6	4.5
46321	Computer-aided Drafting	4	3
46420	Fluid Mechanics	6	4.5
46620	Engineering Communication	4	3
67021	Materials Engineering 1	4	4
Stage 4			
46121	Mechanics of Machines	6	4.5
46220	Solid Mechanics 1	6	4.5
46421	Thermodynamics	6	4.5
46821	Computing 3	6	4.5
Stage 5			
46130	Dynamics of Mechanical Systems	4	3
46331	Design 1	6	4.5
46430	Thermofluids	6	4.5
67061	Materials Engineering 2	4	4
68012	Electrical Engineering 1 (Mechanical)	4	4
Stage 6			
45931	Electrical Engineering 2 (Mechanical)	4	4
46230	Solid Mechanics 2	6	4.5
46431	Heat Transfer	4	3
46530	Measurement and Instrumentation	6	4.5
46630	Engineering and Society	4	3
Stage 7			
46033	Project A	4	3
46334	Design 2	4	3
46531	Control Engineering 1	6	4.5
46632	Engineering Management	6	4.5
	Elective 1[2]	4	3
Stage 8			
46034	Project B	6	4.5
46992	Engineering Practice	6	4.5
	Elective 2	4	3
	Elective 3	4	3
	Elective 4	4	3

[1] Industrial Experience, 46997 (Sandwich) and 46999 (Part-time) to be undertaken in accordance with the Faculty's Industrial Experience Regulations.

[2] Electives are normally to be taken within the School, except with the written approval of the Head of School. Electives are offered on demand and not all electives are offered every year. Some electives are offered in an intensive mode between semesters.

PART-TIME ATTENDANCE PATTERN

Academic requirements[1]

		CP	HPW
Stage 1			
Autumn semester			
33120	Engineering Mathematics 1	6	6
46310	Introduction to Engineering	4	3
46810	Introduction to Computing	4	3
Spring semester			
46311	Engineering Graphics	4	3
65023	Engineering Chemistry	6	6
68011	Engineering Physics (Mechanical)	4	4

Stage 2

Autumn semester

46110	Mechanics 1	6	4.5
46710	Materials Processing	4	3
46811	Computing 2	4	3

Spring semester

33220	Engineering Mathematics 2	6	6
46321	Computer-aided Drafting	4	3
46620	Engineering Communication	4	3

Stage 3

Autumn semester

46122	Mechanics 2	6	4.5
67021	Materials Engineering 1	4	4
68012	Electrical Engineering 1 (Mechanical)	4	4

Spring semester

46420	Fluid Mechanics	6	4.5
46821	Computing 3	6	4.5

Stage 4

Autumn semester

46121	Mechanics of Machines	6	4.5
46421	Thermodynamics	6	4.5

Spring semester

46220	Solid Mechanics 1	6	4.5
46430	Thermofluids	6	4.5

Stage 5

Autumn semester

46130	Dynamics of Mechanical Systems	4	3
46331	Design 1	6	4.5
67061	Materials Engineering 2	4	4

Spring semester

45931	Electrical Engineering 2 (Mechanical)	4	4
46230	Solid Mechanics 2	6	4.5
46630	Engineering and Society	4	3

Stage 6

Autumn semester

46334	Design 2	4	3
46431	Heat Transfer	4	3
46530	Measurement and Instrumentation	6	4.5

Spring semester

46531	Control Engineering 1	6	4.5
46632	Engineering Management	6	4.5

Stage 7

Autumn semester

46033	Project A	4	3
46992	Engineering Practice	6	4.5
	Elective 1 2	4	3

Spring semester

46034	Project B	6	4.5
	Elective 2	4	3
	Elective 3	4	3
	Elective 4	4	3

[1] Industrial Experience, 46997 (Sandwich) and 46999 (Part-time) to be undertaken in accordance with the Faculty's Industrial Experience Regulations.

[2] Electives are normally to be taken within the School, except with the written approval of the Head of School. Electives are offered on demand and not all electives are offered every year. Some electives are offered in an intensive mode between semesters.

ELECTIVES

All of the following electives have four credit points and three contact hours per week.

Manufacturing and Management

46040 Ergonomics
46640 Terotechnology
46642 Engineering Economics
46740 Quality and Reliability
46741 Flexible Manufacturing
46742 Production and Cost Control
46743 Work Study
46744 Computer-aided Manufacturing

Applied Mechanics and Design

46140 Kinematics and Dynamics of Machines
46141 Applied Dynamics
46142 Robotics
46143 Einstein's Universe
46240 Solid Mechanics 3
46241 Finite Element Applications
46340 Structures
46341 Machine Design
46342 Unitised Load Handling
46343 Appropriate Technology
46344 Engineering Speculation
46345 Industrial Design
46346 Bulk Materials Handling

Energy

46441 Combustion and Air Pollution
46442 Advanced Fluid Dynamics
46443 Refrigeration and Airconditioning
46444 Power Cycles
46445 Fluid Machines

Control and Computing

46540 Programmable Controllers
46541 Control Engineering 2
46840 Advanced Engineering Computing
46841 Operations Research

Other approved electives

65071 Corrosion Technology for Engineers
91379 Environmental Science for Engineers

Bachelor of Engineering in Manufacturing Systems Engineering

SANDWICH ATTENDANCE PATTERN[1]

Academic requirements[2]

		CP	HPW
Stage 1			
33120	Engineering Mathematics 1	6	6
46312	Introduction to Manufacturing Systems	4	3
46311	Engineering Graphics	4	3
46810	Introduction to Computing	4	3
65023	Engineering Chemistry	6	6
Stage 2			
46110	Mechanics 1	6	4.5
46715	Manufacturing Processes	6	4.5
46811	Computing 2	4	3
67021	Materials Engineering 1	4	4
68011	Engineering Physics (Mechanical)	4	4
Stage 3			
33221	Engineering Mathematics 2A	3	3
46125	Mechanics for Manufacturing	6	4.5
46321	Computer-aided Drafting	4	3
46620	Engineering Communication	4	3
46725	Manufacturing Systems	6	4.5
Stage 4			
46220	Solid Mechanics 1	6	4.5
46630	Engineering and Society	4	3
46726	Manufacturing Systems Planning	4	3
46821	Computing 3	6	4.5
68012	Electrical Engineering 1 (Mechanical)	4	4
Stage 5			
45931	Electrical Engineering 2 (Mechanical)	4	4
46435	Fluid Mechanics for Manufacturing	4	3

46535	Metrology and Instrumentation	6	4.5
46632	Engineering Management	6	4.5
67061	Materials Engineering 2	4	4

Stage 6

46335	Design for Manufacturing	6	4.5
46336	Computer-aided Manufacturing	4	3
46436	Thermodynamics for Manufacturing	4	3
46531	Control Engineering 1	6	4.5
46540	Programmable Controllers	4	3

Stage 7

46033	Project A	4	3
46437	Thermofluids for Manufacturing	4	3
46735	Manufacturing Systems: Quality	6	4.5
46835	Operations Research	6	4.5
	Elective 1[3]	4	3

Stage 8

46034	Project B	6	4.5
46337	Manufacturing Systems Design	4	3
46992	Engineering Practice	6	4.5
	Elective 2[3]	4	3
	Elective 3[3]	5	3

[1] While provision will be made for students to take this program in a part-time mode, the preferred pattern for the Bachelor of Engineering in Manufacturing Systems Engineering is for the program to be undertaken in sandwich mode, except for Stage 7 which is preferably undertaken part time over a year. The first 30-week period of professional experience is preferably undertaken in Stage 3. This pattern allows the student to complete the degree in five years, including the required 90 weeks of professional experience.

[2] Industrial Experience, 46997 (Sandwich) and 46999 (Part-time) to be undertaken in accordance with the Faculty's Industrial Experience Regulations.

[3] Electives are normally to be taken within the School, except with written approval of the Head of School. Electives are offered on demand and not all electives are offered every year. One elective must be at least 5 credit points.

Bachelor of Engineering/ Master of Design

DESCRIPTION

This joint program is offered as a Bachelor of Engineering in Mechanical or Manufacturing Systems Engineering and a Master of Design (BE/MDes). The course is designed to meet the demand for professional engineers who understand how industrial designers work and cooperate effectively with them in design teams to produce innovative and attractive products for the Australian and international markets.

The course brings together two existing degrees, the Bachelor of Engineering in Mechanical or Manufacturing Systems Engineering, and the Master of Design which is offered by the Faculty of Design, Architecture and Building at UTS.

In addition to the engineering content, a student must achieve 72 credit points in the Master of Design program. This total is made up of 28 credit points of core coursework subjects, 20 credit points of elective subjects and 24 credit points for an approved design project, taken over two semesters.

The central concern of the Industrial Design program is with the design of products for manufacturing industry. Industrial designers have responsibility not only for the visual and tactile qualities of products but also to a large extent for their safety, efficiency and cost effectiveness. Through a combination of coursework and project work, the Master of Design degree deals with the management of design and its social, technological and environmental implications. It includes material on design decision making, design research methods, computer-aided design and the history of design.

ADMISSION

Students must enrol initially in the BE program. Acceptance for the joint program is competitive, based on

performance at a high level in both the first half of the BE and the introductory Industrial Design (ID) subject. While students will be accepted for entry to the joint course after completing the first half of the BE and the qualifying Industrial Design subject at a satisfactory level, they will not actually be **admitted** to the course until they are about to start the first subjects of the Master of Design program.

Students will not qualify for either the BE or the MDes until they have completed the requirements for both. This is because the major BE project is deferred and incorporated into the larger and more advanced project in the MDes. This capstone project, which allows students to consolidate and apply all the coursework material, is jointly supervised by staff from the two schools. Where the project is work-based there will also be an industrial supervisor.

If, after admission to the joint course, students decide not to proceed but to revert to the BE degree, they will need to complete the normal BE requirements, including the major project.

ATTENDANCE PATTERNS

Students can complete the joint degree program in a minimum of six-and-a-half years. This requires the BE component being undertaken on the sandwich pattern, and the MDes being completed on a full-time basis. The coursework in the MDes program is offered in the evenings and may be taken on a part-time basis. To undertake the degrees separately and consecutively would normally require a total of eight years.

Students must meet the Faculty's industrial experience requirements of relevant work experience in industry totalling at least 90 weeks.

Enquiries can be made by telephone during office hours on 330 2666.

Mechanical Engineering subjects in the joint degree:

Academic requirements[1]

		CP	HPW
Stage 1			
33120	Engineering Mathematics 1	6	6
46310	Introduction to Engineering	4	3
46311	Engineering Graphics	4	3
46810	Introduction to Computing	4	3
65023	Engineering Chemistry	6	6
Stage 2			
33220	Engineering Mathematics 2	6	6
46110	Mechanics 1	6	4.5
46710	Materials Processing	4	3
46811	Computing 2	4	3
68011	Engineering Physics (Mechanical)	4	4
Stage 3			
46122	Mechanics 2	6	4.5
46321	Computer-aided Drafting	4	3
46420	Fluid Mechanics	6	4.5
46620	Engineering Communication	4	3
67021	Materials Engineering 1	4	4
Stage 4			
46121	Mechanics of Machines	6	4.5
46220	Solid Mechanics 1	6	4.5
46421	Thermodynamics	6	4.5
46821	Computing 3	6	4.5
84220	Industrial Design 2 (from the Industrial Design (ID) Course)	4	3
Stage 5			
46130	Dynamics of Mechanical Systems	4	3
46331	Design 1	6	4.5
46430	Thermofluids	6	4.5
68012	Electrical Engineering 1 (Mechanical)	4	4

xxxxx	Human Factors – Anatomy and Physiology		
	and		
84330	Industrial Design 3 (from the ID Course)		

Stage 6

45931	Electrical Engineering 2 (Mechanical)	4	4
46230	Solid Mechanics 2	6	4.5
46530	Measurement and Instrumentation	6	4.5
46630	Engineering and Society	4	3
67061	Materials Engineering 2	4	4
84550	Industrial Design 5 (from the ID Course)		

Stage 7

46334	Design 2	4	3
46431	Heat Transfer	4	3
46531	Control Engineering 1	6	4.5
46632	Engineering Management	6	4.5
	Elective 1[2]	4	3

Stage 8

46992	Engineering Practice	6	4.5
	Elective 2	4	3

[1] Industrial Experience, 46997 (Sandwich) and 46999 (Part-time) to be undertaken in accordance with the Faculty's Industrial Experience Regulations.

[2] Electives are normally to be taken within the School, except with written approval of the Head of School. Electives are offered on demand and not all electives are offered every year. One elective must be at least 5 credit points.

Manufacturing Systems Engineering subjects in the joint degree:

Academic requirements[1]

		CP	HPW

Stage 1

33120	Engineering Mathematics 1	6	6
46312	Introduction to Manufacturing Systems	4	3
46311	Engineering Graphics	4	3
46810	Introduction to Computing	4	3
65023	Engineering Chemistry	6	6

Stage 2

46110	Mechanics 1	6	4.5
46715	Manufacturing Processes	6	4.5
46811	Computing 2	4	3
67021	Materials Engineering 1	4	4
68011	Engineering Physics (Mechanical)	4	4

Stage 3

33221	Engineering Mathematics 2A	3	3
46125	Mechanics for Manufacturing	6	4.5
46321	Computer-aided Drafting	4	3
46620	Engineering Communication	4	3
46725	Manufacturing Systems	6	4.5

Stage 4

46220	Solid Mechanics 1	6	4.5
46630	Engineering and Society	4	3
46726	Manufacturing Systems Planning	4	3
46821	Computing 3	6	4.5
68012	Electrical Engineering 1 (Mechanical)	4	4
84220	Industrial Design 2 (from the Industrial Design (ID) Course)	4	3

Stage 5

45931	Electrical Engineering 2 (Mechanical)	4	4
46435	Fluid Mechanics for Manufacturing	4	3
46535	Metrology and Instrumentation	6	4.5
46632	Engineering Management	6	4.5
xxxxx	Human Factors – Anatomy and Physiology		
	and		
84330	Industrial Design 3 (from the ID Course)		

Stage 6

46335	Design for Manufacturing	6	4.5
46336	Computer-aided Manufacturing	4	3

46436	Thermodynamics for Manufacturing	4	3
46531	Control Engineering 1	6	4.5
67061	Materials Engineering 2	4	4
84550	Industrial Design 5 (from the ID Course)		

Stage 7

46437	Thermofluids for Manufacturing	4	3
46540	Programmable Controllers	4	3
46735	Manufacturing Systems: Quality	6	4.5
46835	Operations Research	6	4.5
	Elective 1	4	3

Stage 8

46337	Manufacturing Systems Design	4	3
46992	Engineering Practice	6	4.5
	Elective 2	4	3

Master of Design subjects in the joint degree:

Stages 8 to 10

Students take seven core Master of Design coursework subjects and five elective subjects. The design project is common to both degrees and draws on both engineering and industrial design knowledge and skills. The project is taken over two semesters.

Master of Design core subjects:

82004 Design Decision Making
82905 Research Methods
82912 Design Seminar
82013 Research Seminar
82901 Psychology of Design
82903 Technological Change
81020 Management Techniques and Design
and/or
81920 Marketing and Design

Master of Design elective subjects:

User Studies
Technology Studies
Design Management Studies
Methodology Studies
General Studies
Design Computing Studies

Subjects common to Bachelor of Engineering and Master of Design:

Stages 9 and 10

89917 Design Project

STAFF AND LOCATION OF FACILITIES

The School of Mechanical Engineering is located in the Engineering Building (Building 2), City campus, Broadway. The School office and academic staff offices are on Level 6. Laboratories and classrooms are on Levels 2, 3, 4 and 6.

The names, office locations and professional interests of academic and senior support staff are set out below. The University's telephone number is 330 1900 and staff may be reached at the extensions below. Messages may be left, either in person or by telephone, at the School office, 330 2669.

	Room	Ext
Head of School		
Assoc Prof S F Johnston	612B	2668
Design, Ergonomics, Social Context and Philosophy of Technology		
Deputy Head of School		
Mr K A Stillman	624	2682
Control Engineering, Chemical Engineering, Real-time Computing, Simulation, Optimisation		
Professor of Mechanical Engineering		
Prof J P Gostelow	627	2685
Turbomachinery, Gas Turbines, Fluid Mechanics, Innovation		
James N Kirby, Professor of Manufacturing Engineering		
Prof F B Swinkels	416	2588
Design for Manufacturing, Materials, Computer-aided Design and Computer-aided Manufacturing		
Assoc Prof C T Mathews	628	2686
Control Engineering, Industrial Instrumentation Energy Resources, Technical Change, Engineering Management, Engineering Education		

Assoc Prof
R M Spencer 606 2660
Production Planning and Control, Product Process Design and Development, Computer-aided Manufacture, Metrology/CMM, Robotics

Dr Y P Bhasin 605 2659
Operations Management, Work Study, Planning and Control, Engineering Economics, Quality and Reliability, Manufacturing Processes

Mr A J Burfitt 624 2689
Design, Stress Analysis, Photoelasticity

Dr G Hong 619 2677
Turbulence Transition, Internal Combustion Engines, Thermodynamics, Engineering Statistics

Dr B P Huynh 616 2675
Computational Mechanics, Fluid Mechanics, Heat Transfer

Dr A N F Mack 626 2684
Computing, Aerodynamics, Finite Element Methods, Computational Fluid Dynamics

Mr G M Marks 625 2683
Appropriate Technology, Industry Development Policy, Mechanics, Engineering Education

Mrs H T McGregor 620 2678
Human Communication, Engineering and Social Issues, Cooperative Education, Engineering Documentation Education and Professional Development

Mr L E Reece 416 2587
Turbomachinery, Computer-aided Engineering, Thermofluids, Ergonomics, Philosophy of Technology

Mr S Spain 625 2688
Design, Control Engineering, Robotics

Dr F C O Sticher 623 2681
Advanced Kinematics and Dynamics, Instrumentation

Mr R B Ward 621 2679
Engineering Management, Technical Communication, Maintenance Hazard and Risk

Mr R M Wiltshire 416 2586
Stress Analysis, Structural and Vehicle Dynamics, Machine Design, Computer-aided Engineering

Support Staff

Mrs S Tanuwijaya 612 2671
Executive Officer

Mrs C Lew 612 2670
Administrative Assistant

Mrs K Johnston 612 2669
Administrative Assistant

Mr J J McCaffrey 323C 2558
Engineer

Mr K W Bowyer 648 2656
Engineer

Mr K C Barnes 648A 2657
Engineering

Mr A Revel 301A 2550
Engineer

Mr P H Alt 313A 2569
Assistant Laboratory Manager

Mr T Bayfield 648 2691
Assistant Laboratory Manager

Mr C E Evans 212B 2544
Senior Technical Officer

Mr C Chapman 318A 2561
Professional Officer

Mr J I Gibson 212D 2543
Senior Technical Officer

Mr L D'Arcy 201 2533
Senior Technical Officer

Mr R Turnell 313A 2570
Senior Technical Officer

Mr G Bayley 212 2545
Senior Laboratory Craftsperson

Mr S M Gordon 212 2546
Senior Laboratory Craftsperson

Mr J R Grove 253B 1026
Workshop Supervisor

Mr L Stonard 253 1026
Technical Officer

Mr L Slade 253 1026
Senior Laboratory Craftsman

UNDERGRADUATE SUBJECT DESCRIPTIONS

Key to subject numbers

Subject descriptions appear in numerical order. Subject numbers are made up of five digits. The first digit indicates the faculty which teaches the subject.

2 = Faculty of Business
3 = Faculty of Mathematical and Computing Sciences
4 = Faculty of Engineering
5 = Faculty of Humanities and Social Sciences
6 = Faculty of Science (School of Physical Sciences)
7 = Faculty of Law and Legal Practice
91 = Faculty of Science (School of Biological and Biomedical Sciences)

Within the Faculty of Engineering, the second digit indicates the school to which the subject belongs, and whether it is an undergraduate or postgraduate subject. For example:

Civil Engineering undergraduate subjects begin with '47'

Electrical Engineering undergraduate subjects begin with '45'

Mechanical Engineering undergraduate subjects begin with '46'

Bachelor of Technology subjects begin with '48'.

Bachelor of Engineering Bachelor of Arts in International Studies subjects begin with '485'.

Key to abbreviated course names used in subject synopses

Where the subjects shown form a prescribed or recommended part of a course, the abbreviation for that course is indicated as follows:

CE Bachelor of Engineering in Civil Engineering

CEE Bachelor of Engineering in Civil and Environmental Engineering

SE Bachelor of Engineering in Structural Engineering

EE Bachelor of Engineering in Electrical Engineering

ET Bachelor of Engineering in Telecommunications Engineering

CSE Bachelor of Engineering in Computer Systems Engineering

MEE Bachelor of Engineering in Mechanical Engineering

MSE Bachelor of Engineering in Manufacturing Systems Engineering

BEBA Bachelor of Engineering Bachelor of Arts in International Studies

BT Bachelor of Technology in Manufacturing Engineering

Guide to subject descriptions

The subject descriptions shown below indicate the subject code and name, the number of credit points for the subject (e.g. 3cp), the duration of the subject, indicated as semester weeks, if applicable, and the number of formal contact hours each week (e.g. 4hpw). Also shown are the prerequisites or corequisites if any, the method of assessment, the name of the subject coordinator and a brief outline of the content.

Prerequisites are subjects which must be completed before taking the subject to which they refer. Corequisites may be completed before or be taken concurrently with the subject to which they refer.

Note: Methods of assessment given in the following descriptions are subject to change.

24221

PRINCIPLES OF MARKETING

BT
4cp; 3hpw
subject coordinator: Ms R McGuiggan

Provides students with an understanding of basic marketing theory and its application in manufacturing and general management; develops an understanding of the processes of market research and product development, pricing strategies, advertising, promotion and sales and distribution of goods and services to all sectors of the economy. Emphasis is placed on the

decision-making strategies required in manufacturing environments.

Assessment: assignments 70 per cent, final examination 30 per cent

25310

FINANCIAL MANAGEMENT FOR MANUFACTURING ENGINEERING

BT
4cp; 3hpw
subject coordinator: R Trayler

Introduces the students to the terminology and basic concepts of economic and financial analysis and the application of financial management principles to manufacturing engineering. The course covers an introduction to economics, supply and demand, revenue-cost relationships, time-value analysis, capital budgeting, project analysis, break-even analysis, effects income tax, depreciation, replacement studies; general accounting principals; financial ratios, annual reports and capital financing.

31141

DATABASE STRUCTURES AND MANAGEMENT

CSE/ET
3cp; 3hpw
prerequisite: 45133 Software Development 2

The nature of common data structures and their use was introduced in 45133 Software Development 2. This subject covers operations on data structures, basic file systems, common database architectures and their relative merits, data entry to database and data retrieval. The student will, on completion, have the knowledge to be able to select and configure suitable databases to meet a specification and be able to write handlers to supply and extract data from the database. Key features of the subject are the illustration of concepts by commercial systems such as PICK, UNIFY, DBASE IV or LOTUS 123, plus a major assignment using an asynchronous communications port for data input and ad hoc report generation from the stored data.

Topics include review of strings, arrays, lists, trees, linking, and structures of structures; operations including sort, search, merge; basic file systems on mass storage, distributed databases, data input (forms, handlers) and data retrieval (ad hoc queries, report generator, alarms), database administration.

Assessment: assignments 40 per cent, quizzes 60 per cent

31926

PARADIGMS FOR ARTIFICIAL INTELLIGENCE

CSE
4cp; 3hpw
coordinator: Dr S Prabhakar, School of Computing Sciences

Introduces the basic issues in modelling intelligent behaviour. The issues are addressed by introducing the underlying assumptions behind various paradigms and analysis of experiences with these paradigms in research. Topics include: intelligent systems as problem solvers and learning systems; modelling the external world and the user environment; and the psychological, philosphical, computational and scientific issues in modelling intelligence.

Assessment: seminar 20 per cent, two assignments 40 per cent, project 40 per cent

33120

ENGINEERING MATHEMATICS 1

MEE/MSE
6cp; 6hpw
School of Mathematical Sciences

Presents basic aspects of calculus to engineering students. On completion of the subject, students should have a knowledge of the following topics: matrices and determinants; vectors; limits, continuity and differentiation; applications of differentiation; integration and applications; elementary functions; methods of integration; sequences, series and complex numbers.

33121

ENGINEERING MATHEMATICS 1A

CE/SE/CEE
3cp; 3hpw
School of Mathematical Sciences

Presents basic aspects of calculus to engineering students. On completion of the subject, students should have a knowledge of the following topics: matrices and determinants; vectors; limits, continuity and differentiation; applications of differentiation.

33122

ENGINEERING MATHEMATICS 1B

CE/SE/CEE
3cp; 3hpw
prerequisite: 33121 Engineering Mathematics 1A
School of Mathematical Sciences

Presents basic aspects of calculus to engineering students. On completion of the subject, students should have a knowledge of the following topics: integration and applications; elementary functions; methods of integration; sequences, series and complex numbers.

33220

ENGINEERING MATHEMATICS 2

MEE
6cp; 6hpw
School of Mathematical Sciences

Builds on the elementary aspects of calculus covered in Engineering Mathematics 1. On completion of the subject, students should have a knowledge of partial derivatives, multiple integrals and differential equations. Topics covered include: partial derivatives; double integrals and applications; triple integrals and applications; differential equations; solution of ordinary differential equations by Laplace transforms; convolution theorem; step functions; series solutions of ordinary differential equations; regular singular points; Bessel functions; boundary value problems; Fourier series; vibrating membrane and Bessel functions; vector fields; divergence and curl; line and surface integrals; and theorems of Gauss and Stokes.

Assessment: class test 25 per cent, final examination 75 per cent

33221

ENGINEERING MATHEMATICS 2A

CE/SE/CEE AND MSE
3cp; 3hpw
prerequisite: 33122 Engineering Mathematics 1B
School of Mathematical Sciences

Builds on the elementary aspects of calculus covered in Engineering Mathematics 1A and 1B. On completion of the subject, students should have a knowledge of partial derivatives, multiple integrals and differential equations. Topics covered include: partial derivatives; double integrals and applications; triple integrals and applications; differential equations.

Assessment: class test 25 per cent, final examination 75 per cent

33310

ENGINEERING MATHEMATICS 3 (ELECTRICAL)

EE/CSE/ET
6cp; 6hpw
prerequisite: 33102 Mathematics 2
School of Mathematical Sciences

The series solution of differential equations and the conceptualisation of simple problems requiring multidimensional thinking, for example, boundary value problems, vector calculus and complex variable theory.

The subject content is as follows: series solution of linear differential equations; ordinary and regular singular points; Bessel functions; boundary value problems for one-dimensional heat and wave equations; Laplace equation in a circle; circular drum; double and triple integrals; polar cylindrical and spherical coordinates; line and surface integrals; Green's theorem; divergence theorem and Stokes' theorem; analytic functions; Cauchy-Riemann equations; conformal mapping; Cauchy's integral theorem;

Taylor and Laurent series; the residue theorem; inverse Laplace transforms. There will be emphasis on deriving proofs of the fundamental concepts.

Assessment: class tests 25 per cent, final examination 75 per cent

35101

MATHEMATICS 1

CE/CSE/ET
6cp; 6hpw
prerequisite: HSC 3-unit Mathematics is assumed
School of Mathematical Sciences

The objective is for students to master the fundamental mathematical operations used in most branches of electrical engineering. Topics include matrices and determinants; solution of linear equations; Gaussian reduction. Eigenvalues and eigen vectors. Vectors; products of vectors; equations of lines and planes. Complex numbers: polar form, De Moivre's theorem. Limits, continuity and differentiation. Mean value theorem. Curve sketching; related rates; maxima and minima; integration. Riemann sums; fundamental theorem of calculus; application to areas and volumes and to lengths of curves; logarithm and exponential functions. Trigonometric and hyperbolic functions. L'Hopital's rule.

Assessment: two examinations 40 per cent each, class tests and assignments 20 per cent

35102

MATHEMATICS 2

CE/CSE/ET
6cp; 6hpw
prerequisite: 35101 Mathematics 1
School of Mathematical Sciences

The objective is for students to master the fundamental mathematical operations used in most branches of electrical engineering. Topics include: Methods of integration; improper integrals; ordinary differential equations; first order linear and variable separate equations; higher order linear equations; underdetermined coefficients. Sequences and series; tests for convergence; power series; radius of convergence; Taylor series. Application of matrix exponentials to systems of linear equations. Series solution of linear differential equations; ordinary and regular singular points; Bessel functions. Partial derivatives, directional derivative and gradient; maxima and minima; Lagrange multipliers.

Assessment: two examinations 40 per cent each, class tests and assignments 20 per cent

35111

DISCRETE MATHEMATICS

EE/CSE/ET
6cp; 6hpw
School of Mathematical Sciences

This is a foundation subject which contibutes basic techniques to later mathematics and computing subjects. Topics: Graphs, paths, trees. Set operations. Indexing and recurrence relations. Propositional and predicate calculus. Groups and monoids. Automata. Permutations, combinations, partitions, counting and allocation problems.

Assessment: class tests and assignments 40 per cent, final examination 60 per cent

45113

DIGITAL TECHNIQUES

EE/CSE/ET
3cp; 3hpw
subject coordinator: A/Prof C E Peterson

The first part of this subject will introduce number systems and Boolean algebra. Techniques of manipulating and minimising Boolean functions, and implementing these functions using logic gates will then be presented. The concepts introduced will be demonstrated by designing and building a combinatorial circuit in the laboratory.

The introduction to sequential circuit design will be by examining the operation of D, and JK flip flops. Methods of formally describing the operation of sequential circuits using state tables and state diagrams will then be introduced.

Finally techniques of implementing the circuits represented in the form of state tables and diagrams will be presented. These concepts will again be demonstrated by designing and building a sequential circuit in the laboratory.

Assessment: class tests 20 per cent, laboratory work 20 per cent, final examination 60 per cent

45115

ENGINEERING PRACTICE

EE/CSE/ET
3cp; 3hpw
subject coordinators: Mr P G Lewis, Ms E A Taylor

This subject is undertaken only by students who gained admission on the basis of a TER score i.e. their performance in high school.

The aim is to help students develop their understanding of the practice of electrical and computer systems engineering, the role(s) of practitioners, and the academic disciplines which support these professions; develop an appreciation of their communications capabilities and provide support for those needing to remedy weaknesses; develop an understanding of how their course is designed to contribute to their professional development; assume responsibility for their own learning. Students are encouraged to see their progression through the course as an engineering project that is to be delivered on time and to a specified standard; and take action to equip themselves with skills that will be required in future studies and work.

45116

ELECTRICAL ENGINEERING 1

EE/CSE/ET
3cp; 3hpw
corequisite: 35101 Mathematics 1
subject coordinator: Mr W G Hooper

This is a first course in DC and AC circuit theory and introduces electric and magnetic fields. Circuits containing resistors and capacitors are analysed. Circuit measurements use AC and DC meters and the oscilloscope.

Assessment: laboratory work 10 per cent, mid-semester examination 30 per cent, final examination 50 per cent, tutorials 10 per cent

45123

SOFTWARE DEVELOPMENT 1

EE/CSE/ET
6cp; 6hpw
prerequisite: 45115 Engineering Practice, 35111 Discrete Mathematics
subject coordinator: Dr D Lowe

Introduces students to the fundamental aspects of computer usage and computer programming. They should be able to engineer software based on the object-oriented paradigm. They should understand the need for software engineering principles and be willing to use it in the development of correct, efficient, appropriate, maintainable, cost-effective, re-usable software.

The students should be able to develop small to medium software systems (up to 5000 lines of code), working in teams, using the language Eiffel. They should be able to identify the appropriate tools and techniques to use, and use them in a correct engineering methodology. They should be able to use the relevant tools on both a PC and a UNIX system.

Assessment: assignments 35 per cent, tutorials and reviews 20 per cent, quizzes 15 per cent, final examination 30 per cent

45124

ELECTRICAL ENGINEERING 2

EE/ET
6cp; 6hpw
prerequisite: 45116 Electrical Engineering 1
corequisite: 35102 Mathematics 2
subject coordinator: Dr J D Carmo

Covers the essential theory needed by students in their first industrial semester. It deals with electromagnetic theory, measurements, basic electronic rectifier and amplifier circuits and eletro-mechanical devices. It consists of lectures,

tutorials, laboratory and computing work.

Assessment: laboratory reports 10 per cent, problems 24 per cent, experiments 2 per cent, mid-semester test 14 per cent, final examination 50 per cent

45125

ENGINEERING DISCOVERY

EE/CSE/ET
3cp; 3hpw
prerequisite: 45115 Engineering Practice
subject coordinator: Mr P G Lewis

This subject is undertaken by students who gained admission with a TER score i.e. on the basis of their performance in high school.

The objectives of this subject are to continue and extend the exposure of students to team-based approaches to tackling open ended problems, for which the team members initially have neither the skills nor the knowledge to solve. It aims to develop in students the confidence and enthusiasm that allow a positive response to the challenge of working with problems where step-by-step procedures are unknown and to provide a setting in which students have the freedom to explore and discover methods of fostering their own creativity and ingenuity. It aims to develop advocacy, written and verbal reporting skills and the ability to use communications technology.

The problem-based learning approach introduced in Engineering Practice is continued in this subject. The students, grouped into syndicates, will be presented with challenges generally contained within scenarios which attempt to simulate realistic but simplified situations with which junior engineers might be confronted. Resource sessions are provided where necessary at which students have the opportunity to acquire the necessary knowledge and skills.

45133

SOFTWARE DEVELOPMENT 2

EE/CSE
3cp; 3hpw
prerequisite: 45123 Software Development 1
subject coordinator: Dr R Meegoda

Extends the knowledge and skills of the students obtained in Software Development 1. This will cover both software development and specific programming skills.

The students' objectives are to be able to understand and use basic structured analysis and design methods, and to be able to develop small to medium-sized programs (up to 5000 lines of code) in C, working as members of a group. They should be able to apply structured coding techniques to the fundamental data types. The students should be able to produce object-oriented software using a procedural language (specifically, C). They should be able to read C++ software.

Assessment: assignments 35 per cent, tutorials and reviews 20 per cent, quizzes 15 per cent, final examination 30 per cent

45134

NETWORK THEORY

EE/CSE/ET
6cp; 6hpw
prerequisites: 45124 Electrical Engineering 2, 35102 Mathematics 2
subject coordinator: Mr G I Gedgovd

Outlines the general techniques of network analysis. The emphasis is on the time response and frequency response of I and II-order networks. Discussion on response of networks will be preceded by description of typical signals, such as singularity functions, sinusoidal and non-sinusoidal signals, and nodal and mesh analysis. Obtaining the response of networks containing active elements will be explained, with the equivalent circuit of an active element being given to the students. The topic of three-phase networks will be covered briefly.

Assessment: laboratory and assignments 10 per cent, mid-semester examination 40 per cent, final examination 50 per cent

45135

ENGINEERING COMMUNICATION

EE/CSE/ET
3cp; 3hpw
prerequisite: 45125 Engineering Discovery
subject coordinator: Mr P G Lewis

The practice of engineering relies on effective technical communication, and utilises various standard documents and procedures to achieve precision and clarity. The subject develops an understanding of the requirements for effective technical communication in engineering and provides experience in the development, presentation, interpretation and maintenance of engineering information, with respect to established and developing practice.

Assessment: drawing exercises 33 per cent, report and essays 33 per cent, final examination 34 per cent

45141

CONTINUOUS AND DISCRETE SYSTEMS

EE/CSE/ET
6cp; 6hpw
prerequisites: 33310 Engineering Mathematics 3 (Electrical), 45134 Network Theory
subject coordinator: Dr J G Nicol

Gives a comprehensive coverage of the theory of linear systems with and without feedback. Continuous and discrete systems are presented in parallel. State-space methods are introduced and compared with frequency domain techniques. There are six two-hour laboratory sessions. Topics include: physical system modelling, linearisation, block diagrams, signal flow graphs, Laplace and transforms, state equations, time and frequency domain response, root locu, stability criteria (Routh, Hurwitz, Jury, Nyquist).

Assessment: laboratory work 20 per cent, mid-semester examination 30 per cent, final examination 50 per cent

45143

COMPUTER HARDWARE

EE/ET
3cp; 3hpw
prerequisites: 45116 Electrical Engineering 1, 45113 Digital Techniques
subject coordinator: Mr K K Fung

Introduces microprocessor and microcomputer hardware, as well as assembly language programming. Topics include architectures of common microprocessors, assembly language programming, memory subsystem, interrupts, I/O subsystem and I/O controllers.

Assessment: assignments 30 per cent, final examination 70 per cent

45144

ELECTRONIC DEVICES AND CIRCUITS

EE/CSE/ET
6cp; 6hpw
prerequisites: 68033 Engineering Physics 3 (Electrical), 45134 Network Theory
subject coordinator: Dr B S Rodanski

Semiconductor physics, p-n junction, ideal vs real semiconductor diode, JFET, properties of the MOS system, MOSFET, BJT. Device modelling. Basic applications of semiconductor devices. Other solid-state devices (thyristors, photoelectronic devices, microwave devices). Introduction to integrated circuits. Each topic introduced in a lecture will be reinforced in a tutorial session. In addition, there will be four laboratory sessions dealing with diodes and their applications, field-effect transistors and simple FET amplifiers, BJT characteristics and model parameter extraction and BJT amplifier configurations. Students will also be required to complete three to four assignments.

Assessment: assignments 12 per cent, laboratory 8 per cent, mid-semester examination 30 per cent, final examination 50 per cent

45145

ENGINEERING STATISTICS

EE/CSE/ET
3cp; 3hpw
prerequisites: 33310 Engineering Mathematics 3 (Electrical), 45123 Software Development 1, 45124 Electrical Engineering 2
subject coordinator: Dr T J Stevenson

Presents an introduction to statistical theory with applications in engineering. Topics are illustrated with engineering examples and case studies. Topics include: probability theory, random variables, density and distribution functions including Gaussian, Binomial, Poisson and Raleigh, transformation and generation of random variables, moments and expected value calculations, summation of random variables, central limit theorem, sampling from a normal population, estimates of means and variances, confidence limits, correlation, linear regression, multiple regression, analysis of variance, the design of experiments, reliability theory, MTBF calculations, Markov chains.

The subject is taught in three modules: Probability Theory, Characterisation of Random Variables and Sampling Statistics.

Assessment: assignments 40 per cent, mid-semester quiz 30 per cent, final examination 30 per cent

45151

SIGNAL THEORY 1

EE/CSE
3cp; 3hpw
prerequisite: 45141 Continuous and Discrete Systems
subject coordinator: Dr T J Stevenson

An introductory course in communication systems. It presents the theoretical basis for communication system analysis and gives students skills in using the techniques to design components of communication systems. The treatment is continued in the subject Signal Theory 2.

The subject's objectives are to bring students to the point where they can design active and passive lumped element filters which conform to a given mark with specified component tolerances and to equip students with the analytical tools used to characterise deterministic and random signals in both time and frequency domains.

The subject is taught in three modules: Filter Design, the Fourier Transform and Signal Theory and Correlation and Power Spectral Density.

Assessment: assignments 10 per cent, mid-semester quiz 40 per cent, final examination 50 per cent

45152

SIGNAL THEORY 2

EE/CSE/ET
3cp; 3hpw
prerequisites: 45151 Signal Theory 1, 45145 Engineering Statistics
subject coordinator: Prof W Yates

Applies the analytical techniques developed in Signal Theory 1 to the analysis and design of practical baseband and bandpass point-to-point communications systems. Students are also familiarised with the design choices that are embodied in many current communication systems standards in broadcasting and telephony.

The subject is taught in three modules: Baseband Communication Systems, Bandpass Communication Systems, Communication System Performance in Noise.

Assessment: assignment 10 per cent, mid-semester quiz 40 per cent, final examination 50 per cent

45153

ANALOGUE ELECTRONICS

EE
3cp; 6hpw
prerequisites: 45144 Electronic Devices and Circuits, 45141 Continuous and Discrete Systems
subject coordinator: Dr V E Ramaswamy

Aims to develop skills in the analysis, design, practical implementation and testing of the main analogue electronic circuits of interest to an electrical or computer systems engineer. Students

should be able to understand the characteristics and limitations of devices and ICs used in analogue systems; master the analysis and design methods of linear and nonlinear electronic analogue circuits and systems, test and measure the parameters of analogue circuits and systems using standard laboratory equipment.

Assessment: assignments 20 per cent, two examinations 80 per cent

45154

CONTEXTUAL STUDIES

EE/CSE
3cp; 3hpw
prerequisites: at least 22 weeks of approved Industrial Experience and 45135 Engineering Communication
subject coordinator: Ms E A Taylor

Aims to develop an appreciation of the contexts within which engineers practise; including their professional roles and responsibilities within society. It provides an overview and basic framework of knowledge from other disciplines and an appreciation of their interfaces with engineering practice. It also aims to contribute to the development of personal skills, self-knowledge and understanding of society.

Assessment: presentation 20 per cent, participation 20 per cent, journal 30 per cent, final examination 30 per cent

45155

PROJECT A

EE/CSE/ET
3cp; 3hpw
prerequisite: 45143 Computer Hardware
corequisites: 45151 Signal Theory 1, 45153 Analogue Electronics
subject coordinator: Ms V McKain

Project A is laboratory based, and provides students with an individual experience on an analogue design project. It builds on theoretical knowledge gained from prior or concurrent core subjects. Tasks are presented in the form of a request for tender, including a system specification and requires an individually engineered prototype solution. Students are required to design, construct, demonstrate, cost, report on and defend a tender submission for their project. Project topics are allocated from a list intended to cover a range of technical interests.

45163

REAL-TIME SOFTWARE AND INTERFACING

EE/CSE/ET
3cp; 3hpw
prerequisites: 45133 Software Development 2, 45143 Computer Hardware
subject coordinator: Mr N J Carmody

Introduces students to the methods used to develop solutions for real-time computer controlled applications. The optimal design of both the software and hardware required to interface to the 'outside world' is the objective of this course. It will emphasise the real-time and complex interface issues through case studies and laboratory work. The single chip microcomputer and supporting devices will be used to develop a stand alone real-time application.

Assessment: laboratory 50 per cent, final examination 50 per cent

45166

PROJECT MANAGEMENT

EE/CSE/ET
3cp; 3hpw
prerequisite: 45145 Engineering Statistics
subject coordinator: A/Prof J V Parkin

Provides students with knowledge and skills essential to the management of engineering projects. The engineering disciplines required to achieve project objectives within time, budget and resource constraints feature prominently. The subject builds on topics introduced in the prerequisite subject, and forms the contextual background to Systems Engineering.

Assessment: continuous assessment 50 per cent, quizzes and final examination 50 per cent

45176

SYSTEMS ENGINEERING

EE/CSE/ET
3cp; 3hpw
prerequisites: 45166 Project Management, Industrial Experience 60 weeks minimum
subject coordinator: Dr D Sharma

Seeks to develop in students a combination of the knowledge, skills and attitudes required to solve complex problems in engineering, with particular reference to the design of electrical, electronic and computer systems. The subject draws strongly on insights gained from industrial experience, and prepares students for contemporary professional practice.

Assessment: assignments 30 per cent, quizzes 30 per cent, final examination 40 per cent

45182

THESIS 1

EE/CSE/ET
3cp; 3hpw
prerequisites: 45155 Project A, 45176 Systems Engineering (recommended)
subject coordinator: Prof C E Peterson

The primary objective of the subjects Thesis 1 and 2 is to give the student individual responsibility for the completion of a significant engineering task, requiring the application at professional level of knowledge gained during the degree course.

The details covering the conduct and nature of the thesis subjects are covered in a separate document available from the School Office, or the Projects Coordinator. Students should obtain this document at least six months before intending to do the project. In brief, the arrangements are as follows: students may choose a project topic proposed by a member of academic staff or may undertake a topic that has been mutually agreed between themselves and a member of academic staff. All topics will need to have scope for the student to demonstrate his or her ability to successfully complete an engineering project of professional standard.

Thesis 1 provides for the definition, analysis and specification of a task, culminating in a documented program for completion of the task within Thesis 2.

45183

THESIS 2

EE/CSE/ET
12cp; 6hpw
prerequisite: 45182 Thesis 1
subject coordinator: Prof C E Peterson

A significant engineering task, researched within Thesis 1, is completed in this subject with the presentation of a seminar and production of a thesis document.

45242

ELECTROMAGNETICS

EE/ET
3cp; 3hpw
prerequisites: 33310 Engineering Mathematics 3 (Electrical), 45134 Network Theory
subject coordinator: A/Prof P Bryce

Develops the topics of static electric and magnetic fields that lead to, and include, time-varying applications. The magnetic field is seen as a spatial 'distortion' of the electrostatic field, and Maxwell's equations developed from this basis. The fundamental laws of Poisson, Laplace, Faraday, Gauss, Ampere and Kirchoff are derived and placed in context with Maxwell's equations. Examples enable the simultaneous development of advanced mathematical tools for the analysis of two-dimensional boundary value problems.

Assessment: assignment 40 per cent, examination 60 per cent

45252

POWER APPARATUS AND SYSTEMS

EE
6cp; 6hpw
prerequisite: 45242 Electromagnetics
subject coordinator: Dr V E Ramaswamy

Covers transformer equivalent circuits from geometry and material properties, e.m.f. induced in a moving circuit with a

non-uniform time-varying field, winding m.m.f. and air gap flux density, force and torque calculations in a doubly-excited electromagnetic system, principles of DC and AC machines (including stepping motors), steady-state calculations, speed control, two-machine power flow, control of real reactive power.

Assessment: laboratory 20 per cent, mid-semester examination 30 per cent, final examination 50 per cent

45264

FIELDS AND WAVES

EE/ET
3cp; 3hpw
prerequisite: 45242 Electromagnetics
subject coordinator: Dr A M Sanagavarapu

Builds on material introduced in the subjects 45242 Electromagnetics and 45134 Network Theory to consider the theoretical aspects of transmission technology based on electromagnetic field theory. An early introduction to distributed parameter systems, boundary value problems and delayed field vectors enables consideration of steady-state transmission lines, waveguides, dielectric waveguides, optical fibres and simple antennas.

Assessment: mid-semester examination 30 per cent, final examination 70 per cent

45265

NUMERICAL METHODS

EE/CSE
3cp; 3hpw
prerequisites: 45144 Electronic Devices and Circuits, 45145 Engineering Statistics, 45141 Continuous and Discrete Systems, 45242 Electromagnetics
subject coordinator: Dr J D Carmo

Deals with standard numerical techniques, covering the solution of systems of equations, root finding, differentiation and integration, curve fitting, solution of systems of differential equations, the evaluation of eigenvalues, and optimisation techniques. In all cases questions of problem conditioning, numerical accuracy, memory requirements and speed are considered. On completion of the subject students will have built up their own integrated set of tested and documented Pascal or C numerical analysis tools.

Assessment: four exercises 60 per cent, eight problems 40 per cent

45274

PHYSICAL DESIGN AND PRODUCTION

EE
3cp; 3hpw
prerequisites: 68033 Engineering Physics 3 (Electrical), 67023 Materials Technology
subject coordinator: A/Prof R Stere

Introduces students to the methods and requirements of designing an electrical/electronic physical system and to translating this design into a producible and reliable item of equipment. The course consists of two modules:

PDP1: Heat transfer and thermal design of electrical and electronic equipment (7 weeks), including the following topics: Introduction to heat transfer by conduction, convection and radiation. One and two-dimensional, steady-state and transient heat transfer. Effectiveness of various configurations. Models for natural and forced convection heat transfer. Introduction to the concepts of thermal control.

PDP2: Assembly technologies and good design practice (6 weeks) including the topics: Basic processes and design constraints of electronic assembly technologies: monolithic, hybrid thick and thin film, SMA technologies. Good design practice: product definition, product development, designing for manufacture. Concurrent engineering and modern CAD tools for electrical and electronic product design.

Assessment: assignments 20 per cent, mid-semester examination 40 per cent, final examination 40 per cent

45342

ELECTROMECHANICAL SYSTEMS

EE
3cp; 3hpw
prerequisite: 45124 Electrical Engineering 2
subject coordinator: Prof V S Ramsden

Concerned with the operating principles, characteristics and modelling of electromechanical devices used in computer-controlled systems. Through problem-based learning with access to laboratory computer-aided data acquisition and control facilities, students will develop an understanding of one or more devices. Such devices may be singly or doubly excited, linear or rotary, including vibratory feeders, solenoids, stepping motors, brushless dc motors, linear voice coil actuators, dc motors, 1ph and 3ph induction motors. Electronic speed control may be included. Models developed will cover steady-state and dynamic behaviour, linking electrical and mechanical systems.

Assessment: laboratory 20 per cent, project 30 per cent, final examination 50 per cent

45353

OPERATING SYSTEMS

CSE/ET
6cp; 6hpw
prerequisites: 45163 Real-time Software and Interfacing, 45363 Software Engineering
subject coordinator: Mr N J Carmody

Introduction to concurrency, methods of process synchronisation, proof of correctness, concurrency modelling using Petri nets, design of an operating system, distributed operating systems, multiprocessor systems, design of a real-time Kernel. Methods of implementing real-time systems, design of I/O, device handlers. One third of the subject is taught by the School of Computing Sciences.

45363

SOFTWARE ENGINEERING

CSE/ET
3cp; 3hpw
prerequisite: 45163 Real-time Software and Interfacing
subject coordinator: Mr J R M Leaney

Aims to bring students to the point where they are fluent in the issues and objectives of software engineering, competent in structured analysis techniques, are able to apply mathematical techniques to the programming process, are able to coordinate rigorous software analysis, design, coding and testing procedures and able to understand and use object-oriented analysis, design, coding and testing techniques.

On completion of the subject students will be competent, as team members, in the engineering of moderately complex, but not large, engineering software systems.

Assessment: assignments 50 per cent, two examinations 50 per cent

45364

DIGITAL SYSTEMS

CSE/ET
3cp; 3hpw
prerequisite: 45163 Real-time Software and Interfacing
subject coordinator: A/Prof A Ginige

Introduces methodologies, techniques, tools and architectures for specification, design, verification using simulation, and implementation of medium to large-scale digital systems.

Assessment: laboratory 5 per cent, assignments 45 per cent, final examination 50 per cent

45372

COMPUTER SYSTEMS ANALYSIS

CSE
3cp; 3hpw
prerequisites: 45145 Engineering Statistics, 45363 Software Engineering
subject coordinator: Prof C R Drane

Draws together information from a range of earlier subjects so the performance and design alternatives of a large technical computer system can be analysed. The student should gain an understanding of the interaction of the various hardware and software components in the system and the effects on system specification (response time, data access issues, reliability, resilience etc). The lecture program will be supported by a laboratory program based on systems simulation and performance measurement.

The topics include: queuing models of computer systems, logical architecture, physical architecture, computer simulation of systems, modelling techniques, analytical modelling of computer systems and design options.

Assessment: assignments 50 per cent, final examination 50 per cent

45381

COMPUTER-AIDED ENGINEERING

CSE
3cp; 3hpw
prerequisite: 45364 Digital Systems
subject coordinator: Mr N J Carmody

Examines the impact that the computer has had on the process of engineering. The student will appreciate how the computer has changed the way engineers design, control, manage, plan and function in their profession. The impact of the computer on productivity, creativity, and on Australian society will be examined and an appreciation will be gained of the new emerging engineering frontiers.

Assessment: assignments 50 per cent, examination 50 per cent

45382

COMPUTER SYSTEMS DESIGN

CSE
3cp; 3hpw
prerequisite: 45372 Computer Systems Analysis
subject coordinator: Prof C R Drane

Teaches the student to specify and design complex technical computer systems. The student should be able to identify several solutions and then assess these solutions on functional, performance, interface, reliability, maintainability, safety and social acceptability criteria. The student should be able to demonstrate the use of analysis techniques learnt earlier in the course and be able to write clear, concise design documents.

The students will be formed into teams. Each team will be given the task of specifying, designing and implementing an industrial monitoring and control system. Aspects of the design process will be elucidated by a series of lectures.

45387

PROJECT B (COMPUTER SYSTEMS ENGINEERING)

EE/CSE
3cp; 3hpw
prerequisites: 45372 Computer Systems Analysis, 45176 Systems Engineering (recommended)
corequisite: 45382 Computer Systems Design
subject coordinator: Prof C R Drane

Teaches the student to specify and design complex technical computer systems. The student should be able to identify several solutions and then assess these solutions on functional, performance, interface, reliability, maintainability, safety and social acceptability criteria. The student should be able to demonstrate the use of analysis techniques learnt earlier in the course and be able to write clear, concise design documents. This subject is part of the preparation of students for the individual project which forms the basis of the subjects 45182 and 45183 (Thesis 1 and Thesis 2).

45461

POWER CIRCUIT THEORY

EE
3cp; 3hpw
prerequisites: 45252 Power Apparatus and Systems, 45265 Numerical Methods
subject coordinator: Dr J D Carmo

Provides students from all strands with a basic knowledge of modern power system theory. It deals with three-phase transmission lines, transformers, symmetrical components and simple switching and electromechanical transients. The lecture material is reinforced with laboratory and computing assignments.

Assessment: problems 25 per cent, experiments 15 per cent, assignment 15 per cent, examination 45 per cent

45462

POWER ELECTRONICS

EE
3cp; 3hpw
prerequisites: 45153 Analogue Electronics, 45252 Power Apparatus and Systems

The course covers power semiconductor devices such as thyristors. GTOs power transistors, MOSFETs and standard power electronics circuits for AC/DC conversion using these devices. Device characteristics, firing and protection schemes are discussed. Circuit operation and analysis control techniques, and harmonic considerations are emphasised.

Assessment: assignments 25 per cent, two examinations 75 per cent

45472

PROJECT B (POWER AND MACHINES)

EE
3cp; 3hpw
prerequisites: at least one of 45461 Power Circuit Theory, 45462 Power Electronics, 45482 Power Equipment Design, 45483 Power Systems Analysis and Protection
subject coordinator: Dr V E Ramaswamy

Develops skills in the specification, engineering design, project planning, team work, practical implementation and testing of a typical hardware and software system or subsystem, on time and in compliance with given specifications.

A number of project topics will be offered for the students' teams to choose from. Students may also propose projects. The topics offered will be based on, or will require knowledge relevant to, the early special subjects in the Power and Machines strand (Power Circuit Theory, Power Electronics, Power Equipment Design, Dynamics of Electrical Machines). As for other strands, projects will be group projects for typically three to four students. Projects will be suitable for partitioning. They will be supported by laboratory resources and possibly research grants.

All academic staff members in the Power and Machines group may submit and supervise topics.

45481

DYNAMICS OF ELECTRICAL MACHINES

EE
3cp; 3hpw
prerequisites: 45252 Power Apparatus and Systems, 45265 Numerical Methods
subject coordinator: Dr V E Ramaswamy

Deals with the transient behaviour of electric machines. The aims are to show how a motor can be modelled for operation under dynamic conditions and to illustrate how these models can be applied.

Assessment: laboratory 15 per cent, assignments 25 per cent, two examinations 60 per cent

45482

POWER EQUIPMENT DESIGN

EE
3cp; 3hpw
prerequisite: 45252 Power Apparatus and Systems
corequisite: 45274 Physical Design and Production
subject coordinator: Prof V S Ramsden

Considers the thermal, electric, magnetic and mechanical constraints on the design of electric power equipment and is taught through group work on the design of practical equipment examples. Topics include: thermal rating; electric and magnetic rating – insulation, magnetic materials; mechanical rating – forces, noise, vibration; design optimisation – minimum cost, weight etc. Equipment examples – power transformers, resistors, reactors, capacitors.

Assessment: assignments 65 per cent, field trip 5 per cent, laboratory 5 per cent, final examination 25 per cent

45483

POWER SYSTEMS ANALYSIS AND PROTECTION

EE
6cp; 6hpw
prerequisite: 45461 Power Circuit Theory
subject coordinator: Dr J D Carmo

Intended for students specialising in electric power engineering. The main topics studied are: modelling and measurement of parameters of transformers, lines, cables and rotating machines, steady-state and transient analysis of the system; protection schemes and safety considerations. A substantial proportion of the time is devoted to project work involving digital computing and microprocessor-based relays.

Assessment: assignments 50 per cent, problems 20 per cent, experiments 10 per cent, final examination 20 per cent

45484

ELECTRICAL VARIABLE SPEED DRIVES

EE
3cp; 3hpw
prerequisites: 45462 Power Electronics, 45481 Dynamics of Electrical Machines
subject coordinator: Prof V S Ramsden

The field of electrical variable speed drives is based on some fundamental principles implemented through rapidly changing technology. Students learn the underlying principles and gain practical experience with state-of-the-art technology. Laboratory work, demonstration, library research, group projects are supplemented by some specialist lectures. System effects such as supply harmonics, motor derating, acoustic noise, r.f. interference are discussed as well as different drive types and system models.

Assessment: laboratory reports 15 per cent, assignments 35 per cent, examination 50 per cent

45561

DIGITAL SYSTEMS DESIGN

EE/CSE
3cp; 3hpw
prerequisites: 45143 Computer Hardware, 45123 Software Development I
subject coordinator: A/Prof A Ginige

This subject introduces technology, architectures methodologies and tools for specification, design and implementation of medium scale digital systems. Microprocessor-based implementation methods are emphasised in this course.

Assessment: laboratory 5 per cent, assignments 45 per cent, examination 50 per cent

45562

DATA ACQUISITION AND DISTRIBUTION SYSTEMS

EE/CSE
6cp; 6hpw
prerequisites: 45153 Analogue Electronics, 45163 Real-time Software and Interfacing
subject coordinator: A/Prof R Stere

Aims to develop skills in the analysis, design and practical implementation of electronic measurement systems and data acquisition and distribution systems (DADS) interfacing computers to plant and installations. Topics include: applications and architectures of DADS; general performance characteristics of DADS components; physical principles and design fundamentals of transducers; mechanical, temperature, pressure, flow-rate transducers; optoelectronic transducers and applications; transducer analogue interfacing; low-level signal conditioning; data conversion devices and systems; DADS design; time and error budget of DADS. DADS and control interfacing to computers. Computer structures for DADS; data integrity.

Students will gain a design experience in the art of DADS by participating in a team project involving the design, assembly and testing of a DADS and/or control system in 45577 Project B.

Assessment: laboratory 10 per cent, mid-semester examination 40 per cent, final examination 50 per cent

45577

PROJECT B (INSTRUMENTATION AND CONTROL)

EE
3cp; 3hpw
corequisites: 45581 Analogue and Digital Control, 45562 Data Acquisition and Distribution Systems
subject coordinator: A/Prof R Stere

Develops skills in the specification, engineering design, project planning, team work, practical implementation and testing of a typical hardware and software Instrumentation of Control system or substation, in time and in compliance with given specifications.

A number of project topics will be offered for the student teams to choose. The topics will be closely associated with the subjects Data Acquisition and Distribution Systems, Analogue and Digital Control and Multivariable and Adaptive Control. Topics on applied instrumentation and control systems for power and machines, biomedical engineering, image processing, vision system and robotics will also be offered. The completed, working system will be presented and demonstrated in a seminar. A detailed project report will be submitted by the design team.

45581

ANALOGUE AND DIGITAL CONTROL

EE/CSE
6cp; 6hpw
prerequisite: 45141 Continuous and Discrete Systems
subject coordinator: A/Prof H T Nguyen

Introduces the use of classical and state variable techniques as applied to the analysis and design of continuous and discrete feedback control systems. Topics include: sampling theory, data holds, cascade and feedback compensation employing lead/lag and three-term controllers, deadbeat control, discretisation, digital filters, Lagrangian dynamics, Bond graphs, state estimation and state variable feedback control, phase plane, describing functions, Popov and circle criteria, identification, specifications.

45582

COMPUTER-AIDED DESIGN OF ELECTRONIC CIRCUITS

EE
3cp; 3hpw
prerequisites: 45153 Analogue Electronics, 45265 Numerical Methods
subject coordinator: Dr B S Rodanski

This subject is designed to give the students the knowledge and understanding of basic concepts and techniques of computer-aided analysis and design of electronic circuits and systems

and to provide the essential skills in using modern design tools in engineering practice.

Assessment: assignments 55 per cent, project 45 per cent

45583

ADAPTIVE AND MULTIVARIABLE CONTROL

EE
3cp; 3hpw
prerequisite: 45581 Analogue and Digital Control
subject coordinator: Dr J G Nicol

In this subject students will study multivariable control, adaptive control and optimal control to an advanced level. Laboratory projects are conducted on a continuous basis through the semester. Topics include: direct and inverse Nyquist arrays, characteristic locus, robust control, pole shifting techniques, identification algorithms, minimum variance control, self-tuning adaptive regulators, linear quadratic regulatory design, state estimation and the Kalman filter, Hoo design.

Assessment: laboratory work 50 per cent, assignments 50 per cent

45584

PRINCIPLES OF VLSI DESIGN

EE/CSE
3cp; 3hpw
prerequisites: 45561 Digital Systems Design, 45144 Electronic Devices and Circuits
subject coordinator: Mr N J Carmody

Introduces students to the technologies and methods in designing full and semi custom Very Large Scale Integrated (VLSI) circuits. A further objective is to introduce students to the methods of determining suitable architectures for supporting complex applications implemented in VLSI technologies.

Assessment: assignments 10 per cent, laboratory 40 per cent, final examination 50 per cent

45626

MATHEMATICAL MODELLING

EE/CSE/ET
3cp; 3hpw
prerequisites: 33310 Engineering Mathematics 3, 45141 Continuous and Discrete Systems, 45145 Engineering Statistics

An exploration of the process of mathematical modelling and its relevance in engineering. An engineering-related theme will be explored, problems will be identified and defined, and mathematical models, such as numerical algorithms, will be developed as needed. Students will develop an awareness of different interpretations of the nature of mathematics and their implications in the context of engineering.

Assessment will be based on three learning contracts.

45661

COMMUNICATIONS NETWORKS

EE/ET
3cp; 3hpw
corequisite: 45665 Data Communications
subject coordinator: A/Prof A P Seneviratne

Begins with an introduction to local and metropolitan area networks. Their medium access mechanisms, and the logical link control covered by the IEEE 802 standards will be examined in detail. Then the higher level protocols of the ISO reference model: transport, session, presentation and application layers, will be examined. Special emphasis will be placed on the application layer standard covering CASEs and SASEs. Finally the concepts of wide area networking will be introduced by examining circuit switching techniques. Common channel signalling, the ISDN and B-ISDN protocol architectures will be studied in detail.

Assessment: assignment 15 per cent, lab 25 per cent, final examination 60 per cent

45662
SIGNAL PROCESSING

EE/CSE/ET
3cp; 3hpw
prerequisite: 45152 Signal Theory 2
subject coordinator: Prof W Yates

Covers the theoretical basis of signal processing algorithms used in signal processing and the practical implementation of these algorithms using DSP microprocessors. Time and frequency domain processing, filter design, spectral analysis, speech processing and the FFT. There is a laboratory component using the TMS320C25 or TMS320C30.

Assessment: assignment 10 per cent, quiz 40 per cent, final examination 50 per cent

45663
DIGITAL TRANSMISSION

EE/ET
3cp; 3hpw
prerequisite: 45152 Signal Theory 2
subject coordinator: A/Prof S Reisenfeld

Provides essential knowledge in digital detection theory, digital communication techniques, and digital communication system design. The students gain essential skills required for the design and development of digital communication systems. The course covers digital detection theory, digital modulation, error rate analysis, synchronisation, link design, multiplexing and multiple access, and error correction coding.

Assessment: assignment 20 per cent, laboratory 20 per cent, mid-semester examination 20 per cent, final examination 40 per cent

45664
COMMUNICATIONS ENGINEERING

EE
3cp; 3hpw
prerequisites: 45151 Signal Theory 1, 45153 Analogue Electronics, 45264 Fields and Waves

Considers the major high frequency elements of communication systems from an engineering viewpoint. Basic principles of operation and design are presented, together with the practical implications of non-ideal behaviour (such as transmission line attenuation and dispersion, noise and nonlinearities in active circuits). The subject includes a laboratory component requiring use of design tools and modern test equipment.

Topics include: introduction and revision of transmission lines and scattering parameters; passive devices – hybrids, couplers, filters and diplexers; small-signal, high frequency amplifier design – realisation of circuit models, lumped element noise models, s-parameter design, noise reduction in microwave amplifiers; large signal effects in amplifiers – intermodulation; RF oscillators; frequency synthesis; frequency conversion – mixers and detectors; antennas – fundamental concepts, linear elements, antenna measurements, linear antenna arrays, mutual impedances, parasitic elements, aperture antennas, reflector antennas.

Assessment: assignments 20 per cent, design study 25 per cent, mid-semester quiz 15 per cent, final examination 40 per cent

45667
BROADBAND TELECOMMUNICATIONS NETWORKS

ET
3cp; 3hpw
prerequisite: 45145 Engineering Statistics

This subject introduces the underlying technology and user-visible architecture of Integrated Services Digital Networks (ISDN) and Broadband ISDN. The subject first explores the development of digital transmission and switching technologies, packet switching and common channel signalling. Then architecture of ISDN and B-ISDN is explored. Finally, standards that govern the development of these networks, and the services that will be supported by these networks are introduced.

Assessment: assignments 25 per cent, laboratory project 25 per cent, final examination 50 per cent

45668

TELETRAFFIC ENGINEERING

ET
3cp; 3hpw
prerequisite: 45145 Engineering Statistics

Introduces the concepts associated with the design of common-usage telecommunication links and switching equipment. The subject will present busy hour engineering terms and service criteria for switching systems and techniques used to determine the trunk capacity. Trunk network configurations with numerous routing algorithms will also be examined.

Assessment: assignments 40 per cent, final examination 60 per cent

45678

PROJECT B (TELECOMMUNICATIONS)

EE
3cp; 3hpw
prerequisite/corequisite: either 45662 Signal Processing or 45665 Data Communications
subject coordinator: A/Prof T Buczkowska

The projects will involve the design and development of a product and will be carried out by a team of no more than four students and no less than two students. Each team will be assigned academic staff member(s) who will act as the Client, the Company Director and Technical Adviser.

The client will be available for consultation in the first two weeks, and will be available only on two or three other occasions for the duration of the project. The Director/Technical adviser will be available at regular intervals, but only at specified times such as during a design group meeting.

45681

COMMUNICATIONS SYSTEMS

EE/ET
6cp; 6hpw
prerequisite: 45663 Digital Transmission
subject coordinator: A/Prof A P Seneviratne

The subject involves two modules of which students must undertake one. Each module involves a major case study for which students are required to evolve a working solution. In each module students will be given lectures covering background information on existing technologies, regulatory considerations and international standards, and an appreciation of the cost-performance trade-offs that must be made. The case study in each module will be changed each semester.

45780

ENGINEERING RESEARCH: THE CUTTING EDGE

EE/ET/CSE
3cp, 3hpw
prerequisite: 45166 Project Management
corequisite: 45176 Systems Engineering

This subject has three primary objectives. Firstly it is intended to give the students an appreciation of the way in which the engineering field is growing and expanding, and how this growth is achieved. They should realise the importance of continuing to develop their understanding, knowledge and skills, once they have completed the course.

Secondly, it aims to illustrate the breadth of the engineering field. The students are encouraged to step out of their own narrow focus, and investigate other aspects of engineering, and to see how this can provide insights into their own specialisation.

Finally, it aims to provide the students with an appreciation of research, what it involves, what the goals are, how these are achieved, and what constitutes good research methodology. The students should be able to see the relevance of research to normal engineering tasks.

45931

ELECTRICAL ENGINEERING 2 (MECHANICAL)

MEE/MSE
4cp; 4hpw
prerequisite: 68012 Electrical Engineering 1 (Mechanical)

Introduces fundamental Electronic/Electrical devices and circuits to undergraduate students in the School of Mechanical Engineering.

There are two strands within the course. The Linear strand examines fundamental semiconductor devices and demonstrates their linear application, particularly in the power control area. The Digital strand similarly introduces the fundamental devices along with Boolean Algebra and demonstrates their application in simple industrially-oriented digital control systems.

45997

INDUSTRIAL EXPERIENCE (SANDWICH)

EE/CSE/ET

45999

INDUSTRIAL EXPERIENCE (PART-TIME)

EE/CSE/ET

Students enrol in this subject while they are gaining industrial experience, which is a requirement of the course. Ninety weeks of approved industrial experience must be gained prior to graduation. The student must experience typical environments in which professional engineering is practised, including the range of situations and requirements peculiar to the workplace and the successful operation of enterprises; to develop an understanding of the role, responsibilities and interfaces of engineering in technologically dependent enterprises and the community, having regard for other professions and disciplines; to reinforce and extend the knowledge of principles, techniques and technologies gained from the academic program; to enrich learning through the integration of work and study experiences; and to facilitate professional development. Students must become familiar with the Faculty's industrial experience requirements and rules which are set out on page 11 of this book.

46033

PROJECT A

MEE/MSE
part-time and sandwich
4cp; 3hpw
corequisite: 46632 Engineering Management
subject coordinators: A/Prof S F Johnston, Mr A J Burfitt

This is the first of two related project subjects in which students are responsible for the complete execution of a project, from specification to final report. Projects may be initiated by staff, students or employers, and students may work individually or in groups. A project may include any aspects of design, building, testing, analysis or software. The key feature should be a professional approach to a problem of relevance to industry, commerce or the community. Student effort for these two related subjects is expected to be equivalent to at least 400 hours of professional effort.

In Project A the students should complete to the satisfaction of the academic project supervisor, 50 per cent of the activities that follow the preliminary planning phase of an engineering project. Typically, this will include complete write up of a literature survey chapter which summarises and reviews the prior knowledge available on the student's own selected project topic together with, at least, a draft table of contents listing all the proposed chapters and appendices in the final report. For software projects, program flow charts will have been developed and some software modules written and debugged. For experimental projects, the design of any equipment to be built for conducting the experiments will be completed and initial experimental designs developed. For design, build and commission projects, the design

will be completed and construction commenced. For design only projects, layout or assembly drawings will be completed with detail drawings to follow in Project B.

Assessment: project report 100 per cent (oral presentation if required)

46034

PROJECT B

MEE/MSE
part-time and sandwich
6cp; 4.5hpw
corequisite: 46033 Project A
subject coordinators: A/Prof S F Johnston, Mr A J Burfitt

This is the second of two related project subjects in which students are responsible for the complete execution of a project, from specification to final report. Projects may be initiated by staff, students or employers, and students may work individually or in groups. A project may include any aspects of design, building, testing, analysis or software. The key feature should be a professional approach to a problem of relevance to industry, commerce or the community. Student effort for these two related subjects is expected to be equivalent to at least 400 hours of professional effort. In the subject Project B, the student completes the design, building, test, analysis or software development as specified, and writes up and submits a formal report on the work.

Assessment: project report 100 per cent (oral presentation if required)

46040

ERGONOMICS

MEE/MSE
4cp; 3hpw
prerequisite: 46631 Engineering Management
subject coordinator: Mr L E Reece

Covers the basic concepts of ergonomics, and illustrates the relationship between improved health and safety and improved productivity by relating human capabilities to engineering design and task design factors in the workplace.

The subject consists of approximately equal parts of health science topics and engineering topics. The health science topics include basic physiology, anatomy, biomechanics, perception etc. to provide a background for the understanding of the relationship between people and their workplace and work tasks. The engineering topics deal with basic design approaches which incorporate the abilities and limitation of people, and the analysis and synthesis of work tasks and work organisations. Practical demonstrations and exercises using actual work situations are included.

Assessment: assignments, essays and seminars 30 per cent, final examination 70 per cent

46110

MECHANICS 1

MEE/MSE
6cp; 4.5hpw
subject coordinator: Mr G M Marks

An introduction to the principles of Newtonian mechanics, applied to planar motion. The behaviours of non-rotating bodies is analysed through an explicit investigation of Newton's three laws of motion, extending to energy and momentum methods. This subject lays the foundation for more advanced work in mechanics in succeeding subjects. Through both discussion and selected exercises, students are also introduced to professional methods of dealing with engineering problems.

Assessment: assignments 20 per cent and two examinations (30 per cent and 50 per cent)

46121

MECHANICS OF MACHINES

MEE
6cp; 4.5hpw
prerequisite: 46122 Mechanics 2
subject coordinator: Mr S Spain

This subject presents four broad fields; forces in mechanisms including band, shoe and disc brakes, engine balancing

and harmonic analysis, geometry and cams with fixed axes of rotation, and elementary gear theory. A main aim of the subject is to encourage individual thought and discussion of possible solutions which need not always follow conventional patterns.

Assessment: assignments 30 per cent, examinations 70 per cent

46122

MECHANICS 2

MEE
6cp; 4.5hpw
prerequisites: 46110 Mechanics 1, 33120 Engineering Mathematics 1
subject coordinator: Dr F C O Sticher

This subject presents Kinematics and Dynamics in a more general way than in Mechanics 1. The spatial two and three-body velocity and acceleration equations are derived and applied to spatial and planar mechanisms. Planar Dynamics is then developed for general planar motion, including the use of energy methods, impulse, virtual work and virtual power. Second moment of mass is included.

Assessment: assignments 15 per cent, examination 85 per cent

46125

MECHANICS FOR MANUFACTURING

MSE
4cp; 3hpw
prerequisites: 46110 Mechanics 1, 33120 Engineering Mathematics 1
subject coordinator: Mr S Spain

Aims to apply the principles learnt in Mechanics 1 to various fields of engineering practice in machine component design. The subject will be based on explorations of real problems and case studies such as those related to operation of robotics and machine tools and general materials handling.

Assessment: assignments 30 per cent, examinations 70 per cent

46130

DYNAMICS OF MECHANICAL SYSTEMS

MEE
4cp; 3hpw
prerequisite: 46120 Mechanics 3
subject coordinator: Dr F C O Sticher

Aims to develop insight into the causes and effects of vibration in machinery and structures; to introduce the techniques of condition monitoring and the foundations of control theory. The subject deals mainly with linear vibration theory. Topics covered include multidegree of freedom systems, elementary modal analysis, frequency response, transients, simple modelling of vehicle suspension, and electrical analogues. Computer packages are used where appropriate, and some experiments and demonstrations of vibration monitoring instrumentation are introduced.

Assessment: assignments 10 per cent, examinations 90 per cent

46140

KINEMATICS AND DYNAMICS OF MACHINES

MEE
4cp; 3hpw
prerequisites: 46121 Mechanics of Machines, 46130 Dynamics of Mechanical Systems
subject coordinator: Dr F C O Sticher

Introduces the student to the field of kinematic synthesis for the first time, and to the power of spatial (projective) geometry, through the five assignments which form the assessment of the course to encourage and require the student to exercise individual judgement and design initiative. The subject deals with freedom and constraint in spatial mechanisms, elementary screw-systems theory, four and five positions planar synthesis of mechanisms, function generation, open loop spatial mechanisms (robotics), gyroscopic effects on whirling speeds, dynamic equivalence, polydyne cam design and general three-dimensional dynamics including spin

stability as applied to space vehicles. An integral part of the process of discovery learning, essential to this subject, is the building of working mechanism models.

Assessment: five assignments

46141

APPLIED DYNAMICS

MEE
4cp; 3hpw
prerequisite: 46130 Dynamics of Mechanical Systems
subject coordinator: Dr F C O Sticher

Introduces the application of the theories of rigid body dynamics and mechanical vibrations to machine and structural analysis. Topics include spatial dynamics and Euler's equations of motion, the vibration of continuous systems, modal analysis and parametric excitation. These topics are applied to the study of vehicle dynamics, inertial guidance systems and the vibration of beam and plate structures. Both analytical and computer-based solution techniques are covered and laboratory work is an integral part of the course.

Assessment: six assignments 67 per cent, projects 33 per cent

46142

ROBOTICS

MEE
4cp; 3hpw
prerequisites: 46121 Mechanics of Machines
subject coordinator: Mr S Spain

Aims to develop confidence and competence in the application of kinematic control and programming principles relevant to robots.

Topics include coordinate classification of joints, spatial kinematics, configurations, geometric duality, envelopes, trajectories, safety; joint interpolation between positions, homogeneous coordinate transformations, kinematic equations, differential relationships, velocity and acceleration, singularity positions, joint/end effector/world coordinate systems; kinetics, force and motion reciprocity, assembly problems, compliance, design of parts for assembly.

Assessment: reports and assignments 60 per cent, examination 40 per cent

46143

EINSTEIN'S UNIVERSE

MEE/MSE
4cp; 3hpw
prerequisite: 46122 Mechanics 2 (for MEE students)
subject coordinator: Dr F C O Sticher

Aims to give perspective to the Newtonian model of the Universe (i.e. conventional mechanics) in the light of the philosophical and experimental difficulties of this model which were addressed by Einstein, and to explain, in a simple but rigorous way, the logic and results of Einstein's Theory of Relativity.

Topics include: the special Theory of Relativity explained via the Michelson-Morley results and the Doppler effect. Consequences for the concepts of time, velocity and distance. The General Theory of Relativity from the point of view of the time paradox and the principle of equivalence. The similarities and divergences of the thought processes necessary to embrace the Newtonian synthesis, the Einstein synthesis and modern Quantum Mechanics.

Assessment: two essays 50 per cent, quantitative solution of assignment problems 50 per cent

46220

SOLID MECHANICS 1

MEE/MSE
6cp; 4.5hpw
prerequisite: 46122 Mechanics 2
subject coordinator: Mr R M Wiltshire

Deals with the basics of solid and structural mechanics. The concepts of stress and strain, material properties (both linear and nonlinear) and structural analysis are introduced in terms of axial, torsional, bending and shear stresses and the deflection of beams.

Further work includes the transformation of stress and strain, combined stresses in beams and yield and failure analysis. Laboratory work is a significant component of the course.

Assessment: assignments 15 per cent, laboratory 15 per cent, examinations 70 per cent

46230

SOLID MECHANICS 2

MEE
6cp; 4.5hpw
prerequisite: 46220 Solid Mechanics 1
subject coordinator: Mr R M Wiltshire

Aims to develop an understanding of the basic principles of solid mechanics and the use of these principles in the design of simple structures and machine elements; and to establish the background for further study in the areas of structural, experimental and solid mechanics with special reference to mechanical design. This subject builds on the material treated in Solid Mechanics 1 and deals with the basis of solid and structural mechanics. The topics include the analysis of beams using moment area, superposition and energy methods, torsion and shear in thin walled sections, shells of revolution, thick walled cylinders, composite beams, limit analysis and elastic stability. An overview is given of experimental stress analysis and computer-based numerical methods. Laboratory work is an integral part of the course.

Assessment: laboratory and assignments 20 per cent, class quiz 20 per cent, final examination 60 per cent

46240

SOLID MECHANICS 3

MEE
4cp; 3hpw
prerequisite: 46230 Solid Mechanics 2
subject coordinator: Mr R M Wiltshire

Aims to facilitate an understanding of the fundamental and classical principles of solid mechanics and the use of these principles in mechanical engineering design; and to establish the background for more advanced study in the area of solid mechanics and the use of Finite Element Stress Analysis. Introduces the theories of elasticity and plasticity, matrix structural analysis and the theory of plates and shells. It includes material and geometric nonlinearity, structural stability and limit analysis. In addition to topics relating to mechanical design, students are introduced to the use of Australian standards for the practical design of structures.

Assessment: assignments 60 per cent, project 20 per cent, class quiz 20 per cent

46241

FINITE ELEMENT APPLICATIONS

MEE
4cp; 3hpw
prerequisites: 46240 Solid Mechanics 3, 46130 Dynamics of Mechanical Systems, 46321 Computer-aided Drafting
subject coordinator: Mr R M Wiltshire

Aims to facilitate an understanding of the practical application of solid mechanics to the design of structures and machines using the Finite Element Method; and to develop an awareness of the capabilities and limitations of the Finite Element Method in solid and structural analysis.

This subject is a practical introduction to the Finite Element Method and is intended for potential users of Finite Element computer programs. As a consequence the subject is in two parts: an introduction to the basic theories of the finite element method. This includes a review of matrix structural analysis, the use of structural and variational methods to formulate element stiffnesses, geometric and material nonlinearity, dynamic analysis and optimisation. The second part consists of the modelling process and the analysis of finite element solutions. This includes problem formulation, the preparation of data for finite element computer programs, element selection, convergence and the analysis of errors. Particular attention is paid to the use of

behaviour of isoparametric and frame and plate bending elements. General purpose structural analysis programs, MSC/NASTRAN and MSC/Pal 2, are used to obtain finite element solutions.

Assessment: assignments 60 per cent, project 20 per cent, class quiz 20 per cent

46310

INTRODUCTION TO ENGINEERING

MEE
4cp; 3hpw
subject coordinator: Ms H McGregor

This subject provides an overview of issues and concepts which are important to new engineering students. Major learning areas include:

Part I – Discovering Engineering
History of technology/manufacturing; Learning at UTS and in this course; Introduction to Professional Associations and professionalism/ethics; Quality in learning and in performance; Cooperative Education; Documentation.

Part II – Experiencing Engineering
Manufacturing Systems Engineering – Proactive – importance of standards requirements; Life Cycles; Design; Management; Mechanics – understanding mechanical systems; Energy and productive power; Environmental concerns.

The subject includes practical examples and exercises to assist students to explore issues for themselves. The concept of cooperative education and the role of professional experience in the course and the sorts of employment which are suitable are also discussed.

Assessment: continuous assessment by assignments and projects

46311

ENGINEERING GRAPHICS

MEE/MSE
4cp; 3hpw
subject coordinator: Mr G M Marks

Aims to enhance fundamental visualisation and drawing skills and to develop knowledge of the formal and informal graphical communication requirements of the professional mechanical engineer. This subject commences with an overview of orthographic projection. It then covers engineering elements, basic engineering drawing, pictorial drawing, sketching and working drawings. The last topic includes tolerances and limits and fits, surface finish, detail and assembly drawings.

Assessment: continuous assessment via drawing exercises

46312

INTRODUCTION TO MANUFACTURING SYSTEMS

MSE
4cp; 3hpw
subject coordinator: Ms H McGregor

Introduces the UTS Manufacturing Systems Engineering course and the profession of engineering. This subject will provide an overview of issues and concepts which are important to new engineering students. Major learning areas will include:

Part I – Discovering Engineering
History of technology/manufacturing; Learning at UTS and in this course; Introduction to Professional Associations and professionalism/ethics; Quality in learning and in performance; Cooperative Education: Documentation.

Part II – Experiencing Engineering
Manufacturing Systems Engineering – Proactive – importance of standards requirements; Life Cycles: Design; Management; Mechanics – understanding mechanical systems; Energy and productive power; Environmental concerns.

The subject will include practical examples and exercises to assist students to explore issues for themselves. The concept of cooperative education and the role of professional experience in the course and the sorts of employment which are suitable will also be discussed.

Assessment: continuous assessment by assignments and projects.

46321

COMPUTER-AIDED DRAFTING (CAD)

MEE/MSE
5cp; 4hpw
prerequisite: 46710 Production Processes or 46715 Manufacturing Processes
subject coordinator: Prof F B Swinkels

Students are introduced to the use of computers in 2D drafting and 3D wire frame, surface and solids modelling. These modelling techniques are then applied to determine 2D sectional properties and 3D mass properties.

Assessment: assignments 25 per cent, projects 50 per cent, examinations 25 per cent

46331

DESIGN 1

MEE
6cp; 4.5hpw
prerequisites: 46122 Mechanics 2, 46220 Solid Mechanics 1, 46321 Computer-aided Drafting (CAD)
subject coordinator: Mr A J Burfitt

Design 1 and 2 introduce the student in a systematic way to the process of engineering design. They encourage students to integrate their technical and other knowledge and skills and apply them to the solution of realistic problems. Design 1 introduces students to design methodology. One emphasis of this subject is on machine elements, strength and endurance. The machine elements will include bolted and welded joints, springs, shafts, gears and bearings. Factors affecting materials selection, including the use of carbon fibre and other composites, will be discussed. Power transmission systems are then discussed, including selection criteria, couplings, clutches, chain and belt drives. The subject involves group participation in a creative design competition.

The philosophy underlying these two subjects is to introduce the student to the various tasks and decisions associated with engineering design projects, from problem formulation to final presentation. In both design subjects students will be required to address the applicable codes and regulations, safety and other requirements of the human operators, and the wider responsibilities of the engineer in preserving health, the environment and public safety.

Assessment: assignments 70 per cent, examinations 30 per cent

46332

DESIGN 2

MEE
4cp; 3hpw
prerequisite: 46331 Design 1
subject coordinator: Mr A J Burfitt

Further development of the skills needed for project design and management related to systems with many complex variables. Lectures will stress the synthesis of engineering and economic skills acquired in the course, and encourage students to build on that foundation by specific research applied to this project-based subject. Topics will typically be drawn from: pressure vessels; fluid power, materials handling and transport systems. Industrial visits will be arranged to provide state-of-the-art information. Students will undertake design projects, singly or in groups.

Assessment: projects 60 per cent, final examination 40 per cent,

46335

DESIGN FOR MANUFACTURING

MSE
6cp; 4.5hpw
prerequisites: 46726 Manufacturing Systems Planning, 46535 Metrology and Instrumentation, 45931 Electrical Engineering 2 (Mechanical)
subject coordinator: Prof F B Swinkels

Aims both to build on earlier material to develop a broad appreciation of the central issues in designing systems, processes and products for manufacturing, and to develop specific skills in one or more design areas. Students will be encouraged to formulate and investigate industrially relevant problems of their

own selection. The emphasis will be on capitalising on the design possibilities offered by new techniques and organisational structures in manufacturing. Examples and case studies will be central to the presentation of the subject.

Approaches to design which may be considered in the subject include: Reducing time to market /time compression /simultaneous /concurrent engineering; Value Analysis /FMEA / QFD, functional dimensions; design by features; geometric dimensional tolerancing; material selection in mechanical design; process simulation; design for manufacture of castings, forgings, fabrications, plastics, ceramics and composites; design for assembly, design for recycling, design for manufacture (including forming processes).

Assessment: reports 30 per cent, assignment 15 per cent, examination 55 per cent

46336

COMPUTER-AIDED MANUFACTURING

MEE/MSE
4cp; 3hpw
prerequisite: 46321 Computer-aided Drafting
subject coordinator: Prof F B Swinkels

Aims to develop an understanding of computer-aided manufacturing technology in the areas of coordinate measurement, sheet metal applications, machine tool programming and data communication and control. Topics covered include coordinate measurement for CAD/CAM data analysis and verification; sheet metal manufacturing programming for flat pattern, nesting and punchlaser; NC programming for point-to-point machine, planar milling and surface milling; data communication and transfer for the various CAM processes.

Assessment: assignments 20 per cent, projects 30 per cent, examination 50 per cent

46337

MANUFACTURING SYSTEMS DESIGN

MSE
4cp; 3hpw
prerequisites: 46335 Design for Manufacturing, 46735 Manufacturing Systems: Quality, 46835 Operations Research
subject coordinator: Prof F B Swinkels

This subject is designed to assist students to integrate and apply all the material in the course to industrially relevant design problems, including problems of their own selection. The emphasis will be on capitalising on the design possibilities offered by new techniques and organisational structures in manufacturing. Examples and case studies will be central to the presentation of the subject.

Design issues which may be addressed in the subject include: strategic planning, facilities design, design engineering, purchasing, MIS, legal issues, finance/accounting, business economics, human resources, marketing/sales, logistics, and manufacturing; internationalisation of trade and manufacture; continuous and at times rapid change; interaction with consultants, research and development organisations; development of 'off the shelf' systems for unique company fit; system upgradability; system life; software package installation; patents and intellectual property; support for 'learning organisations'; information technology, including protocols like MAP; 'seamless' transfer between systems, telecommunications and software technologies; integrated manufacturing systems; flexible manufacturing systems; routing, factory flow analysis and layout, facility design.

Assessment: reports 50 per cent, assignments 15 per cent, examinations 35 per cent

46340

STRUCTURES

MEE
4cp; 3hpw
prerequisite: 46230 Solid Mechanics 2

This is a non-specialist subject aimed at preparing the mechanical engineer for practical structural steel and reinforced concrete design. It aims to develop competence in structural steel and reinforced concrete design to Australian Standard requirements, based on broad understanding of the underlying theory.

Assessment: assignments 60 per cent, final examination 40 per cent

46341

MACHINE DESIGN

MEE
4cp; 3hpw
prerequisites: 46331 Design 1, 46121 Mechanics of Machines, 46230 Solid Mechanics 2, 46130 Dynamics of Mechanical Systems

Particular emphasis will be placed in this subject on the detailed design of mechanisms and machines. Specific topics treated will be some of the following: the tribology of bearings, gears and cams including hydrodynamic and hydroelastic lubrication; variable speed drive and control elements including special purpose mechanisms and hydraulic drives and couplings and their characteristics and capabilities; machine logic and control. A project applying a number of these elements to the design of a mechanism or machine will be a major part of the subject assessment.

Assessment: assignments 60 per cent, project 40 per cent

46342

UNITISED LOAD HANDLING

MEE/MSE
4cp; 3hpw
corequisite: 46332 Design 2 or 46835 Operations Research
subject coordinator: Mr A J Burfitt

Gives an overview of the techniques available for the transport and storage of goods and materials handled in the form of unitised loads, and to enable students to select appropriate approaches and specify equipment requirements. Aspects of unitised materials handling to be dealt with include cost statistics; belt conveyors, bulk handling; fork lifts, intermodal transport; inventory and scheduling; pipeline conveying, freight pipelining; bulk liquid pipelining; road/rail/air transport. Site visits and practical examples and exercises are included. The subject has been designed to complement 46346 Bulk Materials Handling.

Assessment: quizzes 30 per cent, assignments/visit reports 40 per cent, projects 30 per cent

46343

APPROPRIATE TECHNOLOGY

MEE/MSE
4cp; 3hpw
corequisite: 46632 Engineering Management
subject coordinator: Mr G M Marks

Provides an effective vehicle for individual understanding of the term 'appropriate technology' and an appreciation of its relevance to engineering practice. This will be done by encouraging students to question the appropriateness of specific technologies, particularly in terms of their long-term sustainability, and giving students experience of project work intended to address the perceived shortcomings of present approaches.

Assessment: reports 25 per cent, seminar 25 per cent, project 50 per cent

46344

ENGINEERING SPECULATION

MEE/MSE
4cp; 3hpw
prerequisite: 46630 Engineering and Society
corequisite: 46631 Engineering Management
subject coordinator: Dr R B Ward

Encourages students to consider and be aware of the opportunities, possibilities and probabilities in the results and side effects of their professional work on the world around them.

Assessment: continuous assessment, assignments

46345

INDUSTRIAL DESIGN

MEE/MSE
4cp; 3hpw
corequisite: 46220 Solid Mechanics 1
subject coordinator: A/Prof S F Johnston

The objective is primarily to broaden students' design skills and awareness and also to prepare them for working in interdisciplinary teams with industrial design professionals. This subject introduces the engineer to the discipline of industrial design. The emphasis is on innovation, human factors and visual semantics. The teaching is largely project based.

Assessment: projects 100 per cent

46346

BULK MATERIALS HANDLING

MEE/MSE
4cp; 3hpw
corequisite: 46332 Design 2
subject coordinator: Mr A J Burfitt

Gives an overview of the techniques available for the transport and storage of particular solid materials handled in bulk, and enables students to select appropriate approaches and specify equipment requirements. Aspects of bulk materials handling to be dealt with include material characteristics; systems approach; storage systems; self conveyors; pneumatic conveying; quality considerations; mechanical handling; feeding, discharge and transfer systems; environmental aspects. Site visits and practical examples and exercises are included. The subject has been designed to complement 46342 Unitised Load Handling.

Assessment: quizzes 30 per cent, assignments/visit reports 40 per cent, projects 30 per cent

46420

FLUID MECHANICS

MEE
6cp; 4.5hpw
prerequisites: 33120 Engineering Mathematics 1, 46110 Mechanics 1
subject coordinator: Dr B P Huynh

Provides an introduction to the broad area of fluid mechanics, by giving a thorough grounding in fundamental principles and developing expertise in the solution of common problems. The subject introduces fluid statics and fluid dynamics. It covers fluid properties, manometry, forces on submerged surfaces, acceleration of fluid volumes, continuity, Bernoulli, impulse-momentum and flow measurement.

The limitations implied by an ideal fluid are reviewed before the modifications required for a real fluid are presented.

Assessment: assignments 10 per cent, laboratory reports 10 per cent, examinations 80 per cent

46421

THERMODYNAMICS

MEE
6cp; 4.5hpw
prerequisites: 33120 Engineering Mathematics 1, 46420 Fluid Mechanics, 68011 Engineering Physics (Mechanical)
subject coordinator: Dr G Hong

This is an introductory subject with the emphasis on the basic principles of thermodynamics, including a thorough discussion of the First and Second Laws. The properties of a simple substance and the ideal gas concept are also considered and the principles briefly applied to power and refrigeration

cycles. It aims to develop fundamental understanding of thermodynamics and the ability to apply knowledge to analysis of thermodynamic systems.

Assessment: tutorial questions 10 per cent, laboratory reports 15 per cent, examinations 75 per cent

46430

THERMOFLUIDS

MEE
6cp; 4.5hpw
prerequisites: 46420 Fluid Mechanics, 46421 Thermodynamics
subject coordinator: Mr L E Reece

The basic principles of fluid mechanics and thermodynamics are consolidated by application to fluid machines and engineering plant. The subject extends basic principles in the following areas; standard and actual power cycles; dimensional analysis and similitude; principles and selection of pumps and fans; compressible flow.

Assessment: tutorial questions 10 per cent, lab tests and reports 15 per cent, examinations 75 per cent

46431

HEAT TRANSFER

MEE
4cp; 3hpw
prerequisite: 46430 Thermofluids
subject coordinator: Dr B P Huynh

Aims to provide students with sufficient understanding and knowledge of heat transmission to enable them to deal with common engineering systems. Covers the fundamentals of heat transmission in engineering systems. Topics include conduction, convection, radiation and heat exchangers. Laboratory experiments are an important part of the subject.

Assessment: assignments 10 per cent, laboratory reports 10 per cent, examinations 80 per cent

46435

FLUID MECHANICS FOR MANUFACTURING

MSE
4cp; 3hpw
prerequisites: 33120 Engineering Mathematics 1, 46110 Mechanics 1
subject coordinator: Dr B P Huynh

The subject provides an introduction to: Basic fluid statics; the Bernouilli equation; fixed flow-rate problems; pipe head-loss problems; unsteady flow (including a descriptive or qualitative discussion of water hammer); flow measurement devices. It deals with pump selection and installation, but not pump design.

Assessment: assignments 10 per cent, laboratory reports 10 per cent, examinations 80 per cent

46436

THERMODYNAMICS FOR MANUFACTURING

MSE
4cp; 3hpw
prerequisite: 46435 Fluid Mechanics for Manufacturing
subject coordinator: Mr L E Reece

Aims to develop an understanding of the First and Second Laws of Thermodynamics as they apply to plant used in manufacturing; process steam boilers, steam plants, compressed air systems and equipment.

Students will learn basic Thermodynamic principles so that they know how to use the Conservation of Energy approach in plant analysis and design and appreciate the energy aspects of manufacturing plant equipment. This subject introduces students to the basic principles of thermodynamics, including the First and Second Laws of Thermodynamics. Steam plants, process steam and compressors are also considered.

Assessment: tutorial questions 15 per cent, laboratory reports 20 per cent, examinations 65 per cent

46437

THERMOFLUIDS FOR MANUFACTURING

MSE
4cp; 3hpw
prerequisite: 46436 Thermodynamics for Manufacturing
subject coordinator: Mr L E Reece

Aims to develop an understanding of thermodynamics and fluid mechanics so that informed decisions can be made about the related aspects of manufacturing activity, particularly: (1) on effects of parameter changes on heat transfer; (2) thermofluid aspects of plant selection.

Topics include: dimensional analysis; heat transfer; selection of plant equipment (pumps, hydraulics etc).

Assessment: tutorial questions 15 per cent, laboratory tests and reports 20 per cent, examinations 65 per cent

46441

COMBUSTION AND AIR POLLUTION

MEE
4cp; 3hpw
prerequisite: 46421 Thermodynamics

Aims to develop an understanding of the fundamentals of combustion science and apply the results to the control of pollutant formation. A treatment is given of the fundamentals of combustion as well as the consideration of fuels and their characteristics. Special attention will be given to the products of combustion and their relationship to current air pollution considerations.

Assessment: examination 40 per cent, essay 40 per cent, assignments 20 per cent

46442

ADVANCED FLUID DYNAMICS

MEE
4cp; 3hpw
prerequisites: 46430 Thermofluids, 46821 Computing 3
subject coordinators: Dr A N F Mack, Mr L E Reece

Builds on previous subjects in the thermofluids stream. Covers the Navier-Stokes equations and the difficulties with their solution followed by an investigation of approximations to these equations and their validity. Topics here include the inviscid Euler equations, together with potential flows. The main limitation of these approximations is their failure to model the viscous boundary layer. This topic is therefore examined, along with the effects of turbulence. Finally, numerical methods are presented for the modelling of the entire flow region.

Assessment: reports 25 per cent, assignments 50 per cent, examination 25 per cent

46443

REFRIGERATION AND AIRCONDITIONING

MEE
4cp; 3hpw
prerequisites: 46430 Thermofluids, 46431 Heat Transfer
subject coordinator: Dr G Hong

Gives students experience in applying the principles of thermodynamics, heat transfer and fluid mechanics to the airconditioning of buildings and to the design criteria and performance of commercial and industrial refrigeration equipment. Additionally, the student will be able to analyse various refrigeration cycles and be capable of undertaking an energy audit of a complete system. The student is introduced to the concepts of determining the cooling and heating loads of a building, designing the air handling and distribution system and selecting the appropriate plant to provide the cooling and heating requirements.

Energy conservation and management as applicable to the various airconditioning and refrigeration systems are reviewed.

Assessment: projects 10 per cent, laboratory assignments 10 per cent, examination 80 per cent

46444

POWER CYCLES

MEE
4cp; 3hpw
prerequisite: 46430 Thermofluids
subject coordinator: Dr G Hong

Covers steam and gas power cycles in depth. Combustion chemistry and efficiency, equipment details, augmentation methods and cogeneration systems are presented. Aims to develop proficiency in the performance analysis of actual steam and gas turbine power plants.

Assessment: examinations 80 per cent, assignments 15 per cent, laboratory 5 per cent

46445

FLUID MACHINES

MEE
4cp; 3hpw
prerequisite: 46430 Thermofluids
subject coordinator: Mr L E Reece

The application of thermodynamics and fluid mechanics principles in turbomachinery analysis and design. The objective is to present a more thorough treatment of fluid machines than was possible in the core subjects. In particular, a theoretical design and development basis will be provided for axial flow compressors, pumps, fans and turbines and for centrifugal pumps, fans and compressors.

Assessment: tutorial questions 10 per cent, laboratory reports 20 per cent, examinations 70 per cent

46530

MEASUREMENT AND INSTRUMENTATION

MEE
6cp; 4.5hpw
prerequisite: 46130 Dynamics of Mechanical Systems
corequisite: 45931 Electrical Engineering 2 (Mechanical)
subject coordinator: Dr F C O Sticher

Gives mechanical engineering students detailed exposure to using a wide range of modern measuring instruments. This subject introduces the student to a variety of measurement techniques. A large proportion of the time is spent in carrying out experiments. Topics covered will be drawn from the following: length, time, angular measurement, straightness, flatness, pressure, temperature, strain, force, frequency response, vibration and sound.

Assessment: laboratory reports 75 per cent, four small examinations 25 per cent.

46531

CONTROL ENGINEERING 1

MEE/MSE
6cp; 4.5hpw
prerequisites: 46130 Dynamics of Mechanical Systems or 46125 Mechanics for Manufacturing, 46530 Measurement and Instrumentation or 46535 Metrology and Instrumentation
subject coordinator: Mr K A Stillman

The methods and concepts required for classical control analysis are developed; mathematical models based on linear differential equations (and their Laplace transforms) are introduced. Transient analysis, simulation, controller actions, frequency response analysis, and stability are treated. Several control systems are analysed with particular emphasis on servo systems and process control. Important hardware aspects (such as control valves and hydraulic actuators) are covered. A brief treatment is given of computer-based control (programmable controllers) and their advantages and

limitations. A proportion of the course is devoted to laboratory studies of various real control systems.

Assessment: assignments 50 per cent, quiz (open book) 10 per cent, final examination (open book) 40 per cent

46535

METROLOGY AND INSTRUMENTATION

MSE
6cp; 4.5hpw
prerequisite: 46125 Mechanics for Manufacturing
corequisite: 45931 Electrical Engineering 2 (Mechanical)
subject coordinator: Mr S Spain

This subject introduces the student to a variety of measurement techniques. A large proportion of the time is spent in carrying out experiments. Topics covered will be drawn from the following: Instruments for Linear Measurement (e.g. Comparators); Calibration. Measurement of straightness, flatness, alignment, length, time, position, angle, velocity and acceleration. Measurement of temperature, force, pressure, strain, frequency, frequency response, vibrations and sound. Advanced inspection technologies such as Coordinate Measuring Machines, LASERs. Attention is given to data collection and processing and to emerging technologies.

Assessment: laboratory reports 75 per cent, four small examinations 25 per cent

46540

PROGRAMMABLE CONTROLLERS

MEE/MSE
4cp; 3hpw
prerequisite: 45931 Electrical Engineering 2 (Mechanical)
corequisite: 46531 Control Engineering 1
subject coordinator: Mr S Spain

Modern process and manufacturing control technology includes the application of discrete logic control as well as classical analog control. The discrete logic analysis of processes is introduced and examined using binary logic and Boolean algebra, and other tools which are available to the control engineer.

The Programmable Logic Controller (PLC) is introduced as a specialised computing device which applies binary logic to control processes, and its various functions and capabilities are examined.

Techniques are applied such as state and ladder diagram development and the application of high level languages for programming. Communication facilities and protocol are discussed with the view to integration of complete control systems. The emphasis of the course is on design for applications requiring discrete input/output control, and programmable analog input/output. Case studies are used extensively.

Assessment: assignments 20 per cent, laboratory reports 40 per cent, examinations 40 per cent

46541

CONTROL ENGINEERING 2

MEE/MSE
4cp; 3hpw
prerequisite: 46531 Control Engineering 1
subject coordinator: Mr K A Stillman

Aims to develop an understanding of the methods of 'classical control' and their advantages and limitations, to introduce selected topics from 'modern control' and to prepare the student for postgraduate study in Control Engineering.

This subject follows on from Control Engineering 1, extending the control system analysis to include Inverse Nyquist methods and Root Locus methods. Considerable time is devoted to comparing and assessing these classical techniques. Additional topics then covered are state variable feedback and control, with a brief introduction to multivariable control. Where possible laboratory studies of various real control systems will be used.

Assessment: assignments 30 per cent, laboratory 40 per cent, final examination (open book) 30 per cent

46620

ENGINEERING COMMUNICATION

MEE/MSE
4cp; 3hpw
subject coordinator: Ms H McGregor

The aim is to develop students' written and oral communication skills to a professional level. Students develop confidence through workshop presentations and gain advanced knowledge through lecture sessions. Reports, letters, proposals, oral presentations, meeting procedure, group dynamics and elective topics are covered.

It covers the various aspects of the communication process in an engineering context. Students participate in workshop sessions to develop written and oral skills to a professional level. Basic communication theory is used as a foundation for practical work in research techniques; writing letters, reports and discussions papers; and conducting conferences, seminars, interviews, meetings and small group discussions.

Assessment: assignments 100 per cent

46630

ENGINEERING AND SOCIETY

MEE/MSE
4cp; 3hpw
prerequisite: 46620 Engineering Communication
subject coordinator: Ms H McGregor

Encourages students to think about and be aware of the social and other contexts in which their profession functions. It is also intended to help students to integrate the different aspects and topic areas of the engineering course as a whole.

The subject deals with the nature of the engineering profession and its various interactions with society. Attention is given to the historical development of mechanical engineering, the philosophical basis of the profession, and its relationship with the environment, industry and the community.

Assessment: essays 45 per cent, seminar 15 per cent, final examination 40 per cent

46632

ENGINEERING MANAGEMENT

MEE/MSE
6cp; 4.5hpw
prerequisite: 46630 Engineering and Society
subject coordinator: Dr R B Ward

The emphasis in this subject is on management decision making, which is illustrated by four basic quantitative methods and by discussion of the fundamental functions of management: planning, organising, leading and controlling. Management activities such as marketing and forecasting are covered, as is management of change and personal management.

Following selected reading and tutorial discussion, students will review aspects of the structure and operation of their current or most recent employer and prepare written summaries of their conclusions.

Topics will be chosen from matters such as: the organisation of the firm; industrial relations policy and practices; social location and impact of the firm in the community; product and process range and development; roles of professional engineers in the firm.

Assessment: continuous assessment through reports and assignments

46640

TEROTECHNOLOGY

MEE/MSE
4cp; 3hpw
prerequisite: 46821 Computing 3
corequisite: 46632 Engineering Management
subject coordinator: Dr R B Ward

Aims to provide students with basic knowledge of the management of maintenance, and to prepare them for the control of continued operation, value, depreciation and replacement of industrial assets and property, by introducing them to current philosophy, procedures, processes and equipment.

There is a brief review of the financial considerations of asset management, such as Nett Present Value and Depreciation, the economics of repair versus replacement, and how maintenance relates to an enterprise as a whole. Subsequent topics, illustrated with appropriate examples, will include the effects of design on maintainability; the relationship between plant availability for production and maintenance; maintenance strategies and their dependence on situations; maintenance planning; condition monitoring; failure analysis; loss control; the organisation, operation and costing of a maintenance department.

Assessment: continuous assessment through reports and assignments

46642

ENGINEERING ECONOMICS

MEE/MSE
4cp; 3hpw
prerequisite: 46632 Engineering Management
subject coordinator: Dr Y P Bhasin

Introduces students to the basic concept of economic analysis and its application to engineering projects, an economic evaluation of investment alternatives, and the application of economic analysis techniques in the comparison of engineering design alternatives.

Covers economic considerations in evaluating operational problems, revenue-cost relationship through break-even analysis, time-value analysis, cost-benefit analysis, depreciation, effects of income tax on economic evaluations, replacement studies, risk uncertainty and sensitivity considerations, and introductory macroeconomics.

Assessment: assignments 30 per cent, examination 70 per cent

46701

ROBOTICS AND FLEXIBLE MANUFACTURING

CSE
3cp; 3hpw
prerequisites: 45342 Electromechanical Systems, 67023 Materials Technology
subject coordinator: Mr S Spain

The subject is subdivided into three sequential sections, each leading into the next: (i) traditional manufacturing and production processes, (ii) fundamentals of robots and Computer Numerical Control (CNC) and (iii) flexible manufacturing in the computer-integrated manufacturing (CIM) environment.

Each section is prefaced with lectures aimed at familiarisation with the fundamentals behind each topic, supplemented by videos, comprehensive laboratory work and factory visits where appropriate.

Assessment: assignments 50 per cent, examination 50 per cent

46710

MATERIALS PROCESSING

MEE
4cp; 3hpw
prerequisite: 46311 Engineering Graphics
subject coordinator: Dr Y P Bhasin

Begins to develop an appreciation and understanding of materials processing principles and their application in manufacturing.

This subject covers: classificiation of processes; safety engineering; principles and processes of casting, permanent mould casting and hot working of metals; principles and processes of welding and metal cutting.

Assessment: reports 30 per cent, assignments 15 per cent, examinations 55 per cent

46715

MANUFACTURING PROCESSES

MSE
6cp; 4.5hpw
corequisite: 67021 Materials Engineering I
subject coordinator: Dr Y P Bhasin

Begins to develop an appreciation and understanding of materials processing principles and their application in manufacturing.

This subject covers classification of processes, safety engineering principles and processes of casting, permanent mould casting and hot working of metals, welding and metal cutting.

Assessment: reports 30 per cent, assignments 15 per cent, examinations 55 per cent

46725

MANUFACTURING SYSTEMS

MSE
6cp; 4.5hpw
prerequisites: 46312 Introduction to Manufacturing Systems, 46715 Manufacturing Processes
subject coordinator: A/Prof R M Spencer

Builds on earlier material to develop a more detailed understanding of manufacturing systems principles and applications. This subject will make major use of examples and case studies, illustrated by one or two appropriate industry visits.

Topics to be treated will include: Development and analysis of systems; history and characteristics of manufacturing in Australia; typical objectives for manufacturing systems; manufacturing models and strategies; manufacturing strategies. Importance of quality in manufacturing; Quality Standards (AS3900/ISO9000 Series): Resources for manufacturing. The nature and importance of maintenance systems. Communication and information technology; electronic data interchange; documentation. Configuration management and product life cycles.

Assessment: reports 30 per cent, assignment 15 per cent, examination 55 per cent

46726

MANUFACTURING SYSTEMS PLANNING

MSE
4cp; 3hpw
prerequisite: 46725 Manufacturing Systems
subject coordinator: A/Prof R M Spencer

Builds on earlier material to develop a broad appreciation of manufacturing systems planning. The emphasis will be on developing an awareness of planning philosophies and techniques, using examples and case studies. Manufacturing systems planning material to be treated may include: forecasting models; process planning and design; capacity planning; aggregate planning and master scheduling; resource requirement planning; just-in-time; cellular manufacturing; KANBAN systems; inventory control; standard costing system and work-centre costing; project planning and control; ratio analysis; reliability, maintainability, maintenance planning.

Assessment: reports 30 per cent, assignment 15 per cent, examination 55 per cent

46735

MANUFACTURING SYSTEMS: QUALITY

MSE
6cp; 4.5hpw
prerequisite: 46335 Design for Manufacturing
subject coordinator: Dr Y P Bhasin

Builds on earlier material to develop a broad appreciation of manufacturing systems quality issues and methodologies. The emphasis will be on developing an awareness of quality systems, philosophies and techniques, using examples and case studies. Material to be treated may include: planning, organisation and operation of a production enterprise for quality – ensuring process is capable and in control; inspection by control charts – attributes and variables; process capability studies; methods for quality improvement; inspection by sampling plans; TQM; quality circles; quality standards and quality certification; reliability, exponential model, series, parallel and

standby systems; sudden death tests; design for maintainability – whole life analysis; 'Total Customer Responsiveness' (soliciting and transforming raw customer comments and feedback into product and process modifications and innovations; manuals for installation/ operators/ maintenance); product certification (NATA).

Assessment: reports 30 per cent, assignment 15 per cent, examination 55 per cent

46740

QUALITY AND RELIABILITY

MEE/MSE
4cp; 3hpw
prerequisite: 46821 Computing 3
subject coordinator: Dr Y P Bhasin

Provides basic knowledge of fundamentals of quality control and reliability. At completion of the course, the student will be able to interpret quality control data and records, and establish an appropriate QC System for any process.

Covers process capability, control chart techniques, cusum charts, techniques of acceptance control, standards of acceptance sampling, prediction of reliability for series, parallel and standby systems and reliability testing.

Assessment: assignments 35 per cent, examination 65 per cent

46742

PRODUCTION AND COST CONTROL

MEE/MSE
4cp; 3hpw
prerequisite: 46632 Engineering Management
subject coordinator: Dr Y P Bhasin

Aims to familiarise the student with quantitative methods for the planning and control of materials and costs in manufacturing processes, and to introduce computer-aided planning and MRP2 approach.

Introduces an organised and systematic approach towards obtaining maximum utilisation of capacity resources in order to reduce excess inventory, controlling product quality, and ensuring timely product delivery at minimum cost. The subject will cover material management, forecasting of demand, capacity requirement planning (CRP), materials requirement planning (MRP), production scheduling, production control, network analysis, costing, distribution of overheads, ratio analysis, and annual reports. Computer-aided planning will also be introduced.

Assessment: reports and assignments 20 per cent, examination 80 per cent

46810

INTRODUCTION TO COMPUTING

MEE/MSE
4cp; 3hpw
subject coordinator: Dr A N F Mack

Introduces the computer as a means of solving engineering problems and as an aid to communications. The main emphasis will be on personal computers, but some time will be devoted to more powerful computers and networks. The topics covered will include DOS, word processing, spreadsheets, databases, and programming at an elementary level. Operating systems including UNIX and networking will also be treated at an elementary level.

Assessment: assignments 50 per cent, examinations 50 per cent. Students are required to pass in each section.

46811

COMPUTING 2

MEE/MSE
4cp; 3hpw
prerequisites: 46810 Introduction to Computing, 33120 Engineering Mathematics 1

Expands the student's ability to use the computer as an aid in the practice of engineering, further develops programming concepts, elementary numerical techniques, use of selected mathematical packages, databases and spreadsheets.

The subject includes: programming concepts and structure, numerical accuracy in computer arithmetic, binary arithmetic, simple integration, matrix manipulation and solution of linear simultaneous equations, solution of

f(x)=0, use of spreadsheets for graphical display and presentation.

Assessment: assignments 45 per cent, quiz (open book) 15 per cent, final examination (open book) 40 per cent

46821

COMPUTING 3

MEE/MSE
6cp; 4.5hpw
prerequisites: 46811 Computing 2, 33220 Engineering Mathematics 2

Introduces a selection of commonly used statistical and numerical tools and their underlying theory. To develop an understanding of the usage and limitations of these tools in the practice of engineering. Topics include: elementary probability, summarising data, the standard distributions (such as Binomial, Poisson, Normal, Weibull), inference and hypothesis testing, linear regression and curve fitting, introduction to ANOVAR, solution of sets of equations, introduction to partial differential equations, singular value decomposition and eigen structures, discrete Fourier series.

Assessment: assignments 45 per cent, quiz (open book) 15 per cent, final examination (open book) 40 per cent

46835

OPERATIONS RESEARCH

MEE/MSE
6cp; 4.5hpw
prerequisites: All Stage 5 subjects
corequisite: for MEE, 46632 Engineering Management
subject coordinator: Mr K A Stillman

Aims to apply the various techniques of operations research to the design and management of manufacturing systems.

This is an introduction to the philosophy and methodology of operations research, with a more detailed treatment of selected techniques including simulation, linear programming, dynamic programming, network analysis (CPM, PERT, Least Cost Scheduling), and queuing theory.

46840

ADVANCED ENGINEERING COMPUTING

MEE/MSE
4cp; 3hpw
prerequisite: 46821 Computing 3
subject coordinator: Mr K A Stillman

Aims to give an appreciation of selected important topics from Computer Science and develop understanding of program structure and data structure; and to develop skills in formulating and solving problems in optimisation.

The subject is broadly divided into programming and application. The programming section uses the Ratfor preprocessor as a bridge from fortran to the more richly structured languages Pascal and C. The use of the UNIX dataprocessing tools awk and grep are introduced. The application section is an introduction to optimisation methods: linear programming, simulated annealing and calculus-based algorithms.

Assessment: assignments 70 per cent, final examination (open book) 30 per cent

46992

ENGINEERING PRACTICE

MEE/MSE
6cp; 4.5hpw
prerequisite: 46632 Engineering Management
subject coordinator: Dr R B Ward

The subject deals in more detail with issues raised in 46632 Engineering Management. It principally covers the structure of commercial entities (from sole trader through to public company), the detailed accounting procedures followed in business, the relevant legal system, marketing and personnel practices. From time to time other topics will be introduced, such as quality, management of innovative technology, business ethics, and risk management.

The different philosophies on cooperative education will also be discussed. Each student will present a report on his/her industrial experience, to give a seminar to the class, outlining this

experience in the light of the course objectives, and to develop their own learning contract for the five years after graduation.

Assessment: continuous assessment by reports and assignments

46997

PROFESSIONAL EXPERIENCE (SANDWICH)

MEE/MSE

and

46999

PROFESSIONAL EXPERIENCE (PART-TIME)

MEE/MSE

These subjects are the Industrial Experience subjects for Mechanical and Manufacturing Systems Engineering degrees. Enrolment in them indicates that the student is currently obtaining industrial experience. Ninety weeks of approved industrial experience must be gained prior to graduation.

The objectives are to help students understand the format, structure and conventions of technical, written and speech reporting; to apply these skills to the writing of professional papers; and to alert students to the principles of communication inherent in speech, writing, listening and reading situations.

47002

PROJECT

CE
2cp; 2hpw

47003

PROJECT

CE
3cp; 3hpw

47004

PROJECT

CE
4cp; 4hpw

47006

PROJECT

CE
6cp; 6hpw

47009

PROJECT

CE
9cp; 9hpw

47012

PROJECT

CE
12cp; 12hpw

47015

PROJECT

CE
15cp; 15hpw
subject coordinator: Dr G L Ring

Different subjects of varying credit points are provided to allow flexibility in undertaking projects over more than one semester. Project topics, guidelines for project registration and other information about projects may be obtained from Dr Ring.

In the project students are expected to carry out a major engineering task and to prepare a formal bound report on that task. The project has many objectives. It develops the need to formalise a rational approach to a significant, long-term piece of work. It requires effective time

management to meet deadlines. It compels students to work individually under the guidance of a supervisor. It enhances their communication and engineering skills. Finally it gives students a feeling of professional pride and confidence in their ability, thus preparing for their future roles in the engineering workplace.

47110

INTRODUCTION TO CIVIL ENGINEERING

CE/SE/CEE
3cp; 3hpw
subject coordinator: Mr W Peters

The objectives are to improve staff/student interaction and understanding and to provide close contact with at least one member of School staff; to provide an insight into the breadth of civil engineering and the many skills and approaches required by the profession; and to develop written and verbal communication skills. Topics include the phases of engineering work; the design process; materials and behaviour; environmental engineering; water engineering; geotechnical engineering; project evaluation; management and professional aspects of engineering, including ethics, professional associations, contracting and consulting.

Assessment: written report 20 per cent, class assignments 20 per cent, seminar 20 per cent, tutorial participation 10 per cent, final examination 30 per cent

47112

COMPUTER APPLICATIONS

CE/SE/CEE
3cp; 3hpw
subject coordinator: Dr A Saleh

Introduces students to computer utilisation and the practical use of a variety of software tools relevant to civil engineering. Emphasis is given to hands-on work at the computer and the application of software to engineering problems. The subject covers introduction to computing environment; software applications; and electronic communications.

47113

COMPUTER PROGRAMMING

CE/SE/CEE
3cp; 3hpw
corequisite: 47112 Computer Applications
subject coordinator: Dr K L Lai

Aims to familiarise students with computing as a tool for solving engineering problems. Emphasis is on the process of formulating problems in a manner suitable for computer solution. At the conclusion of the subject, students should be able to recognise problems which lend themselves to computer solutions and have the confidence to use a computer whenever it is warranted.

Assessment: assignments 25 per cent, mid-term quiz 25 per cent, final examination 50 per cent

47117

STATICS

CE/SE/CEE
4cp; 3hpw
subject coordinator: Mr W Peters

Provides students with the fundamental concepts of statics and the application of the basic principles of statics to solving engineering mechanics problems. Much emphasis in the course will be placed on the concepts of free body diagrams and equilibrium of the free body. At the end of the course students should be able to confidently apply these basic principles to solve statically determinate problems involving non-deformable bodies.

47118

SURVEYING 1A

CE/SE/CEE
3cp; 3hpw
subject coordinator: Mr A Brady

Introduces students to fundamental surveying theory, techniques and instruments which are used in civil engineering. This will include levelling, distance measurement and use of the theodolite. At the completion of Surveying 1A the student should have a

practical understanding of: the execution of the following surveys in the field and appreciation of the accuracies achievable by: (a) levelling, (b) distance measurement by tape or wire and (c) traversing; and execution of the following computations and appreciation of the accuracies required in computation: (a) level reduction, (b) distance reduction, (c) traverse closure for both misclose and bearing and distance of missing line.

This subject is essential to provide students with basic material which they can use during the initial industrial training components of the subject.

Assessment: practical reports and assignments 20 per cent, quizzes 20 per cent, final examination 60 per cent

47120

GRAPHICS

CE/SE/CEE
4cp; 3hpw

In this subject the student will be exposed to a variety of ways in solving three-dimensional design problems, from the basic levels to complex practical problems using conventional and computer-aided design techniques.

Upon completion of this subject, students should be able to clearly think, identify and translate three-dimensional objects onto a two-dimensional frame.

47127

MECHANICS OF SOLIDS 1

CE/SE/CEE
4cp; 3hpw
prerequisite: 47117 Statics
subject coordinator: Dr R Karim

Aims to develop an understanding of the behaviour of deformable solids responding to loads, deformations and temperature changes, leading to analysis of structure and machine elements utilising established principles. The subject emphasises the use of fundamental techniques for formulating and solving problems in the mechanics of deformable solids based on equilibrium and compatibility relationships and material properties. The subject will provide the required knowledge necessary for understanding more advanced topics in 47137 Mechanics of Solids 2 and the underlying principles in structural analysis as well as design subjects.

Assessment: assignments 10 per cent, mid-semester quiz 20 per cent, final examination 70 per cent

47128

SURVEYING 1B

CE/SE/CEE
3cp; 3hpw
prerequisite: 47118 Surveying 1A
subject coordinator: Mr A Brady

Students are assisted in developing basic surveying skills and in reaching a significant level of competence in using basic surveying equipment such as levels, theodolites and distance measuring tapes.

Students will be introduced to the engineering applications of surveying, including detail and contour surveying, setting out of roads and buildings and road design. Students will also be introduced to current surveying computer packages.

Assessment: quizzes 25 per cent, assignments and practical reports 15 per cent, practical test 25 per cent, final examination 35 per cent

47131

STRUCTURAL MECHANICS

CE/SE/CEE
3cp; 3hpw
prerequisite: 47127 Mechanics of Solids 1
subject coordinator: Dr R Karim

Reinforces the basic concepts of statics, mechanics of deformable solids and enhancing the student's understanding of structural behaviour of determinate frames by exploring the principles of energy, theories of failure and concepts of stability.

Assessment: assignments 10 per cent, quiz 30 per cent, final examination 60 per cent

47133

NUMERICAL METHODS IN ENGINEERING

CE/SE/CEE
3cp; 3hpw
prerequisites: 47113 Computer Programming, 33121 Engineering Mathematics 1A, 33122 Engineering Mathematics 1B
corequisite: 33221 Engineering Mathematics 2A
subject coordinator: Mr E Jankulovski

Familiarises the student with a number of numerical methods which will be useful in the solution of a wide range of engineering problems. Emphasis will be given to application, rather than derivation, but some theory will be provided to assist in the understanding of the solution techniques.

Assessment: class tests and assignments 40 per cent, final examination 60 per cent

47134

CONSTRUCTION MATERIALS

CE/SE/CEE
3cp; 3hpw
prerequisite: 67022 Materials Science for Engineers
subject coordinator: Dr H Chung

Timber, steel, concrete and masonry are the major materials commonly used in civil engineering construction. This subject aims to provide understanding of the production, material characteristics and properties, main uses, and testing to relevant Australian Standards. A knowledge of these materials is essential in the design and construction of civil engineering structures.

Assessment: assignments and laboratory reports 30 per cent, quizzes 20 per cent, final examination 50 per cent

47135

FLUID MECHANICS

CE/SE/CEE
4cp; 3hpw
prerequisites: 47127 Mechanics of Solids 1, 33221 Engineering Mathematics 2A
subject coordinator: Dr S Beecham

Fluid Mechanics is the foundation subject for the Water Engineering strand within the Civil Engineering course. It also provides a basic knowledge of fluid mechanics for structural engineering students. The subject's aim is to introduce students to concepts of fluid statics and dynamics, going from the basic principles of mathematics and physics to the empirical procedures used in civil engineering applications.

Assessment: assignments 20 per cent, quiz and final examination 60 per cent, laboratory work 10 per cent, group project 10 per cent

47137

MECHANICS OF SOLIDS 2

CE/SE/CEE
3cp; 3hpw
prerequisite: 47127 Mechanics of Solids 1
subject coordinator: Mr P C Liu

Develops an understanding of the behaviour of a range of deformable solids beyond those considered in the prerequisite subject. On completion of this subject, the students should understand the behaviours of deformable solids responsible for all types of internal action on various cross-sections. This subject forms a sound knowledge to develop the fundamental principles for structural analysis and design.

Assessment: assignments 15 per cent, mid-semester quiz 35 per cent, final examination 50 per cent

47140

CONCRETE DESIGN 1

CE/SE/CEE
3cp; 3hpw
prerequisite: 47127 Mechanics of Solids 1
corequisite: 47137 Mechanics of Solids 2
subject coordinator: Prof K A Faulkes

On completion of this subject, the student should understand the behaviour under load of reinforced concrete beams, one-way and two-way slabs, and short columns; be able to analyse from first principles reinforced concrete sections subjected to bending moment and/or axial compression at any stage of loading up to ultimate; be able to design and detail reinforced concrete beams, one-way and two-way slabs, and short columns, considering all common limit states, except torsion; have some familiarity with the SAA Concrete Structures Standard and some awareness of typical design aids. The subject aims to provide students with a grounding in fundamental principles applicable to the design of all concrete structures.

Assessment: assignments 15 per cent, mini-quizzes 15 per cent, mid-semester examination 25 per cent, final examination 45 per cent

47141

STRUCTURAL ANALYSIS 1

CE/SE/CEE
3cp; 3hpw
prerequisite: 47131 Structural Mechanics
subject coordinator: Dr S Parsanejad

This subject teaches students methods, amenable to hand calculations, for analysis of indeterminate structures, influence coefficient and the applicability of influence lines to design of structural frameworks.

Assessment: assignments 15 per cent, two quizzes 40 per cent, final examination 45 per cent

47142

ENVIRONMENTAL ENGINEERING

CE/SE/CEE
3cp; 3hpw
prerequisite: 65023 Engineering Chemistry
subject coordinator: Dr S Vigneswaran

This subject introduces civil engineering students to basic environmental concepts and the environmental consequences of typical engineering activities in order for them to have a basic understanding on selected environmental science topics; helps them to be familiar with main aspects of NSW environmental legislation with respect to civil engineering activities; have a broad knowledge on current environmental problems; be able to determine likely environmental consequences of several types of engineering activities; and be aware of procedures which can be used to avoid or reduce adverse environmental impacts.

Assessment: assignments 20 per cent, mid-semester examination 30 per cent, final examination 50 per cent

47144

TIMBER DESIGN

CE/SE/CEE
3cp; 3hpw
prerequisite: 47127 Mechanics of Solids 1
subject coordinator: Mr K Crews

Aims to broaden the student's knowledge of timber as a structural material and its modern usage, and to develop a professional capability for design and construction of economical timber structures.

Assessment: assignments 50 per cent, mid-semester quiz 10 per cent, final examination 40 per cent

47145

HYDRAULICS

CE/CEE
3cp; 3hpw
prerequisite: 47135 Fluid Mechanics
subject coordinator: Dr M Patarapanich

Hydraulics follows the introductory Fluid Mechanics subject in the Water Engineering strand. It aims to consolidate students' knowledge of fluid principles, and to cover principles of open channel flow.

On completion, students will have a deeper knowledge of fluid flow principles, and a proficiency in solving problems and performing design calculations for open channel flow systems.

Assessment: assignments 20 per cent, laboratory reports 20 per cent, quizzes/examination 60 per cent

47146

SOIL MECHANICS

CE/SE/CEE
4cp; 3hpw
subject coordinator: Dr G Ring

As a particulate and multiphase material, soil displays many characteristics which are distinctly different from those of other engineering materials. In order to design foundations and earth structures it is essential to understand the basic soil behaviour under different stresses and environmental conditions. The main aim is to study the components of soil and their interrelationships, soil classification for engineering purposes, stresses and failure conditions in a soil mass, and stress-strain characteristics.

Assessment: quizzes, assignments and laboratory reports 50 per cent, final examination 50 per cent

47149

CONSTRUCTION

CE/SE/CEE
3cp; 3hpw
prerequisite: 47128 Surveying 1B
subject coordinator: A/Prof T Anderson

Promotes an interest in and an understanding of some of the equipment and techniques associated with civil engineering construction work.

On completing the subject the student should have a well developed awareness of the equipment, processes and methods associated with construction work; be able to identify many of the day-to-day problems encountered on construction sites; and be able to participate actively in the evolution of the solution to construction problems.

The subject is the first in the Construction and Management strand of the course.

Assessment: assignments 60 per cent, final examination 40 per cent

47150

CONCRETE DESIGN 2

CE/SE/CEE
4cp; 3hpw
prerequisite: 47140 Concrete Design 1
subject coordinator: Prof K A Faulkes

On completion of this subject students should appreciate the effects of and reasons for prestressing concrete beams; understand the behaviour under load of simply supported prestressed concrete beams; be able to analyse from first principles prestressed concrete sections at any stage of loading up to ultimate; be able to design and detail simple prestressed beams considering all common limit states, except torsion; have some familiarity with relevant provisions of the Standards Australia Concrete Structures Standard and some awareness of available software design aids.

Assessment: assignments 15 per cent, mini-quizzes 15 per cent, mid-semester examination 25 per cent, final examination 45 per cent

47151

STRUCTURAL ANALYSIS 2

CE/SE/CEE
4cp; 3hpw
prerequisites: 47141 Structural Analysis 1, 47133 Numerical Methods in Engineering
subject coordinator: Dr A Saleh

In this subject students will master the analysis of structures using the stiffness method and become familiar with the computer application in this field. Students are also introduced to concepts of material and geometric nonlinearities and to problems of elastic stability.

Assessment: quizzes 50 per cent, final examination 50 per cent

47152

PUBLIC HEALTH ENGINEERING

CE/SE/CEE
3cp; 3hpw
prerequisite: 47142 Environmental Engineering
subject coordinator: Dr P Hazleton

Provides civil engineering students with a basic knowledge about water quality, the types of water pollution and objectives, processes and technology of waste water and water treatment, in order for them to become familiar with the water quality constituent, measurement methods and standards; major types of water pollution in NSW; different water and waste water treatment processes used in NSW; rationale of choice of treatment alternatives; and introductory design of treatment processes used commonly in NSW.

Assessment: assignments 20 per cent, mid-semester examination 30 per cent, final examination 50 per cent

47153

PROBABILITY STATISTICS

CE/SE/CEE
3cp; 3hpw
prerequisite: 47112 Computer Applications
subject coordinator: Dr A Saleh

Many areas of engineering are involved with gathering and evaluating large amounts of data. Two aspects are important: the presentation of this data and what inferences can be drawn from this data.

The science of statistics deals with these aspects. This subject aims to introduce the student to these areas of statistical analysis. Particular emphasis is placed on promoting an awareness in students of the variability of design input data and on the tools required to analyse this variability.

Assessment: assignments 10 per cent, class test 30 per cent, final examination 60 per cent

47154

CONCRETE TECHNOLOGY

CE/SE/CEE
3cp; 3hpw
prerequisite: 47134 Construction Materials
subject coordinator: Dr R Sri Ravindrarajah

Concrete is one of the essential materials used in civil engineering construction. The main objective is to provide a basic understanding of concrete technology in relation to production, materials characteristics and properties, durability, and testing in accordance with relevant Australian Standards.

Assessment: assignments and laboratory reports 30 per cent, quizzes 20 per cent, final examination 50 per cent

47155

HYDROLOGY

CE/CEE
3cp; 3hpw
prerequisite: 47135 Fluid Mechanics
subject coordinator: Dr S Beecham

Students are introduced to the principles and methods of Engineering Hydrology, with particular concentration on Australian practice. On completion, students should understand basic principles of hydrology, and be aware of procedures used in Australia. They should be able to estimate design flow rates for various situations, and be familiar with basics of reservoir yield analysis and hydrological modelling.

Assessment: exercises and assignments 50 per cent, quizzes and examination 50 per cent

47156

SOIL ENGINEERING

CE/SE/CEE
3cp; 3hpw
prerequisite: 47146 Soil Mechanics
subject coordinator: A/Prof M R Hausmann

Building on the knowledge of soil properties developed in Soil Mechanics, this subject introduces the solutions to problems of stability and deformation related to shallow footings, retaining structures, deep foundations (piles, piers and caissons), embankments, excavations and natural slopes. The methods of stability analysis presented are based on the Mohr-Coulomb failure law and cover the assessment of bearing capacity, earth pressure and slope stability. Elastic as well as consolidation theory are applied to deformation problems, including settlement, rotation and lateral deflection.

Assessment: quizzes and laboratory reports 50 per cent, final examination 50 per cent

47159

PROJECT PLANNING

CE/SE/CEE
3cp; 3hpw
prerequisite: 47149 Construction
subject coordinator: A/Prof T Anderson

Provides students with a detailed knowledge of a number of techniques which guide engineers in their managerial decision making.

On completing the subject the student should be able to apply the rigorous techniques of critical path method networks as well as other planning systems; analyse cash flows associated with alternative courses of action and have an understanding of benefit-cost analysis; understand the basic principles of primary and detailed cost estimating; and predict the likely production of earthmoving equipment and correctly balance fleets of machinery.

Assessment: assignments 15 per cent, project 35 per cent, final examination 50 per cent

47160

CONCRETE DESIGN 3

CE/SE/CEE
3cp; 3hpw
prerequisite: 47140 Concrete Design 1
subject coordinator: Dr J Ivering

On completion of this subject, the student should understand the behaviour under load, and be able to analyse, design and detail the following reinforced concrete components additional to those covered in 47140 Concrete Design 1: retaining walls, footings, slender columns and flat slabs. In addition the subject deals with the design of a complete building, and aims to develop an approach to conceptual design, the development and consideration of alternatives and selection of appropriate structural systems for concrete buildings.

Assessment: assignments 15 per cent, mini-quizzes 15 per cent, mid-semester examination 25 per cent, final examination 45 per cent

47161

STEEL DESIGN 1

CE/SE/CEE
3cp; 3hpw
prerequisites: 47137 Mechanics of Solids 2, 47141 Structural Analysis 1
subject coordinator: Mr P Liu

The objective is for students to acquire competence in design of structural steel elements in accordance with the Australian Standard AS4100-1900 and to form a sound base for progressing into more advanced steel subjects. Upon completion of this subject, students should be capable of proportioning a complete framework.

Assessment: assignments 15 per cent, mid-semester quiz 35 per cent, final examination 50 per cent

47162

ADVANCES IN POLLUTION CONTROL

CE/CEE
3cp; 3hpw
prerequisite: 47152 Public Health Engineering
subject coordinator: Dr S Vigneswaran

This is an advanced subject intended to give an overview of advances in pollution control technologies and management practices in order for students to become familiar with the pollution control management strategies adopted by different industries; advanced technologies used to produce water suitable for reuse; and technologies used in the upgrading of water and wastewater treatment plants.

Assessment: assignments 20 per cent, mid-semester examination 30 per cent, final examination 50 per cent

47164

METALS TECHNOLOGY

CE/SE
3cp; 3hpw
prerequisite: 47134 Construction Materials
subject coordinator: Dr H Chung

Deals with the behaviour of metals under various service conditions and loads with particular reference to structural steel. Provides the background knowledge on the material aspects of AS4100-1900: Steel Structures, thereby augmenting students' understanding of the principles of steel design. In addition, it will help the students in selecting the appropriate grade of steel for a particular project, specifying the relevant tests for quality control and interpreting the test results.

Assessment: assignment and laboratory reports 30 per cent, quizzes 20 per cent, final examination 50 per cent

47166

GEOTECHNICAL ENGINEERING

CE
3cp; 3hpw
prerequisite: 47156 Soil Engineering
subject coordinator: Dr G L Ring

The geotechnical design process involves understanding the nature of soils at a site and predicting the interaction between those soils and any construction carried out on the site. The theories of soil behaviour developed in 47146 Soil Mechanics and the methods of analysis treated in 47156 Soil Engineering give the student the theoretical background on which design techniques may be built. However, soil and rock, being natural materials, are very variable. This course aims to develop a design philosophy which will allow this variability to be correctly covered in the design. This design philosophy is based partly on the theoretical background (the science) and partly on practical experience and engineering judgement (the art of geotechnical design).

Assessment: assignments 10 per cent, field work 20 per cent, design project 30 per cent, final examination 40 per cent

47167

ROAD ENGINEERING

CE/CEE
3cp; 3hpw
prerequisites: 47156 Soil Engineering, 47159 Project Planning, 47155 Hydrology
subject coordinator: Mr P Kenny

Provides students with a general introduction to Australian methods for the analysis and design of various road components.

Assessment: assignments and reports 50 per cent, final examination 50 per cent

47168

SURVEYING 2

CE/CEE
3cp; 3hpw
prerequisite: 47149 Construction
subject coordinator: Mr A Brady

Widens senior students' horizons regarding advanced survey methods, instruments and theory as applied to civil engineering projects. Students will be given a choice of the practical exercises undertaken so that the subject may be tailored to suit their particular needs or interests in the area of work they find most relevant to them.

Assessment: quiz 30 per cent, practical reports and assignments 30 per cent, final examination 40 per cent

47171

STEEL STRUCTURES AND CONCEPT DESIGN 1

CE/SE
4cp; 3hpw
prerequisites: 47161 Steel Design 1, 47141 Structural Analysis 1, 47137 Mechanics of Solids 2
subject coordinator: Dr S Parsanejad

The objective is for students to gain familiarity and competence in the complete design of typical steel structures and to involve students in the philosophy and methodology of structural design with the aim of attaining coherence amongst the previously acquired knowledge.

Assessment: project 50 per cent, two quizzes 50 per cent

47175

WATER RESOURCES ENGINEERING

CE/CEE
3cp; 3hpw
prerequisites: 47145 Hydraulics, 47155 Hydrology
subject coordinator: A/Prof G O'Loughlin

After studying detailed aspects of water engineering in earlier subjects, students will consider the full scope of water resources engineering and the water industry in this subject. The main topics to be considered are: world water resources, water resource development, functions (e.g. water supply, irrigation) and infrastructure, environmental effects, social aspects, planning, management and systems analysis.

Assessment: exercises and assignments 50 per cent, quizzes and examinations 50 per cent

47176

GROUND MODIFICATION

CE
3cp; 3hpw
prerequisite: 47156 Soil Engineering
subject coordinator: A/Prof M Hausmann

Introduces methods of ground modification for the purpose of improving the engineering properties of soils and rocks, such as: strength, compressibility, tendency to shrink and swell, durability, permeability, potential for liquefaction, and variability. Emphasis is placed on laboratory and field testing, design criteria, methods of analysis and performance evaluation. The main topics are compaction, dewatering, soil stabilisation of admixtures, grouting, soil reinforcement by inclusions and confinement. Additional geotechnical construction processes described include preloading, electro-osmosis, thermal stabilisation (ground freezing or heating), soil and rock anchors, and the use of geosynthetics.

By discussing ways of modifying soils by mechanical, hydraulic, physical, chemical and other means, the student gains a deeper understanding of basic soil and rock properties. After completing this subject, a designer or construction engineer will be better able to evaluate alternative solutions when confronted with difficult foundation conditions or marginal building materials.

Assessment: assignment and quizzes 50 per cent, project 50 per cent

47177

TRANSPORTATION ENGINEERING

CE/CEE
3cp; 3hpw
prerequisite: 47167 Road Engineering
subject coordinator: Mr P Kenny

Provides students with a basic understanding of the issues involved in planning for transport and making transport work more effectively in the community.

Assessment: practical reports and class assignments 50 per cent, final examination 50 per cent

47178

PROJECT ECONOMICS

CE/SE/CEE
3cp; 3hpw
prerequisite: 47159 Project Planning
subject coordinator: A/Prof G O'Loughlin

Advances students' knowledge and competence in economic and financial management associated with civil engineering projects.

On completion the student should have a well developed understanding of the economic framework within which selection of engineering projects is made; be able to provide reasoned advice on the tangible and intangible benefits and costs of projects; be competent in financial management techniques such as benefit-cost analysis, economic project evaluation, intangible and multiple objective analysis, sensitivity and probability analysis; and have an understanding of the roles of engineers in business, including financial and marketing functions.

Assessment: assignments 30 per cent, project 30 per cent, final examination 40 per cent

47179

CONSTRUCTION CONTRACTS

CE/SE/CEE
3cp; 3hpw
prerequisite: 47159 Project Planning
subject coordinator: A/Prof T Anderson

Provides a general appreciation of some of the important aspects of contract management.

On completing the subject the students should have a good understanding of the powers and duties of the parties to a construction contract; a sound knowledge of the Standard General Conditions of Contract; and an awareness of the activities and functions associated with the administration of civil engineering contracts.

Assessment: class assignments 20 per cent, quizzes 20 per cent, final examination 60 per cent

47189

MANAGEMENT FOR ENGINEERS

CE/SE/CEE
4cp; 3hpw
prerequisites: 47149 Construction, 47159 Project Planning, 47179 Construction Contracts
corequisite: 47178 Project Economics
subject coordinator: A/Prof T Anderson

Develops an awareness of the theories of management and an understanding of the techniques and principles associated with the general management of projects and organisations.

This subject is the capstone subject of the Construction and Management strand of the course and aims to develop a broad view of the role an engineer may take in industry and society.

Assessment: assignments 35 per cent, class assessment 20 per cent, final examination 45 per cent

47237

DOMESTIC BUILDING DESIGN AND CONSTRUCTION

SE
3cp; 3hpw
prerequisite: 47127 Mechanics of Solids 1
corequisite: 47137 Mechanics of Solids 2
subject coordinator: Mr K Crews

Aims to familiarise the students with local government's statutory regulation, the structural behaviours of domestic buildings with load-bearing walls and to give a comprehensive coverage of all components of domestic buildings with emphasis on building services, construction aspects and maintenance.

Assessment: assignment 65 per cent, quiz 10 per cent, final quiz 25 per cent

47265

FINITE ELEMENT ANALYSIS

SE
3cp; 3hpw
prerequisites: 47151 Structural Analysis 2, 47133 Numerical Methods in Engineering
subject coordinator: Dr A Saleh

Provides an insight into the finite element method and its utilisation in solving civil engineering problems. The theoretical fundamentals underlying the method will be highlighted. Finite element software packages will be used to demonstrate the versatility and limitation of the method and to provide hands-on experience to enable students to use such software effectively.

Assessment: quizzes and assignments 50 per cent, final examination 50 per cent

47267

APPROXIMATE METHODS IN STRUCTURAL ANALYSIS

SE
3cp; 3hpw
prerequisites: 47141 Structural Analysis 1, 47137 Mechanics of Solids 2, 47140 Concrete Design 1, 47161 Steel Design 1
subject coordinator: Dr S Parsanejad

This subject explores the assumptions underlying the approximate methods of analysis and their justification and equips students with analytical tools for rapid determination of approximate internal actions which can be either used for preliminary design of structural elements or for detection of gross errors in the results obtained from rigorous computer-based analysis.

Assessment: assignments 30 per cent, two quizzes 70 per cent

47268

DYNAMICS OF STRUCTURES

SE
3cp; 3hpw
prerequisites: 47151 Structural Analysis 2, 47133 Numerical Methods in Engineering
subject coordinator: A/Prof B Samali

Introduces students to basic concepts and fundamental principles of structural dynamics and their application to structural design and analysis of dynamically sensitive structures such as tall buildings, towers, chimney stacks, foot bridges, and others. Upon the completion of the subject the student is expected to understand the nature of dynamic (time varying) loads such as those produced by wind, earthquake, rotating machinery, trains, human beings and other sources, and assess the response of civil engineering structures to such loads by taking into account the load-structure interaction, leading to design of structures satisfying both the strength and serviceability requirements.

Assessment: assignments 40 per cent, three quizzes 60 per cent

47270

CONCRETE DESIGN 4

CE/SE
3cp; 3hpw
prerequisite: 47150 Concrete Design 2, 47141 Structural Analysis 1
subject coordinator: Prof K A Faulkes

On completion of this subject, the student should understand and be able to analyse the effects of prestress on prestressed concrete tension members, continuous beams, flat slabs and band-beam structures, should understand the

behaviour of these structures under load up to failure and should be able to design them in accordance with the Australian Concrete Structures Standard. In addition, the subject may cover one or more of the following: design for torsion of reinforced and prestressed concrete members; prestressed concrete water retaining structures; prestressed concrete columns.

Assessment: assignments 15 per cent, mini quizzes 15 per cent, mid-semester examination 25 per cent, final examination 45 per cent

47275

BRIDGE DESIGN

SE
3cp; 3hpw
prerequisites: 47150 Concrete Design 2, 47161 Steel Design 1
subject coordinator: Dr J Ivering

An introduction to the Australian practice of bridge design. Students are taught to analyse bridge components using manual and computerised methods and to design a selected structure in accordance with the current code of practice. On completion of the subject the student should be familiar with structural systems and methods applied to the design of typical bridges and should be capable of designing a small to medium span highway bridge in accordance with the Australian standard.

Assessment: four assignments 60 per cent, seminar 10 per cent, two quizzes 30 per cent

47277

LOADING ON BUILDING STRUCTURES

SE
3cp; 3hpw
prerequisite: 47268 Dynamics of Structures
subject coordinator: A/Prof B Samali

Familiarises students with various types of loads and phenomena responsible for inducing stresses and strains in building structures, and develops an understanding of probabilistic concepts underlying the determination of various loads on structures for serviceability as well as strength calculations. Upon the completion of the subject the student should be able to arrive at load combinations which are likely to produce most adverse effects on a building structure.

Assessment: assignments 40 per cent, three quizzes 60 per cent

47278

STRUCTURAL STABILITY

SE
3cp; 3hpw
prerequisites: 47151 Structural Analysis 2, 47133 Numerical Methods in Engineering
subject coordinator: Prof S Bakoss

A study of the behaviour of slender members subjected to compression and or flexure. This subject will examine the factors which contribute to the onset of buckling in single members and will develop the understanding of the behaviour of slender frames subjected to loads which cause buckling. It will enable students to apply computer-based methods to analyse practical frames to assess their stability.

Assessment: assignments 50 per cent, final examination 50 per cent

47281

STEEL STRUCTURES AND CONCEPT DESIGN 2

SE
3cp; 3hpw
prerequisite: 47171 Steel Structures and Concept Design 1
subject coordinator: Dr S Parsanejad

Provides an understanding of the behaviour of composite beams and plastically deformed steel frames and develops familiarity with the relevant code provisions and their underlying concepts.

Assessment: two projects 50 per cent, two quizzes 50 per cent

47285

DESIGN PROJECT

SE
6cp; 6hpw
prerequisites: 47171 Steel Structures and Concept Design 1, 47160 Concrete Design 3
subject coordinator: Prof S Bakoss

Develops the ability of students to take a substantial structural project from an initial functional brief to the stage where it can be documented for construction. Students will be required to prepare and assess concept designs in terms of functional requirements of a project brief. The preferred options will then be developed to a preliminary design stage followed by the preparation of final design documentation.

Assessment: preparation and assessment of conceptual designs 35 per cent, preliminary designs 30 per cent, final design and documentation 35 per cent

47287

STRUCTURAL TESTING

SE
3cp; 3hpw
prerequisites: 47137 Mechanics of Solids 2, 47151 Structural Analysis 2, 47150 Concrete Design 2
subject coordinator: Dr R Karim

Students are expected to familiarise themselves with techniques on contemporary instrumentation for measuring the strength and behaviour of concrete and steel structures in the field and/or in the laboratory. Provides students with information necessary for the design and application of structural models; to present techniques for the analysis of test data.

Assessment: assignments 10 per cent, laboratory reports 50 per cent, examinations and quizzes 40 per cent

47288

HIGH-RISE BUILDINGS

CE/SE
3cp; 3hpw
prerequisites: 47277 Loading on Building Structures, 47267 Approximate Methods
subject coordinator: Dr S Parsanejad

Enhances the understanding of the behaviour of structural systems with special reference to characteristics inherent to tall buildings and brings about coherence amongst the previously learnt knowledge.

Assessment: project 30 per cent, assignments 20 per cent, 2 quizzes 50 per cent

47301

RAILWAY ENGINEERING (ELECTIVE)

CE/SE
3cp; 3hpw
subject coordinator: Mr A Brady

An introduction to the design, construction and maintenance concepts of railway track and bridges. On completion of the lecture program the student should be able to design, independently, a branch line or a siding complex according to State Rail of NSW Standards. An understanding of track-train interrelationships and their effect on track structure should also have been obtained.

The subject also provides specific information on the design of a railway bridge structure on the basis that the student already has the knowledge to design a road bridge.

Assessment: trade design project 40 per cent, bridge design project 30 per cent, quiz 30 per cent

47302

WELDING (ELECTIVE)

CE/SE
3cp; 3hpw
prerequisite: 47164 Metals Technology
subject coordinator: Dr H Chung

Introduces students to the aspects of welding which affect the efficiency of fabrication and serviceability of steel structures. Deals with the advantages and disadvantages of common welding methods, quality and strength of welds, inspection and economic considerations.

Assessment: assignments 40 per cent, quizzes 60 per cent

47303

LAND DEVELOPMENT (ELECTIVE)

CE/SE
3cp; 3hpw
subject coordinator: Mr A Brady

Provides information for senior engineering students interested in local government or land development projects. Students are introduced to aspects of the land development process from acquisition of raw land through to the marketing of developed land. On completing the subject the student should have an understanding of the land development process and the key participants in that process; understand the techniques of site analysis, concept and detailed designing of land development projects; appreciate the scope for incorporating environmental and street management principles in the design process; and understand the legislative requirements of land development.

The subject is structured in three modules:

Module 1: Context of land development: development processes, nature of clients, site contexts, market contexts, financial contexts, legal contexts.

Module 2: Site analysis and design: site analysis, concept planning, designing with environment in mind, residential street layout, subdivision design.

Module 3: Development approvals and appeals: financial viability, development applications and approvals, Section 94 contributions, Land and Environment Court.

Assessment: assignments 70 per cent, final examination 30 per cent

47305

RISK AND RELIABILITY ANALYSIS (ELECTIVE)

CE/SE
3cp; 3hpw
prerequisite: 47113 Computer Programming
subject coordinator: A/Prof B Samali

Introduces students to principles of reliability analysis and application of probability theory to engineering problems, so as to gain an understanding of its significant role in all aspects of engineering planning and design, including: the formulation of engineering problems and evaluation of systems performance under conditions of uncertainty; systematic development of design criteria, explicitly taking into account the significance of uncertainty; and the logical framework for risk assessment and risk-benefit trade-off analysis relative to decision making.

The principal aim is to emphasise the wider roles of probability theory in engineering, with special attention on problems related to civil and structural engineering, construction management, hydrologic and water resources planning, transportation planning and wind and earthquake engineering.

The subject is concerned mainly with the practical applications and relevance of probability concepts of engineering. The necessary mathematical concepts are developed in the context of engineering problems and through illustrations of probabilistic modelling of physical situations and phenomena in non-abstract terms.

Assessment: assignments 30 per cent, two quizzes 70 per cent

47306

GEOMECHANICS (ELECTIVE)

CE/SE
3cp; 3hpw
prerequisites: 47156 Soil Engineering, completion of 47166 Geotechnical Engineering strongly recommended
subject coordinator: A/Prof M Hausmann

The theory and practice of soil-structure interaction for buildings. The design of foundations, the effects of the behaviour of foundations and soils on buildings and the effects of the stiffness of the superstructure on the behaviour of foundations are investigated. On completion of this subject the students should understand: how to choose the appropriate soil model for a given situation, how to use analytical methods of soil-structure interaction for the design of foundations; and how to employ field experimental studies in the design of foundations.

Assessment: assignments 20 per cent, quiz 20 per cent, report 60 per cent

47307

CONSTRUCTION MANAGEMENT (ELECTIVE)

CE/SE
3cp; 3hpw
prerequisites: 47149 Construction, 47159 Project Planning, 47179 Construction Contracts
subject coordinator: A/Prof T Anderson

Provides a complete and detailed framework for the administration and control of civil engineering construction projects. The subject builds on the knowledge developed in Construction, Project Planning and Construction Contracts.

On completing the subject the student should have a good understanding of the role of a construction manager and the management information systems that assist his functioning and decision making; an understanding of the process of team development and industrial relations issues; a mastery of a number of computer software packages that offer streamlined site administration in the areas of time and cost control; an appreciation of the scope and impact of quality assurance and risk management techniques and procedures.

Assessment: final examination 30 per cent, project submission 40 per cent, skills test 30 per cent

47449

INTRODUCTION TO ENVIRONMENTAL ECONOMICS AND LAW

CEE
3cp; 3hpw
prerequisite: 47142 Environmental Engineering
subject coordinator: A/Prof G O'Loughlin

The subject will provide students with an understanding of ecological sustainability and two of the key strategies environmental law and environmental economics by which it may be achieved. The development of environmental legislation as a means of containing environmental damage will be described, and more contemporary developments towards addressing the core issues of sustainability through both national and, increasingly, international legislation will be evaluated. Difficulties in applying standard economic approaches to environmental goods will be discussed, and methods of incorporating environmental considerations more effectively into economic frameworks will be reviewed. Such approaches will be illustrated through case studies. More complex reconciliations yet to be made between ecology and economy will be detailed. Further developments in environmental law and economics which may be needed to achieve ecological sustainability will be highlighted.

Assessment: assignments (3) 30 per cent, group project and presentation 40 per cent, quizzes (2) 30 per cent

47450

THE BUILT ENVIRONMENT

CEE
3cp; 3hpw
prerequisite: 47142 Environmental Engineering
subject coordinator: Mr K Halstead

Urbanisation as currently practised has very adverse environmental consequences. This course will take an ecological approach to evaluating the various systems which comprise the contemporary city. Effects of urbanisation on the hydrological cycle, on energy and other materials use will be examined in terms of their environmental costs, and alternative technological or strategic approaches will be considered. The relationship between wildlife and urban development will be addressed and ways to optimise urban wildlife values are discussed. The effect of current transportation systems will be examined and alternative strategies considered. The particular environmental problems associated with manufacturing industry, waste disposal and development in coastal areas will be reviewed and more environmentally appropriate strategies proposed. The extent to which change towards more sustainable urban forms can be assisted by legislative and planning initiatives, for example total catchment management, will be addressed. Finally consideration will be given to the processes of political, social and institutional changes.

Assessment: assignments (3) 30 per cent, major report and presentation 40 per cent, quizzes (2) 30 per cent

47452

POLLUTION CONTROL AND MANAGEMENT

CEE
3cp; 3hpw
prerequisite: 47142 Environmental Engineering
subject coordinator: A/Prof S Vigneswaran

This subject introduces students to solid and hazardous waste management and air and noise pollution control. The first part of this subject will provide a good understanding of the management of solid and hazardous waste: quantity, quality and trends; collection, transfer and disposal; waste reduction, recycle and recovery; solid and hazardous waste management strategies in NSW. The second part of this subject will examine air and noise pollution arising from various industrial and urban sources and the control methods. Particular attention will be given to the legal framework and management strategies for air and noise pollution control.

Assessment: mid-term quiz 20 per cent, final quiz 40 per cent, assignments (4) 20 per cent, laboratory (2) 20 per cent

47465

ENVIRONMENTAL HYDRAULICS

CEE/CE
3cp; 3hpw
prerequisite: 47145 Hydraulics
corequisite: 47155 Hydrology
subject coordinator: Dr M Patarapanich

This subject extends the coverage of hydraulics in earlier subjects to the study of hydraulic aspects of environmental systems, such as water distribution networks and sewers, and water bodies receiving pollution loads. It is intended to give students a grounding in water supply and sewerage practice, and to provide a foundation for understanding receiving water models describing rivers, lakes, estuaries and aquifers.

Assessment: exercises and assignments 50 per cent, quiz and examination 50 per cent

47476

LAND CONSERVATION

CEE
3cp; 3hpw
prerequisite: 47146 Soil Mechanics
subject coordinator: Dr P Hazelton

This course gives an overview of geotechnical aspects of environmental engineering. It concentrates on two areas of prime concern – land degradation through soil erosion and through

groundwater contamination. In the soil erosion section of the course, water erosion resulting from engineering works is discussed and the methods of controlling erosion are detailed. In the groundwater contamination section, the principles of contaminant flow in soil and rock are explained and methods of numerical modelling are treated. Students are encouraged to apply the subject matter through typical design examples.

Assessment: mid-term quiz 30 per cent, final quiz 50 per cent, assignments (4) 20 per cent

47482

WASTE MINIMISATION

CEE
3cp; 3hpw
prerequisite: 47142 Environmental Engineering
subject coordinator: A/Prof S Vigneswaran

The course will stress an integrated approach to waste minimisation through the consideration of product life cycles, using clean technologies. Strategies will be presented which address waste minimisation opportunities during materials extraction and refinement, product design, manufacture, use and disposal. Methods such as waste minimisation assessment and environmental auditing will be described and existing institutional, policy and legislative frameworks for waste minimisation in Australia and abroad evaluated. Institutional, economic, political, technological, socio-cultural/psychological barriers to the more efficient use of the waste minimisation concept will be considered. Illustration of the issues raised will be by way of case studies.

Assessment: three assignments 20 per cent each, two quizzes 40 per cent each, major project and presentation 40 per cent

47997

PROFESSIONAL EXPERIENCE (SANDWICH)

47999

PROFESSIONAL EXPERIENCE (PART-TIME)

CE/SE/CEE
subject coordinator: Dr G Ring

This is the Professional Experience subject for Civil, Structural, and Civil and Environmental Engineering degrees. Enrolment in it indicates that the student is currently obtaining industrial experience. Ninety weeks of approved industrial experience must be gained prior to graduation.

Students must become familiar with the Faculty's industrial experience requirements and rules which are set out in this handbook under the heading 'Industrial Experience Requirements'.

48010

INTRODUCTION TO MANUFACTURING

BT
4cp; 3hpw
subject coordinator: A/Prof C T Mathews

Provides students with a broad perspective on Australian manufacturing and its role in the world, to help students make the transition to professional studies in a university setting.

A brief history and analysis of manufacturing are presented in an economic and political context. Students explore the scope of manufacturing in Australia through interviews, site visits, and literature research.

Assessment: assignments 100 per cent

48011

COMPUTING FOR MANUFACTURING AND MANAGEMENT

BT
4cp; 4hpw
subject coordinator: Assoc Lecturer C P Killen

Aims to familiarise students with the use of the basic software and hardware

of computers, especially personal computers, and to start to develop in students an appreciation of the wide uses made of computers by engineers. This is the first subject in the Computing, CADD, CAM, CIM strand of subjects, and as such, lays the foundations for this important sequence.

The computer is introduced as an aid to communication and a means to solve engineering problems. The main emphasis is on personal computers and popular applications. The topics covered include the operating system, word processing, spreadsheets, databases, simple graphics and elementary programming.

Assessment: assignments 40 per cent, examination 60 per cent

48020

COMMUNICATION IN MANUFACTURING AND MANAGEMENT

BT
4cp; 3hpw
subject coordinator: Mrs H T McGregor

Covers the various aspects of the communication process in a manufacturing engineering context. Students participate in workshop sessions to develop written and oral skills. Basic communication theory is used as a foundation for practical work in research techniques, designing and producing letters, reports, discussion papers and other simple engineering documents. Oral skills are developed through conferences, seminars, interviews, meetings, debates and small group discussions.

Assessment: assignments 100 per cent

48021

NUMERICAL METHODS

BT
4cp; 4hpw
prerequisite: 48011 Computing for Manufacturing and Management
subject coordinator: A/Prof C T Mathews

Builds on the students' knowledge of mathematics in the following areas and covers the basic numerical techniques used in subsequent subjects. This subject will cover the following topics: linear algebra, vectors, statistics, curve fitting. Basic numerical methods will be introduced. The main computational resources used will be scientific calculators and PC spreadsheets.

Assessment: assignments 40 per cent, final examination 60 per cent

48022

MATERIALS FOR MANUFACTURING

BT
4cp; 3hpw
prerequisite: 65026 Chemistry
subject coordinator: A/Prof C T Mathews

Builds on the knowledge of materials and materials testing from the Associate Diploma. It provides students with an understanding of the use of materials in manufacturing. Properties, behaviour, application and testing of common engineering materials. Particular emphasis will be placed on newer materials, including ceramics and composites. Ferrous and non-ferrous metals and plastics will also be treated. Factory visits will be an important part of the subject.

Assessment: assignments 20 per cent, laboratory and visit reports 20 per cent, examination 60 per cent

48030

THE INDUSTRIAL ENVIRONMENT

BT
4cp; 3hpw
prerequisites: 48020 Communication in Manufacturing and Management
subject coordinator: Dr D Cobbin (School of Physical Science)

Concentrates on people-related aspects of management in manufacturing. The psychology and sociology of small group behaviour will be an important theme as many companies organise local sections of their plant staff around small groups.

The subject deals with the Australian manufacturing sector, covering the following topics: the history, evolution, national and international context and

significance of manufacturing, employment analysis, relevant government policies, industrial relations, occupational health and safety, the implications of moving towards ecologically sustainable development.

Assessment: assignments 70 per cent, final examination 30 per cent

48031

COMPUTER-AIDED DRAWING AND DESIGN

BT
4cp; 4hpw
prerequisite: 48021 Numerical Methods
subject coordinator: Assoc Lecturer C P Killen

Develops an understanding of computer-aided drafting and design technology, including relevant computer algorithms and geometry modellers, and develops skills in appropriate areas of application such as geometric tolerancing, 2D sectional properties and 3D mass properties.

Students are introduced to the use of computers in 2D drafting and 3D wireframe, surface and solids modelling. These modelling techniques are then applied to determine 2D section properties and 3D mass properties. The drafting and modelling techniques are further used in Computer-aided Manufacturing and Design for Manufacturing subjects.

Assessment: assignments 25 per cent, projects 50 per cent, examination 25 per cent

48040

MANAGEMENT FOR MANUFACTURING

BT
4cp; 3hpw
prerequisites: 48020 Communication in Manufacturing and Management, 48030 The Industrial Environment
corequisite: 24221 Principles of Marketing
subject coordinator: Dr R B Ward

The aim is to integrate management activities in the Australian manufacturing environment and prepare the student for management situations. The overriding feature of the subject is management decision making by use of examples in the fundamental functions of management: planning, organising, leading and controlling applied to manufacturing. Examples will include inventory management.

Assessment: assignments 60 per cent, participation 10 per cent, examination 30 per cent

48041

COMPUTER-AIDED MANUFACTURING

BT
4cp; 4hpw
prerequisite: 48031 Computer-aided Drawing and Design
subject coordinator: Prof F B Swinkels

Develops an understanding of computer-aided manufacturing technology in the areas of coordinate measurement, sheet metal application, machine tool programming and data communication and control.

Topics covered include coordinate measurement for CAD/CAM data analysis and verification; sheet metal manufacturing programming for flat pattern creation, nesting of flat patterns and punchpress operation; NC programming for point-to-point machining, planar milling and surface milling; and data communication and transfer for various CAM processes.

Assessment: assignments 25 per cent, projects 50 per cent, examination 25 per cent

48050

ENGINEERING DOCUMENTATION

BT
3cp; 3hpw
subject coordinator: Mrs H T McGregor

Further develops students' communication skills by investigating the role of information as a corporate resource. Students consider documentation as both a process and a product and develop management strategies to apply basic communication theories to the development of integrated information systems.

The subject covers the various aspects of the documentation process in a manufacturing context. Students participate in workshop sessions to develop written, oral and graphic skills required to produce efficient and effective documents. Basic communication theory is used as a foundation for practical work in designing and producing a variety of corporate documents using different media including text, graphics, computer systems and multimedia.

Assessment: assignments 100 per cent

48051

METROLOGY AND INSPECTION

BT
3cp; 3hpw
prerequisite: 48040 Management for Manufacturing
subject coordinator: Dr Y P Bhasin

Builds on students' basic knowledge of measurement and gives detailed exposure to using a wide range of measuring instruments.

The subject will cover principles of measurement mechanical, optical and pneumatic comparators; slip gauges, line and end standards; angular measurement; measurement of straightness, flatness and alignment; screw thread measurement; measurement of surface texture; machine tool testing; coordinate measuring machines; and other measuring systems.

Assessment: assignments 20 per cent, laboratory 40 per cent, examination 40 per cent

48052

PROFESSIONAL REVIEW

BT
3cp; 2hpw
prerequisite: 48040 Management for Manufacturing
subject coordinator: A/Prof C T Mathews

Focuses the students on their past work experience and requires them to plan their professional development for the five years after their graduation.

The subject includes the following topics: recording and reporting on their industrial experience, drawing up a five-year learning contract, recording and reporting on their employing company's structure, the main activities of the company, its strategic objectives, its policies on training and R&D and its policies on occupational health and safety.

Assessment: assignments 80 per cent, seminar 20 per cent

48053

TECHNOLOGICAL CHANGE AND STRATEGIC PLANNING

BT
3cp; 2hpw
prerequisite: 48040 Management for Manufacturing
subject coordinator: A/Prof C T Mathews

Aims to give students insight into company strategic planning policies and an understanding and appreciation of technological change, especially with respect to the Australian manufacturing industries.

The subject deals with the Australian manufacturing sector, covering the following topics: a brief overview of technological change from Sung China to the 20th century, Kondratieff cycles, invention and innovation, research, design and development, energy and other resources, trading blocks, multinational companies, strategic planning, government policies on education, research and industrial development.

Assessment: assignments 70 per cent, final examination 30 per cent

48060

QUALITY FOR MANUFACTURING

BT
3cp; 3hpw
prerequisite: 48051 Metrology and Inspection
subject coordinator: Dr Y Bhasin

Provides basic knowledge of Quality Assurance. On completion of this course, the student will be able to understand the concept and principles

of quality control techniques and implement the systems to improve the quality of any process. The subject will cover quality organisation, process control, process capability, cusum charts, standards for acceptance sampling, incoming material control, quality circles, inspection strategies, reliability systems and reliability testing.

Assessment: assignments 30 per cent, examination 70 per cent

48061

DESIGN FOR MANUFACTURE

BT
3cp; 3hpw
prerequisite: 48041 Computer-aided Manufacturing
subject coordinator: A/Prof R M Spencer

The subject will attempt to bring together techniques and concepts developed in earlier subjects and provide a framework in which modern process design of manufacturing systems takes place to produce low cost quality products.

The design process is evaluated in areas such as: material selection in design, process selection in design, concurrent engineering, design by features, group technology, and variational geometry/parametric modelling.

Assessment: assignments 25 per cent, projects 25 per cent, examination 50 per cent

48062

TEROTECHNOLOGY (MAINTENANCE MANAGEMENT)

BT
3cp; 2hpw
prerequisites: 48040 Management for Manufacturing, 48050 Engineering Documentation, 48051 Metrology and Inspection
subject coordinator: Dr Y P Bhasin

Provides the student with basic knowledge of the management of maintenance in manufacturing industry, by introduction to current procedures, processes, philosophy and equipment, to prepare the student for managing the repairs to, replacement of, and value of, industrial assets and property.

The subject includes brief revision of the financial considerations of asset management, such as Nett Present Value and Depreciation, the economics of repair versus replacement, and how maintenance relates to an enterprise as a whole. Under a range of appropriate conditions it covers items such as the effect of design on maintainability, the relationship between plant availability for production and maintenance, maintenance strategies and their dependence on situations, maintenance planning, condition monitoring, failure analysis, loss control, and the organisation, operation and costing of a maintenance department.

Assessment: assignments 60 per cent, participation 10 per cent, examination 30 per cent

48501

INTERNATIONAL PRACTICE OF ENGINEERING 1

BE/BA
8cp
prerequisites: 99014 Language and Culture 4, 99015 Contemporary Society 1
coordinator: Dr S Parsanejad

This subject will be undertaken while at an overseas location and will feature a total immersion approach to cultural awareness and language skills development linked to the study of the practice of engineering in the overseas location. Where possible, it will include practical work experience.

48502

INTERNATIONAL PRACTICE OF ENGINEERING 2

BE/BA
24cp
prerequisite: 48501 International Practice of Engineering 1
coordinator: Dr S Parsanejad

This subject will be undertaken while at an overseas university as an exchange student studying subjects relevant to the study of the practice of engineering in

the host country and to the field of UTS engineering studies.

48503

REVIEW OF OVERSEAS EXPERIENCE

BE/BA
3cp; 2hpw
prerequisite: 48502 International Practice of Engineering 2
coordinator: Ms H McGregor

Guides students through the process of experiential learning; to ensure that they achieve the maximum benefit from their international experience, and to provide opportunities for individual students to draw on the overseas experiences of other students.

The subject provides a forum for both entering and returning students to share their international experiences, to draw on their collective resources, to support and encourage each other, and to contribute to planning for the ongoing development of the course. Professional career planning and life-long learning techniques are developed.

Assessment: assignments 100% (research papers, learning proposals, oral and written reports and career plan)

48504

AUSTRALIAN ENGINEERING ON THE INTERNATIONAL SCENE

BE/BA
3cp; 2hpw
prerequisite: 48502 International Practice of Engineering 2
coordinator: Ms H McGregor

The subject explores concepts of engineering ethics and professionalism, legal, political and commercial systems, and economics in an international context. Issues in diversity, leadership, and sustainable development are discussed. Past and present engineering developments are evaluated and their impact on the world discussed. The subject extends the cultural awareness developed throughout the course to help students consider possible and probable futures. The subject will draw from a number of resources including the expertise of Australian engineers working in the international scene.

Assessment: assignments 100 per cent (research papers, oral and written reports)

48505

PROJECT

BE/BA
10cp
prerequisite: 48502 International Practice of Engineering 2
coordinator: Dr S Parsanejad

Provides students with an opportunity to focus attention and work on an issue of relevance to the practice of professional engineering in an international or global setting.

The project may include any aspect of the international practice of engineering relevant to the cultural studies and/or engineering interests of the student. The project may be linked to the BE project requirement, but in such cases, the BA component of the project must be readily identifiable and assessable. The project will be developed in consultation with the Program Director. Students may work on a project either individually or in groups. These groups might include non-engineering students enrolled in relevant IIS programs.

Assessment: project report 100 per cent

51131

COMMUNICATIONS 1

CE/SE/CEE
3cp; 3hpw
subject coordinator: Ms K Fry

The objectives are to help students understand the format, structure and conventions of technical, written and speech reporting; to apply these skills to the writing of professional papers; and to alert students to the principles of communication inherent in speech, writing, listening and reading situations.

Assessment: one essay 25 per cent, one report 25 per cent, oral report 25 per cent, quiz 25 per cent

51161

COMMUNICATIONS 2

CE/SE/CEE
3cp; 3hpw
prerequisite: 51131 Communications 1
subject coordinator: Ms K Fry

The objectives are to help students nearing graduation to communicate effectively in speech and writing with the wide range of people encountered not only in the workplace but also with those beyond the employing organisation; to emphasise to students the difficulties of communicating technical detail to those lacking in either the expertise or the 'culture of engineering'; to help students articulate in a public way the concerns and viewpoints of the engineer in society; and to strengthen and reinforce students' understanding and techniques in technical research writing and organisational reporting.

Assessment: report 25 per cent, seminar 25 per cent, class assignments 25 per cent, quiz 25 per cent

52001

HISTORY OF IDEAS

EE/CSE
3cp; 3hpw

Designed to familiarise students with major currents in social thought in a global context, as a grounding for later years and advanced units pertinent to professional practice.

54230

ABORIGINAL SOCIAL AND POLITICAL HISTORY

6cp; 3hpw
School of Humanities

The subject is a campus-wide elective. It will examine and analyse the impact of colonialism on indigenous peoples, with particular reference to the Aboriginal inhabitants of this region. The emergence of Aboriginal social and political movements will be presented as the basis for repossession of traditional heritages in land and culture.

Assessment: participation 10 per cent, minor essay (1500 words) 30 per cent, major essay (2500 words) 60 per cent

59325

SCIENCE TECHNOLOGY AND HUMAN VALUES

EE/CSE/ET
8cp; 3hpw

Introduces students to a range of literature interpreting the sciences and technologies. To develop in students concepts of social and ethical responsibility in the practices of scientific and technological development. To enable students to develop their own perspectives on a range of issues that relate to applications of science and technology. To provide consideration of human values and social issues as they are discussed within and beyond various scientific and technological discourses.

Assessment: major project 60 per cent, scientific or technical issue review 20 per cent, participation 20 per cent

65023

ENGINEERING CHEMISTRY

CEE/CE/SE and MEE/MSE
6cp; 6hpw

This subject provides students with the basic knowledge of chemistry needed for understanding engineering materials and processes. It covers the following topics: mole concept, stoichiometry, structure of the atom, atomic spectra, periodic table, chemical bonding, electrochemistry and corrosion, gas laws, change of state, colloids, solution equilibra, basic organic chemistry, polymers and the structure of solids.

Assessment: laboratories 10 per cent, quizzes 30 per cent, final examination 60 per cent

65026

CHEMISTRY

BT
4cp; 3hpw
subject coordinator: Dr B Young (School of Physical Sciences, Chemistry)

Provides the basic knowledge of chemistry for understanding manufacturing processes.

Covers the following topics: electronic structure of the atom, periodic table, chemical bonding, states, stoichiometry, thermochemistry, aqueous solutions, metals, electrochemistry, organic chemistry. In covering these topics the following applications should be mentioned: water impurities, softening, seawater and desalination, cells, corrosion, combustion, oil and refined products, petrochemicals, polymers, food-simple chemistry and calorific values.

Assessment: assignments 30 per cent, examination 70 per cent

65071

CORROSION TECHNOLOGY FOR ENGINEERS

MEE
4cp; 3hpw
prerequisite: 65023 Engineering Chemistry
corequisite: 67021 Materials Engineering 1

Develops a practical understanding of corrosion processes and mitigation practice.

Provides a detailed survey of the various forms of corrosion, and the use of appropriate anti-corrosion techniques is discussed in terms of modern theory and practice. Some attention is given to the economics of alternative anti-corrosion methods. Lectures are complemented by extensive practical work which emphasises the applied nature of the subject. The subject extends the prior knowledge that students have of the mechanical behaviour of metals, so that corrosion resistance also is considered an important aspect of materials selection.

Assessment: laboratory reports 30 per cent, final examination 70 per cent

66032

GEOLOGY FOR ENGINEERS

CE/SE/CEE
3cp; 3hpw
subject coordinator: Dr S Sangameshwar

Introduces students to the areas of classical geology – rocks and minerals; landscape forming process; elementary rock mechanics.

Assessment: classwork 50 per cent, final examination 50 per cent

67021

MATERIALS ENGINEERING 1

MEE/MSE
4cp; 4hpw
prerequisite: 65023 Engineering Chemistry

Introduces students to the relationship between structure, properties, processing and applications of real materials relevant to mechanical engineering. Gives mechanical engineering students a basis for understanding of materials properties, selection, use and durability.

Introduction to metals, ceramics, polymers, and composites used in mechanical engineering, structures, defects, phase diagrams, nucleation, diffusion, dislocations, annealing, mechanical properties, fracture, polymers, polymerisation, adhesives, corrosion, durability, basic processing methods for materials. Design and materials selection for mechanical engineers.

Assessment: laboratory 25 per cent, quizzes 25 per cent, final examination 50 per cent

67022

MATERIALS SCIENCE FOR ENGINEERS

CE/SE/CEE
3cp; 3hpw
corequisite: 65023 Engineering Chemistry
subject coordinator: Dr W Yeung

This is the first of several subjects in the course which deal with the behaviour of civil engineering materials under various service conditions and loads. The subject provides the student with a basic understanding of properties of

materials which is essential for their selection, design, use and durability. It covers the fundamentals on which more advanced materials subjects as well as design subjects in later stages are built.

Assessment: assignments and laboratory reports 30 per cent, quizzes 20 per cent, final examination 50 per cent

67023

MATERIALS TECHNOLOGY

EE/ET
3cp; 3hpw
prerequisite: 68031 Engineering Physics 1 (Electrical)

Develops the student's familiarity with commonly used electrical engineering materials to the extent that he/she would classify them in order of hardness, strength, thermal and electrical conductivity, density, dielectric constant and permeability.

Materials covered include ferrous and non-ferrous metals, plastics and ceramics. The subject includes the topics of measurement of material properties, joining techniques. General production techniques and the selection methods are covered but the emphasis is placed on the properties and selection of metals ceramics, polymers and composites in electronic devices and instruments.

Assessment: laboratory work 20 per cent, assignment 5 per cent, quizzes 25 per cent, final examination 50 per cent

67061

MATERIALS ENGINEERING 2

MEE/MSE
4cp; 4hpw
prerequisites: 67021 Materials Engineering 1, 46220 Solid Mechanics 1
corequisite: 46820 Engineering Statistics

This is a design-oriented subject concerned with predicting material behaviour under various operating conditions. These operating conditions include the environment, the loads and the expected life. The subject uses mathematical models of material behaviour based on theoretical considerations where these are known, or on empirical relationship which have been found to work in practice. Topics include fracture mechanics, fatigue, stress relaxation, creep and creep-rupture in metals and plastics, viscoelasticity, corrosion and the behaviour of adhesives and composites.

Assessment: tutorial assignments 10 per cent, laboratory reports 15 per cent, formal examinations 75 per cent

68011

ENGINEERING PHYSICS (MECHANICAL)

MEE/MSE
4cp; 4hpw
prerequisite: 33121 Engineering Mathematics 1A

Provides the students with a good basis in thermal physics, waves and optics, electricity and magnetism, which will be developed further in later courses.

This is a foundation physics course for mechanical engineering students. It covers the fundamentals of thermal physics, wave motion including sound and light, and electricity and magnetism.

Assessment: class tests 20 per cent, laboratory reports 20 per cent, final examination 60 per cent

68012

ELECTRICAL ENGINEERING 1 (MECHANICAL)

MEE/MSE
4cp; 4hpw
prerequisites: 68011 Engineering Physics (Mechanical), 33122 Engineering Mathematics 1B

Introduces the basic theory of electricity and magnetism and the theoretical and practical aspects of electrical machines. The subject includes a study of magnetic fields and the force exerted by magnetic fields on currents, magnetic fields resulting from current flow and current flow resulting from changing magnetic fields; permanent and electromagnets; magnetic materials and circuits; transients and AC circuit theory; three-phase systems; single and three-phase transformers; DC

generators and motors; three-phase induction motors and synchronous motors.

Assessment: laboratory work 25 per cent, assignments 10 per cent, class tests (2) 20 per cent, final examination 45 per cent. To pass this subject, students must score at least 40 per cent in the final examination.

68021

ENGINEERING PHYSICS (CIVIL)

CE/SE/CEE
6cp; 6hpw
corequisites: 33121 Engineering Mathematics 1A, 47117 Statics
subject coordinator: A/Prof P F Logan

Forms the essential foundation for the civil and structural engineering degrees. It seeks to provide the student with a good basis in dynamics, waves and optics, thermal physics, and electricity and magnetism which will be further developed in later subjects. Students are introduced to the basic techniques of measurement.

Assessment: laboratory 17 per cent, continuous assessment 23 per cent, final examination 60 per cent

68022

ENGINEERING PHYSICS (CIVIL) (PART-TIME)

CE/SE/CEE
3cp; 3hpw
corequisites: 33121 Engineering Mathematics 1A, 47117 Statics
subject coordinator: A/Prof P F Logan

Forms the essential foundation for the civil and structural engineering degrees. It seeks to provide the student with a good basis in dynamics, waves and optics, thermal physics, and electricity and magnetism which will be further developed in later subjects. Students are introduced to the basic techniques of measurement.

Assessment: laboratory 17 per cent, continuous assessment 23 per cent, final examination 60 per cent

68031

ENGINEERING PHYSICS 1 (ELECTRICAL)

EE/CSE/ET
6cp; 6hpw

Students will master the fundamental concepts of static and dynamic mechanics, fluid mechanics and thermal physics and gain a deep understanding of the nature and application of the concepts of power and energy; students should be able to understand the process of scientific method, set up and conduct experiments to test hypotheses and correctly interpret results.

It is a foundation physics subject for Electrical Engineering students. It covers the fundamentals of dynamics and statics, fluid mechanics and thermal physics. Students are introduced to the basic techniques of measurement.

Assessment: continuous assessment 20 per cent, laboratory work 20 per cent, final examination 60 per cent

68032

ENGINEERING PHYSICS 2 (ELECTRICAL)

EE/CSE/ET
3cp; 3hpw
prerequisite: 68031 Engineering Physics 1 (Electrical)

Provides the student with a good basis in waves and optics, atomic and nuclear physics and magnetism which will be further developed in later subjects. Particular emphasis is placed on developing in students a deep understanding of wave phenomena in preparation for later subjects such as electromagnetics, field and waves, power apparatus and systems.

Assessment: continuous assessment 20 per cent, laboratory work 20 per cent, final examination 60 per cent

68033

ENGINEERING PHYSICS 3 (ELECTRICAL)

EE
3cp; 3hpw
prerequisites: 68032 Engineering Physics 2 (Electrical), 67023 Materials Technology

An introduction to the properties of materials such as conductors, dielectrics and magnetic materials. Some statistical methods for analysing complex systems are presented, and the practical relevance of these to materials with engineering applications is emphasised.

Assessment: laboratory work 30 per cent, assignments 20 per cent, quiz 10 per cent, examination 40 per cent

68034

ELECTRICAL POWER GENERATION

EE
3cp; 3hpw
prerequisite: 68031 Engineering Physics 1 (Electrical)

This is a basic subject on energy and power for electrical engineering students. It covers the laws of thermodynamics: T-S diagrams; different thermodynamic cycles including the Otto. Diesel and steam engines; refrigeration cycles, thermal generation technology; nuclear reactors; nuclear fusion; MHD; solar energy; alternative energy including wind, hydro, waves, tidal and geothermal; the distribution and storage of energy including pumped storage and batteries; the efficient use of energy; pollution; the economics, politics and planning of energy production and use.

68035

COMMUNICATIONS PHYSICS

EE
3cp; 3hpw
prerequisites: 45144 Electronic Devices and Circuits, 45145 Engineering Statistics, 45264 Fields and Waves
corequisite: 45152 Signal Theory 2

Basic aspects of electromagnetic wave propagation and attenuation in specific media. Real boundary problems, distributed source and multiwavelength effects; involving interference, diffraction, reflection, and image formation and processing. Waveguides and optical fibres. Sources and detectors of radiation. Electro-optic, acousto-optic and integrated optoelectronics.

Assessment: assignments 15 per cent, laboratory work 25 per cent, quiz 15 per cent, examination 45 per cent

79370

LAW AND CONTRACTS FOR MANUFACTURING

BT
3cp; 2hpw
prerequisites: 48030 The Industrial Environment, 48040 Management for Manufacturing, 48050 Engineering Documentation
corequisite: 48053 Technological Change and Strategic Planning
subject coordinator: Mr M Adams (School of Law)

Provides students with basic knowledge of management in the commercial engineering environment, prepares students for the procedures and processes of operating and negotiating contractual matters as a client, consultant, or contractor.

Assessment: assignments 60 per cent, participation 10 per cent, examination 30 per cent

79371

LEGAL ISSUES IN TELECOMMUNICATIONS

ET
6cp; 3hpw
prerequisite: 45666 Communication Networks

Introduces engineering students to some of the legal issues which impact on providers of telecommunications services and products. After a brief coverage of general issues such as intellectual property, contract law and professional liability, the subject focuses on telecommunications law. The *Telecommunications Act 1992*, the *Radiocommunications Act 1992* and the *Broadcasting Services Act 1992* are each studied and the implications of the regulatory framework on business activity in telecommunications products and services is investigated.

Assessment: assignments 60 per cent, take home examination 40 per cent

91379

ENVIRONMENTAL SCIENCE FOR ENGINEERS

MEE
4cp; 3hpw

Provides a sound introduction to the principles and concepts of environmental science, so that students may gain an understanding of ecosystem dynamics, the human-induced disturbances to which such systems are subject, and approaches aimed at avoidance and remediation of damage caused to ecosystem and global balance.

Assessment: one seminar or poster presentation 30 per cent, one assignment-desk study 30 per cent, final examination 40 per cent

91650

INTRODUCTION TO ENVIRONMENTAL BIOLOGY

CEE
3cp; 3hpw
School of Biological Sciences

The aim of the subject is to provide a sound introduction to the principles and concepts of environmental science, so that students may gain an understanding of ecosystem dynamics, the human-induced disturbances to which such systems are subject and approaches aimed at avoidance and remediation of damage caused both at local ecosystem, and at the global level.

Assessment: one seminar or poster presentation 20 per cent, one assignment–desk study 30 per cent, final examination 50 per cent

91651

ENVIRONMENTAL MICROBIOLOGY FOR ENGINEERS

CEE
3cp; 3hpw
prerequisite: 91650 Introduction to Environmental Biology
School of Biological Sciences

This subject introduces students to the nature of biological organisms classified as microorganisms and the significance of microbial activities for engineering considerations involving environmental impacts. The course will provide an overview of the growth characteristics of microorganisms and the environmental factors which influence microbial growth. This introduction will be developed into an appreciation of microbial activities in decomposition processes, in the transformations of elements in bio-geochemical cycles, and as potential pathogens in waters and groundwaters. The impact of microbial activities on wastewater treatment strategies and the stability of construction materials and in public health engineering and their potential use in bio-remediation and bio-reclamation will be discussed.

Assessment: assignments (3) 20 per cent, mid-term and final quizzes 50 per cent, major group projects and presentation 30 per cent

99011

INTERNATIONAL STUDIES: LANGUAGE AND CULTURE 1

99012

INTERNATIONAL STUDIES: LANGUAGE AND CULTURE 2

99013

INTERNATIONAL STUDIES: LANGUAGE AND CULTURE 3

99014

INTERNATIONAL STUDIES: LANGUAGE AND CULTURE 4

BE/BA
8cp; 5hpw
prerequisites: language proficiency and placement test
coordinated by the UTS Institute for International Studies

A sequence of four Language and Culture subjects designed to prepare UTS students for living in their culture or society of specialisation during their period of in-country study. In practical terms students cannot usually acquire a high degree of competence after studying a language part time for only two

years in a Sydney classroom and living in a country for an academic year.

Students who begin learning a language after entry to the International Studies Program can expect to learn language survival skills for their period of in-country study, and to lay a strong foundation for further language acquisition after graduation. Students with competence in or exposure to a language other than English before entry to UTS are also encouraged to follow the International Studies Program. However, to meet their needs each Language and Culture program may have a number of levels of entry.

Students will be expected to improve their language skills in speaking, comprehension, reading and writing. In exceptional circumstances students with an advanced working competence in a language may be exempted from further language study but required to substitute alternative units of instruction.

Further details are available from the Institute of International Studies.

Assessment: May be based on a variety of tests including oral and written examinations, language competency tests, and practical applications.

99015

INTERNATIONAL STUDIES: CONTEMPORARY SOCIETY 1

99016

INTERNATIONAL STUDIES: CONTEMPORARY SOCIETY 2

BE/BA
8cp; 3–4hpw
coordinated by the UTS Institute for International Studies

In the International Studies Program, students take two units of instruction which provide an introduction to the history, politics, economics and society of their chosen culture of specialisation.

Each specialisation has two Contemporary Society units.

Contemporary Society 1 is a more general introduction that locates the culture of specialisation in its intellectual context. Contemporary Society 2 provides a more detailed and specific introduction that attempts to identify not only the structures of politics, society and the economy, but also the more dynamic aspects.

No previous knowledge of the culture or language of specialisation is required, and all teaching will be conducted in English. These Contemporary Society units are offered in collaboration with the Faculty of Humanities and Social Sciences.

T5115

INTRODUCING ABORIGINAL CULTURES AND PHILOSOPHIES

6cp; 3hpw
School of Adult and Language Education

This subject is offered as an elective for students in all faculties. The subject will introduce students to Aboriginal culture and social organisation as expressions of Aboriginal cosmology. Contemporary Aboriginal culture will be presented as an evolving response to colonialism and as a reassertion of cultural empowerment.

UNDERGRADUATE SUBJECT NAMES IN ALPHABETICAL ORDER

POSTGRADUATE COURSES

THE GRADUATE SCHOOL OF ENGINEERING

INTRODUCTION

The Graduate School of Engineering (GSE) is responsible for graduate studies in the Faculty of Engineering. It provides a first point of contact for enquiries from current and prospective students, together with a range of services relating to graduate program management and administration. All postgraduate studies in engineering, by research or coursework, are coordinated by GSE Program Directors.

The GSE offices are located temporarily on Level 4 (street level) of Building 2 (which is contiguous with the Tower Building) at the City campus, Broadway. (In 1995, it is expected that the GSE will relocate on Level 7 in Building 2.) Names, location and contact details of Program Directors and Graduate Advisors are displayed prominently on GSE noticeboards adjacent to all Faculty and School offices.

All enquiries relating to graduate studies should be directed initially to the School's Graduate Studies Officer, Ms Beate Buckenmaier, who may be contacted between 10.00 a.m. to 1.00 p.m., and 2.00 p.m. to 5.00 p.m., Monday to Friday, and at other advertised times during enrolment periods. Telephone 330 2606, fax 330 2611.

GSE PROGRAMS

The GSE offers an extensive range of programs by research and/or coursework through its award and non-award courses. These have been developed to

Program Description	*Director in 1995*	*Telephone*
Telecommunications Engineering	A/Prof Aruna Seneviratne	330 2441
Engineering Management	A/Prof Jim Parkin	2638
Engineering Design	A/Prof Bijan Samali	2632
Local Government Engineering	Mr Ken Halstead	2640
Water Engineering	A/Prof Geoff O'Loughlin	2644
Groundwater Management	A/Prof Michael Knight	1984
Environmental Engineering and Management	A/Prof Vigi Vigneswaran	2641
Structural Engineering	Prof Steve Bakoss A/Prof Bijan Samali	2629 2632
Manufacturing Engineering and Management	A/Prof Bob Spencer	2660
Control Enginering	Mr Kel Stillman	2682
Energy Systems	Dr Guang Hong	2677
Energy Planning and Analysis	Dr Deepak Sharma	2422
Software Engineering	Prof Chris Drane	2390
Local Government Management	A/Prof Kevin Sproats	2643
Information Systems Engineering	A/Prof Athula Ginige	2383
Microwave and Antennae Engineering	Dr Ananda Sanagavarapu	2447
Power Systems/Power Systems Protection	Dr John Carmo	2338
Non-specialist and other programs in engineering	Dr Hung Chung (Civil) A/Prof Bob Spencer (Mechanical) Dr Venkat Ramaswamy (Electrical)	2637 2660 2418
Interdisciplinary programs	Prof Rod Belcher A/Prof Bijan Samali	2423 2632

match the requirements of engineers and other professionals, and provide opportunities for advanced studies and professional development in engineering or cross-disciplinary areas linking engineering with other disciplines. The character and quality of these programs are evidenced in their focus, structure, presentation, attendance flexibility and assessment practices.

GSE programs reflect current research strengths and interests in the Faculty, and change with time. Each is recognised by the appointment of a Program Director. In 1995, it is expected that programs will be available in each of the fields listed below. Further advice can be obtained from the appropriate Director.

COURSES AND COURSE CODES

The Faculty of Engineering offers a comprehensive range of award and non-award courses.

The degrees of Doctor of Philosophy (PhD) and Master of Engineering (ME) by thesis are offered in areas of current research, through programs in each of the schools in the Faculty.

Several courses are also offered at Master's level by coursework. These include separate Master's degrees in Engineering, in Engineering Management, in Engineering Practice, and in Technology; a Master's in Local Government Management, which is a joint course of the faculties of Engineering and Business; and a Master of Engineering (Telecommunications Engineering). Each can be taken full time or part time.

The PhD and Master of Engineering in Groundwater Management and the Graduate Diploma in Groundwater Management are offered through the National Centre for Groundwater Management, which operates jointly with the Faculty of Science and the Faculty of Engineering.

The Faculty offers a Graduate Diploma in Engineering available over one year full time or two years part time. In addition, the School of Civil Engineering offers a Graduate Diploma in Local Government Engineering, available on a two-year block-release pattern of attendance.

Various programs leading to the award of Graduate Certificates are available over one semester full time or two semesters part time.

The Faculty is also able to recognise, for credit towards some postgraduate awards, programs taken through the Australian Graduate School of Engineering Innovation (AGSEI), an Advanced Engineering Centre jointly established in 1992 by UTS and The University of Sydney, through their respective Faculties of Engineering, and a number of industry partners. Details of these programs can be obtained directly from AGSEI (telephone 299 5699, fax 299 5334); details of course credits for AGSEI programs are available through the Graduate School of Engineering at UTS.

Course codes for graduate programs are listed at the front of this handbook. Please note that course codes for graduate programs by coursework for commencing students in 1995 are different from those for continuing students. Please contact the Graduate Studies Officer, Graduate School of Engineering on 330 2606, for further information relating to course codes.

GENERAL INFORMATION

The following information is only an outline. Additional information is provided to all students upon enrolment.

SEMESTER PATTERNS

The Academic Year of the University is divided into two semesters: Autumn (March – June) and Spring (July – November).

All courses have their major intake in March, at the beginning of the academic year. Some places may be available in the second semester beginning in July, and potential mid-year applicants should contact the Graduate Studies Officer, Ms Beate Buckenmaier, on 330 2606 in April for initial advice.

In 1995, some subjects may also be offered in the Summer program (December 1995 – February 1996).

Research candidates may commence their studies at any time during the year.

ATTENDANCE AND ACADEMIC CREDIT

Available attendance patterns for coursework programs in any year will vary with the choice of subjects; normally, full-time or part-time attendance can be offered. Classes in most subjects are available in the evening. In some cases, however, it is necessary for part-time students to attend the University one afternoon a week or at other times.

Class attendance requirements vary with the courses. For many subjects, attendance during one semester at a weekly three-hour session is the standard requirement. Where appropriate, graduate subjects are also offered on a block release or intensive short-course basis.

Subjects offered on a block-release mode require the student to attend the University for a block of full-time study (usually two–three days) on a small number of occasions (usually three) during the semester. The interval between blocks allows time for self-directed study and application work.

Each subject also has a credit point rating denoting its academic value towards the award, as does research or project work not requiring regular class attendance.

The Faculty also offers a number of short Continuing Professional Education (CPE) courses, which can be taken without a formal assessment requirement. In certain circumstances, such courses may be eligible for credit towards an award course. However, courses completed without assessment cannot be aggregated for credit towards a University award. Information on these CPE courses is available separately.

DURATION OF COURSES

PhD programs are normally a minimum of three years' duration on a part-time basis and two years' duration on a full-time basis if the candidate holds a Master's degree by research, or four years part time, and three years full time for candidates with a Bachelor's degree.

Master's degree programs **by research** and thesis are normally of four semesters' duration on a full-time basis, or six semesters on a part-time basis. In some cases, a student with appropriate advanced study and/or relevant work experience may be permitted to complete the program in a shorter time.

Master's degree programs **by coursework** are normally of two-and-a-half or three semesters' duration on a full-time basis, or five or six semesters part time. Some Master's degree programs can be completed in one year (12 calendar months) by studying during the Summer program (December – February).

Graduate Diploma courses are of two years' duration on a part-time basis and one year's duration on a full-time basis.

Graduate Certificate courses are of one year's duration on a part-time basis and one semester's duration on a full-time basis.

RULES GOVERNING THE COURSES

Students will be subject to the Rules prescribed in the *Student Information Guide 1995* for graduate programs by coursework students and to the General Rules of the University.

Special note should be made of the Faculty's interpretation of the Rule concerning Unsatisfactory Performance. A student who:

1. records two failures in a graduate program by coursework; or
2. over any period of two semesters, fails to meet any concurrent experience or other requirements prescribed for the course; or
3. fails to meet any additional requirements prescribed under Rule 3.2.5

or Rule 3.2.6, within the period set down at the time of admission

will be required to show cause why registration should not be discontinued. The student must respond in writing, and the decision will be made by the Coursework Directors Committee of the Graduate School of Engineering.

APPLICATIONS FOR ADMISSION

Research degrees

In general, applications for most Doctoral and Master's by thesis programs will be accepted at any time and a decision advised as soon as possible. There is no firm closing date for these applications. However, as processing can sometimes be quite lengthy, applicants are advised to apply well in advance of the time they hope to commence their research. Please refer also to the detailed information on these courses in the following pages.

Coursework degrees

Application forms and supplementary application forms may be obtained from the Faculty of Engineering in Building 2, City campus; the UTS Information Service, Level 4, Tower Building, City campus; or the Inquiry Office, Level 5, Kuring-gai campus.

Admission to the courses is very competitive and applicants are advised to exercise care in completing the application forms. The offer of a place will be determined to a considerable degree on the basis of information supplied in this application.

Applications must be submitted to:
UTS Information Service
University of Technology, Sydney
Level 4, Tower Building, Broadway
telephone 330 1990

Postal Address:
PO Box 123
Broadway NSW 2007

The Closing Date for receipt of applications for all coursework degrees in 1995 is 30 November 1994.
Note: This represents a one-month extension of the normal 28 October closing date specified in other University documents.

Courses commence early March 1995.

Late applications

Late applications may be accepted for some postgraduate courses after the closing date. Applicants should contact the UTS Information Service to check which courses are still being offered.

The following conditions apply to all late applicants:

1. A non-refundable late application fee will be charged.
2. Subject to available class places, late applicants will be considered for offers only after on-time applications have been considered.
3. The nominal closing date for late applications is 31 January 1995. However, the University reserves the right to close late applications at any time for any course without prior notice.

Result of application

Applicants who apply by the appropriate closing dates will be advised of the outcome of their applications by mail in late December 1994 – January 1995.

ENGLISH PROFICIENCY

Applicants whose tertiary education was conducted in a language other than English will be required to demonstrate proficiency in the English language. The most effective way of doing this is by obtaining a satisfactory result in a recognised English test.

UTS prefers the IELTS (International English Language Testing System) test: an international test of English that is offered through Australian Education Centres and British Council Offices overseas. The IELTS test is available in Australia in all capital cities and many regional centres. For further information on IELTS contact UTS International Programs on Level 5, Tower Building at the City campus in person, or by telephoning 330 1531.

A satisfactory result on the IELTS test is a minimum overall band score of 6.5 with a minimum of 6.0 in the Writing section.

In some cases UTS will also accept TOEFL. A satisfactory result is a minimum of 570 with 4.5 in the TWE (Test of Written English).

An application for admission will not be considered until proficiency in English has been demonstrated.

DOCUMENTATION

An original or a certified copy of original documentation is required to support all applications. Failure to submit required documentation may delay or even jeopardise an applicant's admission to a course. Details of the documentation required are given on the application form. Applicants who are uncertain of the documentation required should contact the UTS Information Service.

Applicants with overseas qualifications are advised to contact the UTS Information Service to determine whether their qualifications lie within the University's assessment guidelines.

Those applicants who are subsequently advised that their qualifications lie outside the guidelines, may contact the following body to request an educational assessment of their qualifications:

National Office of Overseas Skills Recognition (NOOSR)
P O Box 25,
BELCONNEN, ACT 2616
telephone (06) 276 7644
or freecall 008 02 0086

As the processing of a NOOSR assessment may take some weeks, applicants are advised to contact the UTS Information Service well before the closing date of 30 November 1994 for assessment advice.

All applicants are encouraged to apply well in advance of the course closing date. Applicants who are applying for admission solely on the basis of professional qualifications and/or relevant experience are particularly encouraged to make an early application, as it is often necessary to interview such applicants.

EXEMPTIONS/CREDIT BY SUBSTITUTION

In certain courses, exemption from particular subjects, or credit by substitution, may be granted on the basis of prior studies. Candidates intending to apply for exemption or credit by substitution should submit an Application for Subject Exemption with their application for admission to the course. An application for subject exemption should be accompanied by an outline of the subjects or courses previously undertaken. A photocopy of the relevant extracts from the course handbook will suffice.

Application for Subject Exemption forms are available from the UTS Information Service, Level 4, Tower Building. Further information is available from the Graduate Studies Officer, Ms Beate Buckenmaier, on 330 2606.

The current exemptions/credit by substitution policies in the Faculty of Engineering are as follows:

for the Master of Engineering Management and the Graduate Diploma in Local Government Engineering courses:

1. There will be no exemption or credit by substitution on the basis of prior studies at undergraduate level.
2. Where students have completed postgraduate subjects equivalent to those in this course, they may be granted exemptions up to a maximum of half the course less one subject.
3. Where students have gained expertise in a subject by taking appropriate courses in the past, a subject in lieu may be granted. The student will be required to gain agreement from both the relevant Subject Coordinator and the Course Director on the question of expertise, and to agree with the Director on a suitable subject in lieu.

for other courses:

Exemptions or credit by substitution are not normally available.

ENROLMENT

Enrolment for postgraduate programs involving coursework takes place in late January or early February for the Autumn semester, and in late July for the Spring semester. Complete enrolment details are forwarded to successful applicants. Enrolment must be in person.

Block-release students from country areas who are enrolling in the Graduate Certificate of Environmental Engineering and Management, Graduate Diploma of Local Government Engineering and Master of Local Government Management may complete formal enrolment procedures by mail.

Enrolment for Doctoral and Master's by thesis programs, for those who do not apply in the normal admission period, is by arrangement with the Postgraduate Studies and Scholarships Office of the University.

DEFERMENT OF ENROLMENT

Deferment of enrolment is not allowed for postgraduate courses.

LEAVE OF ABSENCE

Leave of absence is not normally granted to students who have not completed the requirements for at least one subject in their course.

Leave of absence during candidature for one award is not normally granted for a total period exceeding two years.

FEES AND CHARGES

All students are required to pay compulsory student fees/charges at enrolment. Currently, these fees/charges are as follows:

Students' Association	A$ 43.00
UTS Union (General fee)	A$ 173.00
UTS Union (Entrance fee) (non-refundable)	A$ 20.00
Student accommodation levy	A$ 51.00
Student identification card charge (non-refundable)	A$ 6.00
TOTAL	A$ 293.00[1]

[1] Compulsory student fees/charges are subject to revision for 1995.

Students will be exempt from Union Fees if they hold and can produce either a UTS Union Life Membership Card, or a Certificate of Exemption at the time specified for enrolment. For further information, contact the University Union on 330 1145.

In addition to the above charges, most Australian-resident students are required to contribute towards the cost of their postgraduate education either through the Higher Education Contribution Scheme (HECS) or through the payment of postgraduate course fees.

A schedule of approved fees applying to Engineering courses in 1995 will be provided on enquiry to the Graduate School of Engineering. Full information on fees is included with offers of admission, or may be obtained in advance from the UTS Information Service, Level 4, Tower Building, Broadway.

INFORMATION FOR FEE PAYING OVERSEAS APPLICANTS

This section should be read in conjunction with the other sections of this booklet.

Students from countries outside Australia are able to enrol in certain full-time postgraduate programs at UTS on a fee-paying basis.

Fees for courses offered to fee-paying overseas students in 1995 will range from A$12,000 to A$16,500 per annum, depending on the course.

For further information on fee arrangements for overseas students, contact the UTS International Programs Office on 330 1531.

SCHOLARSHIPS

Students undertaking Graduate Diploma and Graduate Certificate courses

full time are eligible to apply for assistance under AUSTUDY. Further information and application forms are available from the Department of Employment, Education and Training.

Students wishing to undertake full-time study leading to the award of a Master's or PhD degree may be eligible for a scholarship at UTS. Scholarships available are listed below:

Scholarships for research programs:
Australian Postgraduate Award (Research)

University Doctoral Research Scholarship

R L Werner Postgraduate Research Scholarship

Scholarships for coursework programs:
Australian Postgraduate Award (Coursework)

Scholarships for study overseas:
Commonwealth Scholarship and Fellowship Plan

Commonwealth Scholarship and Fellowship Plan (New Zealand award)

Overseas Postgraduate Research Scholarship Scheme:
Citizens from all overseas countries (excluding New Zealand) are eligible. Further information and application forms are available from the International Programs Office, Level 5, Tower Building at the City campus.

The John Crawford Scholarship Scheme:
This is open to applicants from participating developing countries. Scholarships will be advertised early each year for the following academic year. Further information may be obtained from the Australian Diplomatic Mission or the Australian Education Centre in countries where scholarships are available. Application forms are not available in Australia.

Further information may be obtained from the Postgraduate Studies and Scholarships Office, Level 5, Tower Building on 330 1521.

ADVANCED ENGINEERING CENTRE

Australian Graduate School of Engineering Innovation Limited (AGSEI)

The Australian Graduate School of Engineering Innovation (AGSEI) was formed jointly by UTS, the University of Sydney and a number of industry members during 1992. AGSEI's establishment has been funded in part by the Commonwealth Government's Advanced Engineering Centres scheme, under policies intended to **'increase higher education's contribution to Australia's design and engineering capacities and to assist in the development of internationally competitive, value-added industries'.**

AGSEI's purpose is to help Australian enterprises build wealth-creating capability by combining the best of engineering and management into an effective culture of innovation. Its structure provides a basis for industry-university educational partnerships.

AGSEI offers modular course programs, multidisciplinary in nature and strongly interactive with industry. These are expected to interest professionals in all sectors and from a range of disciplines, including engineering. Initially at least, programs are being directed at the experienced professional levels.

AGSEI builds specifically on the capability of engineers, and focuses on the organisation and application of engineering effort to innovation and business performance. Its programs cover topics central to the process of engineering such as product and process innovation, strategic planning, technology management, project management, systems and concurrent engineering, quality management, design, information engineering, computer-aided engineering, logistics engineering, human resources and change management, communication, professional business ethics, manufacturing, project financing, risk management, integrated marketing, contract management,

engineering economics, legal and government interfaces.

Participants may aggregate course modules towards the award of the Master of Engineering Practice and other postgraduate awards through the Faculty of Engineering and other faculties of UTS.

AGSEI programs are taken on a full-fee basis. Most modules include a course component, presented at AGSEI premises, and an applications project conducted within each candidate's own workplace under AGSEI guidance.

AGSEI modules are being developed continuously. In 1995, it is expected that these will include offerings of the following modules:

- Leading Process Innovation
- Achieving Innovation
- Managing Engineering Practice
- Innovating through People
- Project Risk Management
- Management Systems for Project Organisations
- Advanced Value Management
- Marketing Engineering Services
- Finance and Enterprise Wealth Creation
- Strategic Information Management
- Manufacturing Mangement
- Maintenance Management

Further details of AGSEI programs, together with advice on crediting them towards a UTS award, may be obtained from the Graduate School of Engineering, by contacting the Graduate Studies Officer on telephone 330 2606, fax 330 2611.

Doctor of Philosophy

The degree of Doctor of Philosophy (PhD) may be awarded to candidates who have completed an individual program of supervised research and submitted a thesis embodying the results of the work. The thesis must constitute a distinct contribution to knowledge, whether by original investigation or by review, criticism or design. A formal course of study or other work may also be prescribed.

Further details of the requirements are given in the Rules relating to Doctoral Degree Students, set out in full in the UTS *Calendar.*

The Faculty of Engineering has for many years offered research programs leading to the degree of Master of Engineering (by thesis). In common with the rest of the University, it has offered Doctoral supervision only within the last few years. In this short space of time a vigorous research culture has developed, assured in part by a large number of Doctoral candidates, most of whom are enrolled full time. This research culture has been strengthened with the establishment of the Graduate School. All candidates from the initial 1989-90 Doctoral cohort who have since submitted have been successful.

The Faculty's overall policy is one of close interaction with industry and the profession, and of seeking to contribute directly to the advancement of Australian engineering practice. Consequently, research programs of an applied nature, and those which involve a direct relationship with industry, are strongly encouraged. The greater proportion of research conducted by Faculty staff is supported from industry sources. There are a number of equally active programs of more basic research supported by granting agencies, and it is University policy to increase support from these sources.

ADMISSION REQUIREMENTS

To qualify for admission to PhD candidature, applicants should hold a Bachelor of Engineering degree with First Class Honours[1], or a Master of Engineering degree, from UTS or the former NSWIT; or must hold another qualification or meet other requirements deemed to be equivalent. Alternatively, an applicant may be permitted to register as a Master's degree student for the purpose of preparing for admission to Doctoral candidature, and may be permitted to transfer to Doctoral candidature upon satisfying prescribed requirements. Details are set out in the UTS *Calendar.*

Applicants for admission to graduate programs in Engineering should have a minimum of two years' experience in employment related to the course (or program) they wish to undertake[2]

[1] In these respects, Faculty of Engineering requirements are more stringent than those specified in the University Rules.

[2] The Faculty of Engineering requires all students to complete 90 weeks of approved Industrial Experience integrated with their academic studies as part of the Bachelor of Engineering degree requirements.

DURATION AND CANDIDATURE

Doctoral degree candidature may be undertaken on a full-time or part-time basis. The work may be carried out either on University premises, at a site external to the University, or some combination of both.

For full-time candidates, the program is normally of at least four semesters' duration for the holder of a Master's degree and six semesters for a holder of a Bachelor's degree. For part-time candidates, the program is normally of at least six semesters' duration for the holder of a Master's degree and eight semesters for the holder of a Bachelor's degree.

APPLICATIONS

In addition to the completed application form and supporting documentation, applicants must submit a covering letter indicating (a) why they wish to undertake the program and (b) the names, addresses and telephone numbers of two professional referees. The application and/or the letter must indicate (c) the proposed research topic and (d) the name of a member of academic staff with whom the topic has been discussed and who is willing to supervise the candidate's work; and should also include (e) any evidence of ability to conduct research and to complete a substantial project.

For part-time candidature, the applicant must also include (f) a statement from the applicant's employer, indicating the level of the employer's support for the application and the time allocation of the candidate to the research project.

It is important that formal applications are lodged after the intending candidate has made suitable enquiries within the Faculty. This is necessary in order to clarify an appropriate research area and to ensure that supervision is available, together with any equipment and laboratory facilities that may be required. Applications which are not supported by an indication of the proposed research topic and the name of a prospective supervisor will not be accepted.

Applications for PhD candidature are accepted at any time and are not subject to set closing dates (although their acceptance may be subject to admission quotas and to resource availability).

RESEARCH AREAS

Research programs are available in fields relating to each of the Faculty's three teaching schools (Civil, Electrical and Mechanical Engineering) and its associated teaching centres (Centre for Local Government Education and Research, National Centre for Groundwater Management, and the Australian Graduate School of Engineering Innovation); and in other inter- or intra-faculty fields through the Graduate School of Engineering.

A brief summary follows of research interests and opportunities in the three long-established teaching schools:

School of Civil Engineering: engineering materials, soils and foundation engineering, water engineering, road materials, public health engineering, local government engineering, structural analysis and design, timber engineering, prestressed and reinforced concrete, steel structures, environmental engineering, engineering construction and project management, FEM and computer applications, concrete technology, regional planning, road and transportation engineering.

School of Electrical Engineering: image processing, intelligent networks, video conferencing, ATM networks, protocol engineering, network management, digital transmission, multiple access schemes, spread spectrum communication, neural networks, information theory as applied to position fixing systems, software engineering, industrial applications of microwaves, microwave circuit design, antennas, digital signal processing in communications, digital systems design, electrical machines and industrial drives, power electronics, instrumentation and data acquisition systems, microhydroelectric control and instrumentation, power systems analysis, adaptive multivariable control, data encryption, speech and image coding, multimedia distributed databases, biomedical engineering.

School of Mechanical Engineering: advanced design, airconditioning, dynamics, biomedical engineering, energy conservation, engineering management, environmental protection, control engineering, fluid dynamics, heat transfer, machine tools, computer aids to manufacturing, computer-aided design and manufacture, robotics, stress analysis, fuels and combustion processes, technology for development, turbomachinery, viscoelastic materials.

Each of these Schools operates modern laboratories and research facilities on the City campus, Broadway. These are supported by extensive computing facilities and library services. The laboratories have excellent back-up workshops and support staff. Many opportunities exist for interesting and challenging research programs.

In addition, **the Graduate School of Engineering** supports research topics that are generic to engineering as a discipline (rather than to the fields of subdiscipline application represented by the three pre-existing schools); those that are essentially cross-disciplinary in nature but with an essential engineering involvement, for example, in engineering innovation, engineering communication or engineering economics; and those which focus on the practice and management of engineering. Candidates who wish to pursue research in engineering management would normally be accommodated through the Graduate School.

Most intending PhD candidates will be able to classify their area of research interest as falling primarily within one of these Schools, and should contact the relevant School directly to discuss their application.

ENQUIRIES

Initial enquiries may be made with the Graduate Studies Officer, Ms Beate Buckenmaier, on 330 2606.

Academic enquiries, such as the selection of an appropriate research topic, should be directed to the relevant Schools, as follows:

Civil Engineering:
Dr Ali Saleh
School of Civil Engineering
Building 2, Level 5, Room 517
telephone 330 2635 (voicemail),
fax 330 2633

Electrical Engineering:
Associate Professor Athula Ginige
School of Electrical Engineering
Building 1, Level 22, Room 2224
telephone 330 2393 (voicemail),
fax 330 2435

Mechanical Engineering:
Mr Lance Reece
School of Mechanical Engineering
Building 2, Level 4, Room 416
telephone 330 2587 (voicemail),
fax 330 2585

Graduate School of Engineering:
Professor W R Belcher
Head of School
Building 1, Level 24, Room 2419C
telephone 330 2423, fax 330 2695

ASSOCIATED CENTRES

The Faculty of Engineering is associated with several major centres in the University, which offer research opportunities in engineering and related fields. These include:

National Centre for Groundwater Management (operated jointly with the Faculty of Science). Research areas include: contaminated land evaluation and rehabilitation; groundwater quality management strategies for industrial, agricultural and urban use; contaminant transport and water resource modelling; optimisation; ground water geophysics and remote sensing; and hydraulic modelling with applications such as irrigation management.

Enquiries may be made to:
Associate Professor M J Knight
Centre Director
Room 1/1715, Building 1, City campus
telephone 330 1984, fax 330 1985

Centre for Local Government Education and Research (UTS, NSW TAFE, and the NSW Local Government Industry Training Committee; within UTS, the Centre has links with several faculties including Engineering and Business). Research areas relating to local government include: local and regional policy (development, planning, assessment), strategic planning and management, values and ethics, community participation.

Enquiries may be made to:
Associate Professor Kevin Sproats
Centre Director
Room 1/1714, Building 1, City campus
telephone 330 2643, fax 330 2274

Centre for Biomedical Technology (operated jointly with the Faculties of Science, Mathematical and Computing Sciences, and Nursing). Research areas relevant to engineering include: cardiac electrophysiology and technology, medical imaging, bio-mathematical modelling, medical instrumentation, diet management and optimal control of diabetes mellitus, optimal cancer therapies, and nursing-technology interfaces.

Enquiries may be made to:
Associate Professor H T Nguyen
Centre Director
Room 1/2517, Building 1, City campus
telephone 330 2451, fax 330 2435

Centre for Materials Technology (jointly with the Faculty of Science). Research topics relating to engineering include: development, characterisation and applications of advanced materials, including composites; materials processing, industrial applications of microwave energy.

Enquiries may be made to:
Dr J M Bell
Director, Centre for Materials Technology
Room 1/1210, Building 1, City campus
telephone 330 2213, fax 330 2219

Institute for Coastal Resource Management Enquiries should be made directly to the Faculty of Science.

Centre for Aquaculture (jointly with the Faculty of Science). Research areas relevant to engineering include: modelling of prawn aquaculture ponds, and waste effluent treatment.

Enquiries may be made to:
Associate Professor M J Knight
Centre Director
Room 1/1715, Building 1, City campus
telephone 330 1984, fax 330 1985

A complete list of centres with which the Faculty is associated may be obtained from the Graduate School of Engineering, by contacting the Graduate Studies Officer on 330 2606.

Master of Engineering (by thesis)

The degree of Master of Engineering (by thesis) may be awarded to candidates who have completed an individual program of supervised work and submitted a thesis embodying the results. A formal course of study or other work may also be prescribed.

In keeping with the Faculty's overall policies, the accent is on applied research and development work, although basic research proposals are also welcomed and supported. Topics which involve close cooperation with industry are very much encouraged, and a majority of current candidates are engaged in topics which are actively supported by their employers.

The degree has been established to provide practising engineers with an opportunity to pursue, in depth, the solution of an engineering problem which requires individual effort beyond the scope of a Bachelor's degree. The thesis must be a distinct contribution to knowledge in the area covered by the research. Its contents may report the results of an original investigation, review or criticise some aspect of engineering knowledge, or present an engineering design or solution involving the application of new or known techniques to an engineering problem of significance.

ENTRY REQUIREMENTS

To qualify for admission to candidature for a Master's degree (by thesis), applicants must hold a Bachelor of Engineering degree from UTS or the former NSWIT, or another qualification deemed to be equivalent. In special circumstances, engineers who do not possess a degree or equivalent may be admitted to the program if they can provide evidence of general and professional qualifications which will satisfy the Academic Board that they possess the educational preparation and capacity to pursue graduate studies.

Applicants who do not meet the requirements for admission to candidature for a Master's degree (by thesis) may be admitted as Master's qualifying students, for the purpose of preparing for full candidature.

Further details are given in the Rules relating to Master's degree (by thesis) students, set out in full in the *Student Information Guide 1995.*

DURATION AND CANDIDATURE

Candidature may be on a full-time or part-time basis. The work may be carried out either using Faculty facilities, or in an industrial location.

For full-time candidates, the program is normally of at least four semesters' duration from the time of registration as a Master's degree candidate. For part-time candidates, duration is normally at least six semesters. Candidates who are specially qualified in the relevant discipline may be allowed to complete the program in less than the normal minimum time.

APPLICATIONS, RESEARCH AREAS AND ASSOCIATED CENTRES

Please refer to the corresponding sections under Doctor of Philosophy, which apply identically to ME (by thesis).

FEES

All Australian-resident **part-time** candidates commencing a Master's by Research course at UTS are liable to pay HECS. Australian-resident **full-time** candidates are expected to be exempt in 1995.

ENQUIRIES

Initial enquiries should be made with the Graduate Studies Officer by telephoning 330 2606. Academic enquiries, such as the selection of an appropriate research topic, should be directed to the relevant schools (see details in corresponding sections under **Doctor of Philosophy**).

Master of Engineering (by coursework)

AIMS OF THE COURSE

The course provides opportunity at Master's level for professionally qualified engineers, including recent graduates, to extend in depth and breadth the knowledge and skills gained from their undergraduate studies.

Each program must be designed to enhance technological knowledge pertaining to one or more fields of engineering. The completion of subjects and project work at advanced level is central to this requirement.

The course offers program flexibility combined with opportunities for articulation from a sub-Master's (i.e. Graduate Certificate or Graduate Diploma) to a Master's level award.

ADMISSION REQUIREMENTS

An applicant for admission to candidature for the Master of Engineering degree shall either:

a) be a graduate in Engineering of the University of Technology, Sydney or the New South Wales Institute of Technology; or

b) hold a degree or equivalent from another higher education institution, deemed to be equivalent to the Bachelor of Engineering degree of UTS.

Experience in the practice of engineering comparable with that required for a first degree in Engineering from UTS is essential.[1]

In selection for places, preference will be given to applicants holding an Honours degree who can show that their chosen program of study will assist them in furthering a demonstrable employment responsibility or career objective.

Applications for admission by internal transfer of candidature from a Graduate Certificate or Graduate Diploma in Engineering may be considered, following completion of subjects totalling at least 20 credit points at a level of performance approved by the Faculty Board in Engineering as evidence of ability to undertake Master's candidature.

[1] The Faculty of Engineering requires all students to complete 90 weeks of approved Industrial Experience integrated with their academic studies as part of the Bachelor of Engineering degree requirements.

DURATION

Nominally 1.25 years (or 2.5 semesters) full time or 2–3 years part time. Full-time programs may be completed in 12 months by studying during the summer months (December to February).

The credit point requirement for course completion is 60cp (see below).

ATTENDANCE

Attendance may be on a full-time or part-time basis. Candidates in concurrent employment as professional engineers will wish to attend on a part-time basis which the Faculty will accommodate through a combination of evening, block release, weekend and other modes. Full-time attendance will be welcomed for candidates who have been released by their employers for the purpose of approved or sponsored study.

DEGREE REQUIREMENTS AND COURSE STRUCTURE

A candidate for the degree shall complete coursework subjects and a major individual project[1], totalling 60 credit points.

The program of study for each candidate shall have regard to the purpose and coherence of subject selection and the integration of course and project work. Within this framework, the Faculty Board in Engineering, on advice from its Graduate School, may from time to time introduce program concentrations that require students to complete a number of prescribed subjects with or without opportunity for electives. In these cases, the area of program concentration will be recognised on the candidate's academic record.

Subjects selected shall be drawn from those offered by the Faculty of Engineering of UTS, other faculties at UTS, other faculties of engineering (including the University of Sydney, the University of New South Wales and the University of Western Sydney), and other institutions approved by the Academic Board. Not less than 50 per cent of total credit points must be completed through subjects offered and/or a capstone project supervised by the Faculty of Engineering at UTS. The capstone project must be supervised by a principal supervisor who is a member or adjunct member of academic staff of the Faculty of Engineering of UTS.

Subjects shall generally be from among those designated as postgraduate. Undergraduate subjects may be included only where they were not included in the course leading to a candidate's primary qualification and where they can be shown to represent material relevant to career development. Undergraduate subjects may not in any event total more than 12 credit points.

[1] In special circumstances, to be approved by the Faculty Board in Engineering, a candidate may be allowed to complete the degree by undertaking a group project.

CREDIT

Subjects taken through any faculty of UTS shall be credited towards the degree at the credit-point values established for them by the University.

The credit-point weighting for the capstone project will lie within the range 18–24cp.

The following provisions are additional to the University's normal Advanced Standing provisions:

- Credit to be granted for subjects taken through providers other than UTS shall be determined by the Faculty Board of Engineering, on the advice of the Head of the Graduate School of Engineering.
- Postgraduate subjects offered by the Faculty of Engineering of the University of Sydney, the University of New South Wales and the University of Western Sydney, or other universities by arrangement, may be credited towards the degree to a maximum value of 24 credit points.

PROGRAM AND SUBJECT AVAILABILITY

The Faculty offers program concentrations in specialised fields relating to its research activities. These may change from time to time in number or available areas of study.

Programs are available in fields relating to each of the Faculty's three teaching schools (i.e. Civil, Electrical and Mechanical Engineering) and its associated teaching centres (Centre for Local Government Education and Research, Centre for Groundwater Management and the Australian Graduate School of Engineering Innovation); and in other inter- or intra-faculty fields through the Graduate School of Engineering. Advice on available program concentrations in any year may be obtained initially on enquiry to the Faculty of Engineering, through the Graduate Studies Officer.

Subjects offered by the Faculty of Engineering and available to ME candidates, and illustrative examples of program concentrations, appear in this handbook. Attention should be paid to the prerequisite requirements of particular subjects. Subjects offered by other faculties of UTS are published in the respective faculty handbooks. Enquiries in respect of these, and of subjects offered by other institutions, may be directed in the first instance to the Graduate Studies Officer in the Faculty of Engineering.

PROGRAM SELECTION

Each candidate's program of study shall be determined in consultation with an academic adviser and shall require the approval of the Head of the Graduate School of Engineering or other person designated by the Faculty Board in Engineering. Approval shall include arrangements for the supervision of project work.

Each individual program must comprise a coherent selection of subjects and project work, of demonstrable relevance to the Aims of the Course set out above.

The Head of the Graduate School of Engineering – or a candidate's academic adviser – will consult with other faculties to identify subjects offered by them that may be relevant to an individual program. Approval to take subjects offered by other universities, within the limits established above, will normally be granted in circumstances where an equivalent subject is not available through UTS.

Prior to undertaking the capstone project, each candidate will be required to submit a comprehensive project definition, as a basis from which the objectives and scope of the work will be agreed together with the credit-point value to be given to the project.

ASSESSMENT

The award of the degree will be ungraded.

In existing UTS subjects, assessment procedures will be as already established or as modified by the appropriate authority from time to time.

Emphasis will be placed where appropriate on self-directed experiential learning and criterion-referenced assessment in the development and review of the Faculty's postgraduate subjects.

SUPERVISION OF CAPSTONE PROJECT

Responsibility for supervision of the capstone project for the degree will rest with the Head of the Graduate School of Engineering, or with a person designated by the Head of the Graduate School as Director of Studies for the ME.

The capstone project must be supervised by a principal supervisor who is a member or adjunct member of staff of the Faculty of Engineering of UTS. Industry-based projects are strongly encouraged, particularly for part-time candidates with employer sponsorship, and will require formal co-supervisory arrangements.

Candidates and supervisors of project work are expected to follow principles and practices consistent with those described in the University's Code of Practice for Master's Research Students and Supervisors, available from the Faculty of Engineering through the Graduate Studies Officer.

Applicants will be advised of the individual subjects to be offered in 1995 during December 1994.

FEES

Fees apply to this course. At the time of printing, the 1995 course fee for Australian resident candidates has not been determined. A schedule of approved fees is available on enquiry to the Graduate Studies Officer, on 330 2606.

Master of Engineering in Telecommunications Engineering

The course is designed to enable graduates of electrical or computer engineering to develop an in-depth specialisation in one of the telecommunications technologies currently emerging. Experienced graduates will also find the course attractive as a means of keeping current with the technologies that are having such a profound influence on their industry. Special features include the opportunity to undertake a substantial Telecommunications Research Project and to participate in the industrially relevant research programs in place in the university.

ADMISSION REQUIREMENTS

Engineers wishing to enter the program must possess a First or Second Class Honours degree in Electrical or Computer Systems Engineering from an Australian university, or an equivalent four-year full-time degree. Applicants should have a minimum of two years' experience in employment related to the course.

Applicants are required to submit a covering letter indicating why they wish to undertake the course, the names, telephone numbers and addresses of two professional referees and, for part-time study, a statement indicating the level of their employer's support for the application. They also need to submit a detailed curriculum vitae with clear indication of the projects or work in the telecommunications or related industries that they have been involved in.

Prospective students who do not meet the entrance requirements may be invited to undertake qualifying study before commencing the Master's program. A qualifying program may comprise subjects totalling up to 45 credit points, and may specify a level of attainment.

Qualifying students who complete a total of 24 credit points in an approved program, with an average grade of Credit or better, may be accepted into the Master's program.

Students who do not attain a sufficient level of performance for admission to the Master's program, but who have completed subjects totalling the requisite numbers of credit points, may be awarded a Graduate Certificate or Graduate Diploma in Engineering.

Graduate Diploma students who complete all Master of Telecommunications coursework subjects, with an average grade of Credit or better, may be accepted into the Master's program. However, such acceptance cannot be guaranteed and should not be the motivation for initial enrolment in the Graduate Diploma course.

OVERVIEW OF THE COURSE

A candidate for the degree shall complete coursework and a research project, totalling 72 credit points.[1] This includes 30 credit points of core material, together with a research project with a weighting of 36 credit points. The remaining credit-point requirements are met through the completion of one or more approved elective(s).

The following coursework subjects are presently offered at the rate of two per semester; but since the actual program of subjects may vary, the current program should be requested from the Graduate Studies Officer.

49202	Communication Protocols	6cp
49204	Teletraffic Engineering	6cp
49205	Transmission Systems	6cp
49201	Integrated Services Networks	6cp
49203	Telecommunications Signal Processing	6cp
	Elective	6cp

The elective may be chosen from any approved subject offered through Graduate School of Engineering or graduate level subjects offered by the faculties of Mathematical and Computing Sciences or Business.

[1] The credit-point requirements for the research project may be adjusted in 1995 to allow completion of the degree with 60 credit points.

ATTENDANCE

Some lectures will be held in the evening, for three hours, and some will be offered in three, two-day modules, with students to undertake independent computer assignments and reading programs between modules. Formal examination will be conducted at the end of each semester. Students will also undertake a research project. Excellent facilities for computer-aided design, hardware development and system simulation are available at the University.

Each of the subjects may be undertaken independently as a short course and later credited towards a Master's degree. For information on short courses, applicants should contact the Graduate Studies Officer on 330 2606.

DURATION

The minimum time for completion of the degree is three semesters for full-time candidates and five semesters for part-time candidates.

FEES

Fees apply to this course. At the time of printing, the 1995 course fee for Australian resident candidates has not been determined. A schedule of approved fees is available on enquiry to the Graduate Studies Officer, on 330 2606.

Master of Engineering in Groundwater Management

This course is offered through the National Centre for Groundwater Management and in collaboration with the Faculty of Science. The course is designed to enable students to develop specialist skills in the area of groundwater management including aspects of geology, hydrology, hydraulics and resource management. This provides a multidisciplinary perspective to issues of groundwater management.

ADMISSION REQUIREMENTS

Applicants must possess a degree in engineering from UTS or an equivalent qualification. Applicants are required to submit a curriculum vitae, and the names, telephone numbers and addresses of two professional referees.

ATTENDANCE

The course is offered on the basis of full-time attendance extending over one calendar year.

DURATION

The course requires full-time attendance for a series of lectures and laboratory work during Autumn semester and full-time project work during Spring semester. The time required to complete the project will be approximately 30 weeks, requiring students to continue project work until a satisfactory level of achievement has been attained.

MEGM COURSE STRUCTURE

		CP	HPW
Autumn semester			
66014	Hydrogeology	5	3
49550	Computing for Groundwater Specialists[1]	0	3
49555	Groundwater Modelling	5	3
66015	Hydrogeochemistry	5	3

49551	Surface Hydrology and Groundwater	5	3
	Elective 1	5	3
	Elective 2	5	3

Spring semester

44152	Groundwater Engineering Project	30	

Electives

66025	Contaminated Site Management	5	3
66017	Geopollution Management	5	3
66018	Groundwater Geophysics	5	3
49554	Groundwater Computing	5	3
66016	Geophysics and Remote Sensing of Groundwater Resources	5	3
	An approved subject offered elsewhere	5	3

[1] This is a non-credit subject available to students whose computing background requires strengthening.

ENQUIRIES

Enquiries should be directed to:

Associate Professor Michael Knight
Director
National Centre for Groundwater Management
Building 1, Room 1715
telephone 330 1984
fax 330 1985

Master of Engineering Practice

AIMS OF THE COURSE

The course provides opportunity, through cooperative education, for practising engineers to extend in depth and breadth the knowledge gained through their undergraduate studies and initial professional experience. Individual course programs are selected from the range of graduate subjects offered by the Faculty of Engineering at UTS, other faculties at UTS, and other institutions approved by the Academic Board.

Each program must be designed to enhance capability in the professional practice of engineering, and understanding of the context in which engineering is practised. It must relate to a real industrial or professional setting, normally that of the enterprise in which the candidate is employed; to interfaces with the other professions which form the overall enterprise; and to the contribution of engineering to the enterprise and to the social and economic context in which it operates. A program may, but need not, include in-depth extension of technological knowledge; but this alone will not be sufficient.

ATTENDANCE AND DURATION

Attendance may be on a full-time or part-time basis. Most candidates will be in concurrent employment as professional engineers and will wish to attend on a part-time basis. Where possible, subjects may be made available in block release or other mode designed to meet the needs of practising professionals. Full-time attendance will be welcomed for candidates who have been released by their employers for the purpose of approved or sponsored study.

The nominal duration of the course is three years part time or one-and-a-half years full time.

ADMISSION REQUIREMENTS

An applicant for admission to candidature for the Master of Engineering Practice shall either:

a) be a graduate in Engineering of the University of Technology, Sydney or the New South Wales Institute of Technology; or

b) hold a degree or equivalent from another higher education institution, deemed to be equivalent to the Bachelor of Engineering degree of UTS.

In addition, applicants will normally be expected to demonstrate experience in the practice of engineering that meets the requirements, as laid down from time to time, for corporate membership of The Institution of Engineers, Australia. Currently, these require a minimum of three years of professional practice. In selection for places, preference will be given to applicants who can show that their chosen program of study will assist them in furthering a demonstrable employment responsibility or career objective.

Applications for admission by internal transfer of candidature from a Graduate Certificate or Graduate Diploma in Engineering may be considered, following completion of subjects totalling at least 24 credit points at a level of performance approved by the Faculty Board in Engineering as evidence of ability to undertake a Master's candidature.

DEGREE REQUIREMENTS AND COURSE STRUCTURE

A candidate for the degree shall complete coursework subjects and a major project totalling not less than 72 credit points. Of this total, the major project shall comprise between 12 and 32 credit points, and typically 24 credit points.

The program of study for each candidate shall relate to the practice of engineering at an experienced professional level and shall have regard to the purpose and coherence of subject selection, the integration of course and project work, and the inclusion of substantial elements of interaction with professional practice.

Subjects selected shall be drawn from those offered by the Faculty of Engineering of UTS, other faculties of UTS, and other providers as noted below. Not less than 24 credit points must be completed through subjects offered and/or project work supervised by the Faculty of Engineering of UTS. The major project must be supervised by a Principal Supervisor who is a member or adjunct member of staff of the Faculty of Engineering of UTS.

Subjects shall generally be from among those designated as postgraduate. Undergraduate subjects may be included only where they were not included in the course leading to a candidate's primary qualification and where they can be shown to represent material relevant to career development. Undergraduate subjects may not in any event total more than 12 credit points.

CREDIT

The following provisions are additional to the University's normal Advanced Standing provisions.

Subjects taken through any faculty of UTS are credited towards the degree at their normal credit-point values established by the University. Credit to be granted for subjects taken through providers other than UTS is determined by the Faculty Board in Engineering.

Postgraduate subjects offered by the Faculties of Engineering of the University of Sydney and the University of New South Wales may be credited towards the degree to a maximum value of 36 credit points.

Subjects offered by the Australian Graduate School of Engineering Innovation Limited (AGSEI) may be credited towards the degree to a maximum value of 48 credit points, provided that:

a) AGSEI has current recognition by the Academic Board of UTS as a suitable provider; and

b) The Faculty Board in Engineering of UTS has approved each AGSEI subject unit concerned, and the arrangements for any project work.

The Academic Board may from time to time accredit other providers, and the Faculty Board in Engineering may accredit their programs, in a similar way.

SUBJECT AVAILABILITY

Subjects offered by the Faculty of Engineering and other faculties of UTS, and available for inclusion in programs of study within the Master of Engineering Practice course, are published in the respective faculty handbooks. Enquiries in respect of subjects and project work offered by other institutions may be directed in the first instance to the Graduate Studies Officer in the Faculty of Engineering.

PROGRAM SELECTION

Each candidate's program of study is determined in consultation with an academic adviser, and requires the approval of the Head of the Graduate School of Engineering or other person designated by the Faculty Board in Engineering. Approval must include arrangements for project supervision.

Each individual program must comprise a coherent selection of subjects and project work, of demonstrable relevance to the Aims of the Course set out above.

The philosophy of the course is one of cooperative education. Programs should maximise opportunity for industrially reinforced learning, based on adaptation and application of material provided through coursework. From time to time, the Faculty may introduce new subjects based upon existing postgraduate subjects but including an applications project for which additional credit may be appropriate.

The Head of the Graduate School of Engineering – or a candidate's academic adviser – will consult with other faculties to identify subjects offered by them that may relate to the practice of engineering and to the interfaces between engineering and other disciplines. In programs involving areas of advanced engineering technology, and subject to the requirement for cohesion within each program and to the overall aims of the course, candidates will be encouraged to consider the value of subjects offered by other universities which complement those available at UTS.

Prior to undertaking the major project, each candidate will be required to submit a comprehensive project definition, as a basis from which the objectives and scope of the work will be agreed together with the credit-point value to be given to the project.

ASSESSMENT

The award of the degree will be ungraded.

In existing UTS subjects, assessment procedures will be those normally applying to each subject.

In new subjects developed for the Master of Engineering Practice course, assessment will accord with the range of standard UTS practice but will allow for employer moderation where a component of the assessed work has been undertaken in an employment situation. In these circumstances, assessment practices consistent with self-directed experiential learning will be adopted.

Special regard will be paid to the encouragement and recognition of team work in selected subjects, particularly those of a cross-disciplinary nature. Where team activity is subject to assessment, the approach used will seek to ensure that each individual's contribution is properly identified.

Candidates will be required to prepare and submit an individual written report for their major project, and to present and defend its findings in a seminar, preferably involving employer participation.

In subjects offered by other institutions, the assessment practices will be as established by those institutions. In deciding whether to approve a subject offered by another institution for credit

towards the degree, the Faculty Board in Engineering will have regard to the method of assessment.

SUPERVISION OF MAJOR PROJECT

Responsibility for supervision of the major project for the degree will rest with the Head of the Graduate School of Engineering, or with a person designated by the Head of the Graduate School as Director of Studies for the MEP.

As noted, the major project must be supervised by a Principal Supervisor who is a member or adjunct member of staff of the Faculty of Engineering of UTS. Industry-based projects are encouraged, and will require formal co-supervisory arrangements.

FEES

Fees apply to this course. At the time of printing, the 1995 course fee for Australian resident candidates has not been determined. A schedule of approved fees is available on enquiry to the Graduate Studies Officer, on 330 2606.

Fees for subjects undertaken through the Australian Graduate School of Engineering Innovation Ltd (AGSEI) – see page 123 – are payable to AGSEI, at levels determined by AGSEI.

ENQUIRIES

Initial enquiries and expressions of interest in admission to this course can be made by telephoning the Graduate Studies Officer, Ms Beate Buckenmaier, on 330 2606.

Master of Engineering Management

The Master of Engineering Management (MEM) program places a greater emphasis on the interface between technology and management than does the traditional MBA. Whilst the MEM program is formally administered by the Faculty of Engineering, there is close collaboration with the Faculty of Business in its presentation and development.

The MEM program provides opportunity for engineers who seek career prospects in engineering management to undertake a formal course of relevant study at the Master's degree level. The course is designed for engineers or scientists who perform, or who aspire to perform, management tasks while maintaining currency in their technical specialities.

The Master of Engineering Management aims to equip its graduates with the ability to formulate technical strategies and successfully deal with the human aspects, organisation issues, project considerations and resource allocations at all phases of the life cycle of technical activities. It enhances skills for the comprehensive treatment of issues at the decision-making level, and focuses on the management of:

- basic and applied research
- development and design
- operations/construction/manufacturing
- technology transfer
- maintenance

The course comprises eight core subjects and either a project or four electives.

DURATION

The course requires 36 semester hours (72 credit points) of study. The program is structured for part-time attendance and is scheduled for two evening sessions per week for three years. An occasional attendance may be required outside the normal evening session times.

OVERSEAS STUDENTS

The MEM course is also available to fee-paying overseas students on a full-time basis, taking approximately one-and-a-half to two years to complete.

ADMISSION REQUIREMENTS

An undergraduate degree in engineering or other technological/applied science field is required for entry to the course. Applicants should have a minimum of two years' experience in employment related to the course.

Applicants are required to submit a covering letter indicating why they wish to undertake the program, a detailed curriculum vitae including the names, telephone numbers and addresses of two professional referees and a statement indicating the level of their employer's support for the application.

MEM COURSE STRUCTURE

		CP	HPW
Semester 1			
49003	Economics for Engineers	6	3
21718	Organisation Analysis and Design	6	3
Semester 2			
49005	Technological Change	6	3
21813	Managing People	6	3
Semester 3			
22747	Accounting for Managerial Decisions	6	3
49002	Project Management	6	3
Semester 4			
49001	Management Decisions	6	3
49004	Systems Engineering and Decision Modelling	6	3
Semester 5/6			
Electives: 4 subjects chosen from the following:			
79708	Contemporary Business Law	6	3
21779	Management Skills	6	3
24734	Managerial Marketing	6	3
25742	Financial Management	6	3
21720	Employment Relations	6	3
21728	Public Sector Management	6	3
21741	Operations Management	6	3

(two other graduate subjects may be substituted for one of the above electives by agreement)

or

44144	Major Project (24 credit points) over 12 months		

FEES

Fees apply to this course. At the time of printing, the 1995 course fee for Australian resident candidates has not been determined. A schedule of approved fees is available on enquiry to the Graduate Studies Officer, on 330 2606.

ENQUIRIES

Initial enquiries and expressions of interest in admission to this course can be made by telephoning the Graduate Studies Officer, Ms Beate Buckenmaier, on 330 2606.

Master of Technology

AIMS OF THE COURSE

The course provides a qualification at Master's level, in engineering or engineering-related areas, for persons professionally qualified as engineering technologists or as practitioners in fields related to engineering. It also provides a qualification at Master's level in areas combining engineering with another discipline.

The course offers program flexibility combined with opportunities for articulation from a sub-Master's (Graduate Certificate/Graduate Diploma) to a Master's level award. Each individual program should be designed to build on the candidate's previous qualifications and experience, either to develop a particular field of technology in depth or to explore relationships and interdependences between technology, engineering, and other disciplines and professions. The completion of subjects and project work at advanced level is central to these objectives.

In some individual cases, the course may provide opportunity to satisfy the educational requirements set by the Institution of Engineers, Australia, for registration as a professional engineer. In this regard, detailed advice should be sought before enrolment.

ADMISSION REQUIREMENTS

An applicant for admission to candidature for the Master of Technology degree shall either:

a) hold the degree of Bachelor of Engineering of the University of Technology, Sydney or the New South Wales Institute of Technology; or

b) hold a Bachelor or Honours degree from UTS or NSWIT requiring four years full-time study for completion in a cognate discipline (such as Applied Science, Computing, Building); or

c) hold a Bachelor or Honours degree or equivalent from another higher education institution, deemed to be equivalent to (a) or (b),

and shall have a minimum of three years practical experience, at a level commensurate with the above qualifications, in capacities that have involved close contact with engineering.

Applicants who have completed a first degree requiring less than four years full-time study are required to undertake a period of academic preparation, equivalent to the requirements applying to the award of a Graduate Diploma. Prior learning from continuing professional education, professional experience and professional achievement are taken into account.

In selection for places, preference will be given to applicants who can show that their chosen program of study will assist them in furthering a demonstrable employment responsibility or career objective.

Applications for admission by internal transfer of candidature from a Graduate Certificate or Graduate Diploma in Engineering may be considered, following completion of subjects totalling at least 20 credit points at a level of performance approved by the Faculty Board in Engineering as evidence of ability to undertake Master's candidature.

DURATION

Nominally one-and-a-quarter years (or two-and-a-half semesters) full time or two–three years part time. Full-time programs may normally be completed in 12 months by studying during the summer months (December to February).

The credit-point requirement for course completion is 60cp (see below).

ATTENDANCE

Attendance may be on a full-time or part-time basis. Candidates in concurrent employment will wish to attend on

a part-time basis which the Faculty will accommodate through a combination of evening, block release, weekend and other modes. Full-time attendance will be welcomed for candidates who have been released by their employers for the purpose of approved or sponsored study.

DEGREE REQUIREMENTS AND COURSE STRUCTURE

A candidate for the degree shall complete coursework subjects and a major individual project[1], totalling 60 credit points.

The program of study for each candidate shall have regard to the purpose and coherence of subject selection and the integration of course and project work.

Subjects selected shall be drawn from those offered by the Faculty of Engineering of UTS, other faculties of UTS, other faculties of engineering (including the University of Sydney, the University of New South Wales and the University of Western Sydney), and other institutions approved by the Academic Board. Not less than 50 per cent of total credit points must be completed through subjects offered and a capstone project supervised by the Faculty of Engineering at UTS. The capstone project must be supervised by a principal supervisor who is a member or adjunct member of academic staff of the Faculty of Engineering of UTS.

Subjects shall generally be from among those designated as postgraduate and shall include as a minimum postgraduate subjects totalling 48 credit points. Undergraduate subjects may be included only where they were not included in the course leading to a candidate's primary qualification and where they can be shown to represent material relevant to career development.

[1] In special circumstances, to be approved by the Faculty Board in Engineering, a candidate may be allowed to complete the degree by undertaking a group project.

CREDIT

Subjects taken through any faculty of UTS shall be credited towards the degree at the credit-point values established for them by the University.

The credit-point weighting for the capstone project will lie within the range 18–24cp.

The following provisions are additional to the University's normal Advanced Standing provisions:

- Credit to be granted for subjects taken through providers other than UTS shall be determined by the Faculty Board in Engineering, on the advice of the Head of the Graduate School of Engineering.
- Postgraduate subjects offered by the faculties of Engineering of the University of Sydney, the University of New South Wales, and the University of Western Sydney, or other universities by arrangement, may be credited towards the degree to a maximum value of 24 credit points.

PROGRAM AND SUBJECT AVAILABILITY

The Faculty offers program concentrations in specialised fields. These may change from time to time in number or available areas of study. Program selection is not confined to these concentrations.

Programs are available in fields relating to each of the Faculty's three teaching schools (Civil, Electrical and Mechanical Engineering) and its associated teaching centres (Centre for Local Government Education and Research, National Centre for Groundwater Management, and the Australian Graduate School of Engineering Innovation); and in other inter- or intra-faculty fields through the Graduate School of Engineering.

Subjects offered by the Faculty of Engineering and available to MTech candidates, and illustrative examples of program concentrations appear in this handbook. Attention should be paid to

the prerequisite requirements of particular subjects. Subjects offered by other faculties of UTS are published in the respective faculty handbooks. Enquiries in respect of these, and of subjects offered by other institutions, may be directed in the first instance to the Graduate Studies Officer in the Faculty of Engineering.

Individual subjects are offered on a demand basis. Generally, graduate classes are limited to a minimum of ten and a maximum of 30 students.

PROGRAM SELECTION

Each candidate's program of study shall be determined in consultation with an academic adviser and shall require the approval of the Head of the Graduate School of Engineering or other person designated by the Faculty Board in Engineering. Approval shall include arrangements for the supervision of project work.

Each individual program must comprise a coherent selection of subjects and project work, of demonstrable relevance to the Aims of the Course set out above.

The Head of the Graduate School of Engineering – or a candidate's academic adviser – will consult with other faculties to identify subjects offered by them that may be relevant to an individual program. Approval to take subjects offered by other universities, within the limits established above, will normally be granted in circumstances where an equivalent subject is not available through UTS.

Prior to undertaking the capstone project, each candidate will be required to submit a comprehensive project definition, as a basis from which the objectives and scope of the work will be agreed together with the credit point value to be given to the project.

ASSESSMENT

The award of the degree will be ungraded.

In existing UTS subjects, assessment procedures will be as already established or as modified by the appropriate authority from time to time.

Emphasis will be placed where appropriate on self-directed experiential learning and criterion-referenced assessment in the development and review of the Faculty's postgraduate subjects.

SUPERVISION OF CAPSTONE PROJECT

Responsibility for supervision of the capstone project for the degree will rest with the Head of the Graduate School of Engineering, or with a person designated by the Head of the Graduate School as Director of Studies for the MTech.

The capstone project must be supervised by a principal supervisor who is a member or adjunct member of staff of the Faculty of Engineering of UTS. Industry-based projects are strongly encouraged, particularly for part-time candidates with employer sponsorship, and will require formal co-supervisory arrangements.

Candidates and supervisors of project work are expected to follow principles and practices consistent with those described in the University's Code of Practice for Master's Research Students and Supervisors, available from the Faculty of Engineering through the Graduate Studies Officer on 330 2606.

FEES

Fees apply to this course. At the time of printing, the 1995 course fee for Australian resident candidates has not been determined. A schedule of approved fees is available on enquiry to the Graduate Studies Officer, on 330 2606.

Master of Local Government Management

This course is designed for individuals employed in local government in a range of occupational groups (e.g. administrators, community workers, engineers, health and building inspectors, librarians etc.) who aspire to senior executive positions in local government.

This course is administered jointly by the faculties of Engineering and Business, and draws also upon the resources of other faculties of the University.

ADMISSION REQUIREMENTS

Applicants are required to submit with their application a curriculum vitae and two letters: one indicating why they wish to undertake the course, and the other a statement indicating the level of their employer's support for the application.

A Bachelor's degree in a discipline appropriate to the activities of local government is a normal minimum requirement for admission.

It will be assumed that successful applicants will have a sound knowledge of the environment and operations of local government and will have demonstrated competence in a relevant functional and/or professional field.

Successful applicants would normally be expected to have a minimum of five years' relevant experience in a professional and/or administrative position following attainment of the minimum required educational qualifications for that position.

PROVISIONAL ADMISSION

Students who do not possess a degree or equivalent may be considered for provisional admission if they can demonstrate:

a) possession of other relevant post-secondary qualifications;

b) a minimum of five years' work experience at a senior level in local government; and

c) adequate preparation and capacity to pursue successfully postgraduate studies.

MLGM COURSE STRUCTURE

		CP
Semester 1		
49451	Environment of Professions in Local Government	6
21728	Public Sector Management	6
Semester 2		
49452	Environmental Management	6
21731	Resources Management	6
Semester 3		
49453	Infrastructure Management	6
	Project or elective (1 subject)	6
	or	
	Research Stream (1 subject)	6
Semester 4		
21729	Human Resource Management (Public)	6
	Project or Elective (1 subject)	6
	or	
	Research Stream (1 subject)	6
Semester 5		
	Project or Elective (2 subjects)	12
	or	
	Research Stream (2 subjects)	12
Semester 6		
49454	Managing Local Enterprise	6
21758	Strategic Management (Public)	6

The course builds upon the experience and expertise of the faculties of Business and Engineering at UTS, both of which have offered educational programs for many years for individuals in local government.

The course is offered by block-attendance mode, normally completed over three years (six semesters). All students will enrol in the Master's course. However, those who successfully complete the foundation of six subjects plus two elective subjects (or one elective and one

project subject) will be permitted to withdraw from the course and graduate with a Graduate Diploma in Local Government.

ELECTIVES

Students may submit for approval a portfolio of up to four elective subjects prior to enrolment in those subjects. Students will be counselled in selecting a balanced portfolio.

APPLIED RESEARCH STREAM

Students who demonstrate aptitude for research and who have gained a minimum average Credit assessment in the first four subjects of the course may be permitted to undertake a research stream (equivalent to four subjects). Students who have attained results of high quality may view this as preparation for a PhD.

WORK PROJECTS (ACTION LEARNING)

Students will have the option of undertaking an action learning project, equivalent to one subject. It will normally combine investigation and action in a real work situation in which both the employer and the University have an interest in the outcome.

SHORT COURSES

It is possible to accumulate limited credit for completion of approved short courses. This is limited to the equivalent of two subjects, termed Vocational Competencies 1 and 2. This is conditional upon:

- approval of the student's portfolio of short courses;
- completion of the short courses during the period of enrolment in the Master of Local Government Management. No credit will be allowed for short courses completed prior to enrolment.

ADVANCED STANDING

Subject to places being available, individuals who have completed the University's Graduate Diploma in Local Government Engineering at a minimum Credit level average may gain entry to this Master's course with advanced standing. Such students will be required to complete a further six subjects, normally over three semesters.

FEES

Fees apply to this course. At the time of printing, the 1995 course fee for Australian resident candidates has not been determined. A schedule of approved fees is available on enquiry to the Graduate Studies Officer, on 330 2606.

Graduate Diploma in Engineering

and

Graduate Certificate in Engineering

AIMS OF THE COURSE

The objective of each of these courses, offered on a Faculty-wide basis, is to provide practising professional engineers with an opportunity to extend their engineering knowledge beyond the subject areas covered in their first degree, and/or to update their knowledge and skills in line with recent advances in engineering, technology and business practice; and to provide graduates in cognate disciplines with the opportunity to undertake formal study in appropriate areas of engineering.

The courses may also be of value to immigrant engineers, already professionally qualified in their countries of origin, who are seeking orientation to Australian conditions and practice.

ADMISSION REQUIREMENTS

Applicants must possess either a recognised engineering degree or an equivalent qualification. In special cases, applications may be considered from non-engineering graduates whose careers bring them into close contact with professional engineering practice.

Applicants should have a minimum of two years' experience in employment related to the course.

Applicants are required to submit two letters with their application: one indicating why they wish to undertake the course, and the other a statement indicating the level of their employer's support for the application. They are also required to submit a detailed curriculum vitae and a description of their work experience.

In certain circumstances, consideration may be given to applicants not possessing formal academic qualifications, who are deemed to have suitable professional qualifications and experience to enable them to pursue graduate studies.

These courses do not guarantee admission to membership of the Institution of Engineers, Australia.

DURATION

The Graduate Diploma requires completion of subjects totalling 45 credit points, and may be taken on a two-semester, full-time basis or on a four-semester, part-time basis.

The Graduate Certificate requires completion of subjects totalling 24 credit points and may be taken on a one-semester, full-time basis or a two-semester, part-time basis.

ATTENDANCE

This will depend on the subjects chosen and on the number of subjects taken in each semester. For full-time attendance, most programs will be available predominantly in the daytime. For part-time attendance it will usually be possible to design suitable programs from subjects available predominantly in the evenings. Some subjects may be offered in block-release or weekend mode.

COURSE STRUCTURE

Students design their own program to suit individual needs. Program details are determined prior to enrolment, in consultation with, and with the approval of, an academic adviser appointed by the Head of the Graduate School. There is opportunity to choose from the broad range of graduate and undergraduate subjects offered by the University's nine faculties, class size quotas permitting.

The program of study for each candidate shall have regard to the purpose and coherence of subject selection. Within this framework, the Faculty Board in Engineering, on advice from its Graduate School, may from time to time introduce program concentrations that require students to complete a number

of prescribed subjects with or without opportunity for electives. In these cases, the area of program concentration will be recognised on the candidate's academic record.

In both cases, the program is normally completed entirely by coursework. For the Graduate Diploma, in exceptional circumstances approved by the Head of the Graduate School, it may be possible to include a project weighted at 12–18 credit points.

At least 60 per cent of the content of any individual program shall consist of subjects offered by the Faculty of Engineering.

Undergraduate subjects may be included only where they were not included in the course leading to a candidate's primary qualification and where they can be shown to represent material relevant to career development. They may not in any event total more than 60 per cent of the content of any individual program, as determined by the credit points awarded on completion of each subject.

Subject selection should be clearly related to a professional theme involving either an expansion of knowledge beyond the areas covered in the student's first degree, or an advance in skills resulting from recent developments in engineering and associated technologies and management practices.

TRANSFER TO MASTER'S DEGREE

Work undertaken under a Graduate Diploma or Graduate Certificate enrolment may be credited towards a Master's degree provided the requirements of the Master's degree are met in full, in terms of subject coverage and project weighting. For example, a candidate who had completed 45cp under Graduate Diploma enrolment and wished to credit this towards a 60cp Master degree, would still have to undertake a full 18–24cp project even if all 45cp of subjects were valid under the Master's requirement.

Completion of the requirements for the Graduate Diploma or Graduate Certificate in Engineering does not guarantee admission to Master's candidature. Eligibility for consideration may be subject to the attainment of a certain level of performance – typically, a Weighted Average Mark in completed subjects of at least 70 per cent (i.e. credit grade).

FEES

Fees apply to this course. At the time of printing, the 1995 course fee for Australian resident candidates has not been determined. A schedule of approved fees is available on enquiry to the Graduate Studies Officer, on 330 2606.

ENQUIRIES

Initial enquiries should be made to the Graduate Studies Officer, Ms Beate Buckenmaier, on 330 2606. Academic enquiries should be directed to schools, as follows:

Civil Engineering:
Dr H W Chung
School of Civil Engineering
Building 2, Level 5, Room 591
telephone 330 2637, fax 330 2633
Consultation hours: Wednesday and Friday, 10.00 a.m. – 12 noon.

Electrical Engineering:
Dr V Ramaswamy
School of Electrical Engineering
Building 1, Level 24, Room 2417A
telephone 330 2418, fax 330 2435
Consultation hours: Friday,
9.30 a.m. – 4.30 p.m.

Mechanical Engineering:
Associate Professor R M Spencer
School of Mechanical Engineering
Building 2, Level 6, Room 606
telephone 330 2660 (voicemail),
fax 330 2655
Consultation hours: Wednesday,
3.30 p.m. – 4.30 p.m.

Graduate Diploma in Engineering in Groundwater Management

This course is offered through the National Centre for Groundwater Management and is designed for students working in the area of groundwater resource management.

ADMISSION REQUIREMENTS

Applicants should possess a degree in engineering from UTS or hold equivalent qualifications. Applicants with other qualifications relevant to groundwater resource development may be accepted for admission, subject to approval by the Faculty Board.

ATTENDANCE

The course is offered on a full-time attendance pattern although students may extend their enrolment over more than one year.

DURATION

The course requires full-time attendance. It has a pattern similar to the Master of Engineering in Groundwater Management. However, the project work of the Spring semester is shorter and requires completion by the end of the teaching semester.

GDE(GM) COURSE STRUCTURE

		CP	HPW
Autumn semester			
66014	Hydrogeology	5	3
49550	Computing for Groundwater Specialists[1]	0	3
49555	Groundwater Modelling	5	3
66015	Hydrogeochemistry	5	3
49551	Surface Hydrology and Groundwater	5	3
	Elective 1	5	3
	Elective 2	5	3
Spring semester			
44153	Groundwater Engineering Project	15	

ELECTIVES

Same as for Master of Engineering in Groundwater Management course.

[1] This is a non-credit subject available to students whose computing background requires strengthening.

ENQUIRIES

Enquiries should be made to:
Associate Professor Michael Knight
Director, National Centre for Groundwater Management
Room 1/1715
telephone 330 1984
fax 330 1985

Graduate Diploma in Local Government Engineering

The objective of this course is to equip the professional engineer involved with local government, in particular local government employees, developers, consultants, employees in government enterprises and state public servants, with the understanding and expertise required for efficient and effective engineering development and/or management of technical services for which local government is responsible.

Graduates from this course will be well equipped to operate within the legal framework of a more open and responsive level of local government, having due regard for economic and environmental constraints.

DURATION AND ATTENDANCE PATTERNS

This course is offered on a block-release pattern of study, it being considered as the most appropriate method of presentation to accommodate the special needs of students living in country areas of the State. A total of 48 credit points must be accrued by completing six core subjects and two electives.

The normal attendance pattern is based on the student attempting two subjects per semester, whereby the student is able to complete the course in four semesters.

The student is required to attend the University (in Sydney) for a three-day block of full-time study (covering two subjects) on three occasions each semester.

ADMISSION REQUIREMENTS

Professional engineers making application to enter the course must possess a Bachelor's degree in Civil or Structural Engineering or hold an equivalent qualification acceptable to the Institution of Engineers, Australia.

Applicants must have obtained a minimum of two years' work experience in local government or of a similar nature. In this respect applicants must submit two letters with their application: one outlining why they wish to undertake the course, and the other indicating the level of support from their employer.

A comprehensive curriculum vitae is to be submitted, together with a detailed description of work experience, and evidence of eligibility for graduate membership of the Institution of Engineers, Australia.

In special circumstances, engineers who have been employed in senior positions within local government and do not possess a degree (or equivalent) may be admitted to the course of study if they submit evidence of professional qualifications and experience which satisfies the Faculty that they possess the educational base and have a capacity to pursue graduate studies. Consideration will be given to applicants possessing a degree in an area allied to civil engineering e.g. surveying, where applicants are employed in local government, and have considerable experience at a senior technical or managerial level.

In certain circumstances applicants will be required to attend for interview prior to consideration of their application for admission. It may be necessary for students to pursue an area of study to prepare for admission to the course.

GDLGE COURSE STRUCTURE

		CP	HPW
49101	Environmental Planning	6	3
49103	Management and Industrial Relations	6	3
49104	Asset Maintenance Management	6	3
49105	Water Supply and Wastewater Management	6	3
49106	Road Engineering Practice	6	3
49108	Local Government Law	6	3

ELECTIVES

49102	Traffic and Transportation	6	3
49107	Storm Runoff Regulation	6	3

Two additional electives will be on offer from other Graduate School programs for block-release attendance.

Consideration will be given to accumulation of credit points for the elective strand by completing approved specialist short courses offered by the Centre for Local Government Education and Research, or other universities.

FEES

Fees apply to this course. At the time of printing, the 1995 course fee for Australian resident candidates has not been determined. A schedule of approved fees is available on enquiry to the Graduate Studies Officer, on 330 2606.

ENQUIRIES

Initial enquiries should be made to the Graduate Studies Officer, Ms Beate Buckenmaier, on 330 2606.

Graduate Certificate in Environmental Engineering and Management

Environmental engineering and management is high on the political agenda. It also has a high professional priority. The Code of Ethics of The Institution of Engineers, Australia reminds its members that their responsibility '... for the welfare, health and safety of the community shall at all times come before their responsibility to the profession, to sectional or private interest or to other Engineers'.

This responsibility applies equally to scientists, town planners and other professionals working in this field. They have a compelling duty to ensure that the adverse effects of development on the total environment are minimised.

This course of four subjects deals with the broad aspects of environmental management relevant to practising professionals in engineering, science, planning, architecture, law, surveying, health and building. Completing the course will develop a background and competence in environmental management.

More specifically, it will develop an awareness of ecological processes; a sensitivity to the possible impacts of planned actions on the environment; an understanding of the issues related to monitoring and to reducing the impacts of those actions; and professional skills to work as part of an integrated team responsible for environment planning and management.

DURATION AND ATTENDANCE PATTERNS

This course is offered on a block-release pattern of study. The normal attendance pattern is based on two subjects per semester requiring a minimum of two semesters to complete the course.

The block-release pattern of study currently consists of three sessions per semester. Each session involves three days of full-time attendance covering two subjects per semester.

ADMISSION REQUIREMENTS

Normal educational qualification for admission is a Bachelor's degree in engineering, science, design, architecture, building, surveying or planning. Equivalent qualifications will be considered on their merits.

Provisional admission for graduates from disciplines other than those above will be available provided their education contained an adequate introduction to mathematics and physical sciences. Each application in these categories will be used as a selection criterion if acceptable applications outnumber available places.

Articulation with Master's program: Work undertaken in this Graduate Certificate enrolment may be credited towards a Master's degree provided the requirements of the Master's degree are met in full, in terms of subject coverage and project weighting. However, completion of the requirements for the Graduate Certificate in Environmental Engineering and Management does not guarantee admission to Master's candidature.

GCEEM COURSE STRUCTURE

		CP
Semester 1		
49122	Introduction to Environmental Engineering and Management	6
49121	Environmental Assessment and Planning	6
Semester 2		
49123	Waste Minimisation and Advances in Pollution Control	6
49124	Urban Water Quality Management	6

FEES

Fees apply to this course. At the time of printing, the 1995 course fee for Australian resident candidates has not been determined. A schedule of approved fees is available on enquiry to the Graduate Studies Officer, on 330 2606.

ENQUIRIES

Initial enquiries should be made to the Graduate Studies Officer, Ms Beate Buckenmaier, on 330 2606. Academic enquiries should be directed to Schools as follows:

School of Civil Engineering:
A/Prof S Vigneswaran
Room 2/523, telephone 330 2641

A/Prof G G O'Loughlin
Room 2/511C, telephone 330 2630

School of Physical Sciences:
Dr M Dawson
Room 4/105, telephone 330 1717

School of Design:
Dr J Broadbent
Room 6/610, telephone 330 8986

School of Biological and Biomedical Sciences:
A/Prof K Brown
Room GH 1.16, telephone 330 4042

POSTGRADUATE SUBJECT DESCRIPTIONS

Subject synopses are listed in numerical order for all the subjects offered in the Master of Engineering by coursework (ME), Master of Engineering Management (MEM), the Master of Technology (MTech), the Master of Local Government Management (MLGM), the Master of Engineering (Telecommunications) [ME (Tel)], the Master of Engineering in Groundwater Management (MEGM), the Master of Engineering and the Graduate Diploma in Local Government Engineering (GDLGE), the Graduate Diploma in Groundwater Management (GDGM) and the Graduate Certificate in Environmental Engineering and Management (GCEEM).

Groundwater Management subjects carry five credit points. Software Engineering subjects carry four credit points. All other subjects carry six credit points unless otherwise stated.

21718

ORGANISATION ANALYSIS AND DESIGN

MEM
6cp; 3hpw
coordinator: I Palmer, Faculty of Business

The central concern of this subject is to develop skills in organisational analysis and on the basis of this to develop diagnostic and prescriptive skills in regard to organisations. The content focuses on the description and analysis of organisations as formal structures, political systems and cultural entities.

21720

EMPLOYMENT RELATIONS

MEM
6cp; 3hpw
coordinator: K Spooner, Faculty of Business

An introduction to the areas of industrial relations and human resource management. The historical steps in the development of the human resource function and the forces which have shaped its development are examined. The major functions of employment relations managers are explored, as well as the relationship between the human resource and the industrial relations functions in the modern organisation. The nature of industrial relations and the various theoretical approaches to the subject are examined. A study is made of the nature of industrial conflict and the contribution to understanding made by several conflict theorists. The structure and functioning of the formal industrial tribunal systems in Australia are examined, as well as the form and function of the employer and employee organisations party to employment relations. The nature and impact of efficiency restructuring and enterprise bargaining upon the management of employment relations are also examined.

21728

PUBLIC SECTOR MANAGEMENT

MEM/MLGM
6cp; 3hpw
coordinator: J Johnston, Faculty of Business

Provides a broad conceptual framework for studying approaches to public sector management for any of the three levels of government in Australia. The move by governments away from the traditional public administration model towards a corporate management model for the public sector model presents many issues and dilemmas for managers. Students will explore, discuss and debate these issues through readings of contemporary literature and class presentations. Topic areas inlcude: catalysts for reform; mandates for change; resource management; commercialisation; corporatisation; privatisation; strategic management; performance management; marketing; project management and implementation; performance monitoring; accountability and evaluation; leadership, values and ethics; public service; and the future.

21729

HUMAN RESOURCE MANAGEMENT (PUBLIC)

MLGM
6cp; 3hpw
coordinator: R Van Munster, Faculty of Business

In this subject students examine the management and development of an organisation's most valuable resource, its staff. Human Resource Management is treated as primarily a line management function with specialist personnel satff acting in an advisory and support capacity. The subject deals, in the first instance, with the people aspect of management in terms of recruitment, selection and development of staff motivation and leadership. This is followed by a critical examination of HRM at the organisation level focusing especially on the strategic importance of the HRM function. Finally, current policies, practices and developments are examined in the context of the political, legislative and industrial relations framework of the public sector.

21731

RESOURCE MANAGEMENT

MLGM
6cp; 3hpw
coordinator: R Van Munster, Faculty of Business

Students develop practical management skills, from accounting and finance in: budget and cash management; cost control through variance analysis; cost minimisation through internal audit; cost-volume-profit analysis; financial statement analysis as applied to specialist settings in the public sector. Topics: current issues and implications for public and community managers from current legislation; management accounting; financial accounting; finance; and application of above to specialist settings.

21741

OPERATIONS MANAGEMENT

MEM
6cp; 3hpw
coordinator: D Davis, Faculty of Business

An introdiction to the management of operations. Topics: techniques for improving information and process flows; service operations; planning, scheduling and controlling production; materials management (including Just-in-Time philosophies, materials requirement planning); total quality management; benchmarking for best practice; process re-engineering; and manufacturing and service operations strategy.

21758

STRATEGIC MANAGEMENT (PUBLIC)

MLGM
6cp; 3hpw
prerequisite: completion of Stages 1-5
coordinator: J Johnston, Faculty of Business

Provides a comprehensive understanding of strategic management as it applies to the public sector. As a private sector technique, strategic management has been adopted by the public sector to enhance efficiency, effectiveness and economy of the public sector at a time of diminishing resources. Students will examine the normative model of strategic management which involves the development of a corporate mission, vision, outcomes, strategies and performance indicators. The less formal aspects which relate to power, behavioural and intuitive aspects of strategic decision making will be considered. The impact of the political environment on strategic management practices will also be explored. Students will work within the theoretical and conceptual frameworks of strategic management to critically assess contemporary strategic management practices in the public sector using corporate plans and case study material.

21779

MANAGEMENT SKILLS

MEM
6cp; 3hpw
coordinator: J Johnston, Faculty of Business

This subject deals experientially with the interpersonal skills needed by managers to lead teams successfully. It takes the individual's awareness of his/her skills and interpersonal style as its starting point and goes on to examine basic communication skills such as listening, counselling and nonverbal behaviour. Applied skills are then dealt with including interviewing skills, time management, goal setting, delegation, group facilitation and meetings management, decision making, conflict management and negotiating skills and organisational communication skills. There is some treatment of interpersonal communication theory.

21813

MANAGING PEOPLE

MEM
6cp; 3hpw

Theory and research from the social sciences are used to explore human behaviour at work. Students are introduced to the basics of individual psychology which is then critically applied to the fields of motivation and job design. The work of social psychology on group dynamics is presented and applied to the management of work groups and committees. Various theories of leadership are examined and critically assessed. The question of intergroup behaviour and conflict is discussed as is power and politics in organisations. The question of change in organisations draws upon much of the foregoing. The subject takes a critical approach to management theory and practice.

Assessment: case study 30 per cent, seminar paper and presentation 30 per cent, examination 40 per cent

22747

ACCOUNTING FOR MANAGERIAL DECISIONS

MEM
6cp; 3hpw

Introduces accounting to those who are not preparing for a career in accounting, but are going to use accounting information in their roles. Topics include both financial and management discounting; financial statements, balance sheet and income statement, financial statement analysis and understanding financial statements, the nature of management accounting, cost behaviour, differential accounting, capital budgeting, responsibility accounting and budgeting.

Assessment: class tests 40 per cent, assignment 20 per cent, final examination 40 per cent

24734

MANAGERIAL MARKETING

MEM
6cp; 3hpw

This subjects views marketing as a key managerial decision-making area, in particular relating the organisation and its environment. Drawing extensively on the literature in marketing management, the subject will adopt a case method approach to the exposition of the nature and complexity of managerial marketing decision making and at the same time develop knowledge and skills for effectively managing the complexity of exchange processes.

25742

FINANCIAL MANAGEMENT

MEM
6cp; 3hpw
prerequisites: 22747 Accounting for Managerial Decisions, 49003 Economics for Engineers
coordinator: L Perry, Faculty of Business

Topics: the conceptual basis of financial decisions; accounting statements and cash flow; net present value; the valuation of debt and equity; capital budgeting issues; risk and return; the capital

asset pricing model (CAPM), capital structure; determinants in the optimal balance of debt and equity; dividend policy; leasing.

44152

GROUNDWATER ENGINEERING PROJECT (F/T)

44156

GROUNDWATER ENGINEERING PROJECT (P/T)

MEGM
30cp

44153

GROUNDWATER ENGINEERING PROJECT (F/T)

44157

GROUNDWATER ENGINEERING PROJECT (P/T)

GDGM
15cp
teaching school: National Centre for Groundwater Management
coordinator: A/Prof M J Knight

41777

ME THESIS (ELECTRICAL – F/T)

41778

ME THESIS (ELECTRICAL – P/T)

41988

PHD THESIS (ELECTRICAL – F/T)

41987

PHD THESIS (ELECTRICAL – P/T)

42777

ME THESIS (MECHANICAL – F/T)

42778

ME THESIS (MECHANICAL – F/T)

42987

PHD THESIS (MECHANICAL – P/T)

42988

PHD THESIS (MECHANICAL – F/T)

43777

ME THESIS (CIVIL – F/T)

43778

ME THESIS (CIVIL – P/T)

43987

PHD THESIS (CIVIL – P/T)

43988

PHD THESIS (CIVIL – F/T)

44777

ME THESIS (GROUNDWATER MGT – F/T)

44778

ME THESIS (GROUNDWATER MGT – P/T)

44988

PHD THESIS (GROUNDWATER MGT – F/T)

44987

PHD THESIS (GROUNDWATER MGT – P/T)

Note: Students undertaking PhD or ME by thesis programs must enrol in the appropriate subject number as listed immediately above.

49001

MANAGEMENT DECISIONS

MEM, ME, MTech, GDE, GCE
6cp; 3hpw
teaching school: Graduate School of Engineering
coordinator: A/Prof J V Parkin

This subject presents a critique of rational decision aids in the light of modern descriptive theories of judgement, choice and decision in organisations. The methods of management science, decision analysis and

judgement analysis are presented and models of reasoning, argument construction, persuasion and negotiation. Real decision behaviour is discussed using sociological and behavioural models of decisions in bureaucracies and firms.

Assessment: three assignments 20 per cent each, quiz 30 per cent, lecturers' assessment 10 per cent

49002

PROJECT MANAGEMENT

MEM, ME, MTech, GDE, GCE
6cp; 3hpw
teaching school: Graduate School of Engineering
coordinator: A/Prof J V Parkin

The emphasis will be an interdisciplinary one of relevance to all fields of engineering. The subject considers the management, financial and contractual responsibilities of engineering managers and organisations from the establishment of a project team and the instigation of a contract. The perspectives of all parties, including principals, contractors and subcontractors will be considered.

Assessment: assignments 30 per cent, reading list evaluations 30 per cent, project 40 per cent

49003

ECONOMICS FOR ENGINEERS

MEM, ME, MTech, GDE, GCE
6cp; 3hpw
teaching school: Graduate School of Engineering
coordinator: A/Prof J V Parkin

This subject deals with the effect of economics on activities and management in two ways, aiming: to provide an understanding of the economic forces that shape the environment of engineering activities; to provide engineering managers with economics-related techniques of decision making and management.

Main topics: Macroeconomic issues and policies; microeconomic market theory; theory of the firm; project evaluation and cost-benefit analysis; intangibles and risk; an introduction to operations research and systems engineering, finance and project accounting, project management.

Assessment: four assignments 30 per cent, two seminars 30 per cent, final examination 40 per cent

49004

SYSTEMS ENGINEERING AND DECISION MODELLING

MEM, ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: 49001 Management Decisions or equivalent
corequisite: 49002 Project Management
teaching school: Graduate School of Engineering
coordinator: Prof W R Belcher

The underlying process of problem solving through engineering projects is interpreted as a unifying theme in current professional practice. The tools and methodologies of this systems engineering process are examined from an engineering management viewpoint.

Assessment: mastery test (confirming understanding of concepts) 20 per cent, group assignments (relating to case studies) 30 per cent, individual project (including seminar) 50 per cent

49005

TECHNOLOGICAL CHANGE

MEM, ME, MTech, GDE, GCE
6cp; 3hpw
teaching school: Graduate School of Engineering
coordinator: A/Prof J V Parkin

In this subject the results of introduction of technological innovations into society are examined, using both historical and contemporary examples. The potential effects of emerging technologies are considered with the possibilities of facilitating planned and desirable technological developments.

The subject is also seen as a key element in the development of communication skills at a professional level, orally in small and large groups and in written work.

Assessment: four essays 20 per cent each, student seminar 20 per cent

49006

RISK MANAGEMENT IN ENGINEERING

ME, MTech, GDE, GCE
6cp; 3hpw
teaching school: Graduate School of Engineering
coordinator: A/Prof B Samali

This subject develops capability to identify, assess, ameliorate and limit risk in the management and practice of engineering through the application of the concepts and tools of risk engineering. On completion, students are able to identify the main hazards in an engineering project and to design an appropriate risk management strategy. Topics supported by case studies include: semantics of risk and hazard; risk as a social construct; principles of risk management; steps in risk engineering; integration with engineering process; risk perception, risk communication, and the acceptability of risks; statutory provisions in NSW relating to some engineering risks; legal principles relating to engineering risks (contract, liability etc.); checklists and scoping for risk identification and assessment; design criteria and code provisions for various risks; comparing risks; quantified and qualitative risk assessment methods; risk assessment in emergencies; financial tools in the management of engineering risks.

Assessment: four assignments 25 per cent each

49007

SOCIAL IMPACTS OF ENGINEERING

ME, MTech, GDE, GCE
6cp; 3hpw
teaching school: Graduate School of Engineering
coordinator: A/Prof J V Parkin

The subject develops awareness of the impacts of technological development, environmental modification and planned intervention on human communities. Topics include social theories of technology, the growth of the engineering world view, the social impacts of technological change, the social and technical construction of risk, third world industrialisation, technology and oppression, social impact assessment, and the integration of social, environmental and technical values in planning.

Assessment: quiz 30 per cent, assignments 70 per cent

49021

EVALUATION OF ENERGY INVESTMENTS

ME, MTech, GDE, GCE
6cp; 3hpw
teaching school: Graduate School of Engineering
coordinator: Dr D Sharma

The context of project evaluation; characteristics of energy sector and project investments; concepts and methods of financial and economic evaluation of energy investments; issues in cost-benefit evaluation; treatment of risk, intangibles and externalities; environmental considerations in project evaluation; multiattribute evaluation frameworks; case studies.

Assessment: assignments 40 per cent, examinations 60 per cent

49022

ENERGY RESOURCES AND TECHNOLOGY

ME, MTech, GDE, GCE
6cp; 3hpw
teaching school: Graduate School of Engineering
coordinator: Dr D Sharma

Energy resources and reserves; concepts and principles of resource assessment; regional, national and international resource requirements and availability; resource technology evaluation; economic and environmental impacts of resource use.

Assessment: assignments 40 per cent, examinations 60 per cent

49023

ENERGY ECONOMICS

ME, Mtech, GDE, GCE
6cp; 3hpw
teaching school: Graduate School of Engineering
coordinator: Dr D Sharma

The micro model; economics of non-renewable energy resources; markets for non-renewable energy resources; energy pricing principles and policies; case studies.

Assessment: assignments 40 per cent, examinations 60 per cent

49024

ENERGY MODELLING

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisites: 49023 Energy Economics, 49025 Methods for Energy Analysis or equivalents
teaching school: Graduate School of Engineering
coordinator: Dr D Sharma

Macroeconomic settings of energy-economy modelling; energy balances; energy input-output analysis; energy aggregation; energy system modelling; modelling of energy-economy interactions.

Assessment: assignments 40 per cent, examinations 60 per cent

49025

METHODS FOR ENERGY ANALYSIS

ME, MTech, GDE, GCE
6cp; 3hpw
teaching school: Graduate School of Engineering
coordinator: Dr D Sharma

Probability concepts; sampling and estimation; regression analysis; statistical tests; analysis of variance; simultaneous equations; time series methods; econometric models and applications; introduction to statistical packages.

Assessment: assignments 40 per cent, examinations 60 per cent

49026

ELECTRICITY SECTOR PLANNING

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisites: 49021 Evaluation of Energy Investments, 49023 Energy Economics or equivalents
teaching school: Graduate School of Engineering
coordinator: Dr D Sharma

Nature of electricity planning; operational and reliability issues; generation and production planning; electricity pricing; demand side measures; regulatory and institutional aspects; case studies.

Assessment: assignments 40 per cent, examinations 60 per cent

49027

ENERGY DEMAND ANALYSIS AND FORECASTING

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisites: 49023 Energy Economics, 49024 Energy Modelling or equivalents
teaching school: Graduate School of Engineering
coordinator: Dr D Sharma

Theoretical and analytical concepts and tools for the understanding of energy demand generation and evolution in relation to the socio-economic development; methods and models of energy demand projections; considerations about the design, implementation and monitoring of an energy demand management policy.

Assessment: assignments 40 per cent, examinations 60 per cent

49028

POLICY AND PLANNING OF ENERGY CONSERVATION

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: 49021 Evaluation of Energy Investments or equivalent
teaching school: Graduate School of Engineering
coordinator: Dr D Sharma

Rationale and context for energy conservation planning and policy; historical

perspective of energy conservation; public and private sector interventions and mechanisms for rationalizing the design of energy conservation policies; examples and case studies of energy conservation programs at national, sectoral and enterprise levels in developing and industrialised countries; decision methods for program design.

Assessment: assignments 40 per cent, examinations 60 per cent

49029

ENVIRONMENTAL POLICY FOR ENERGY SYSTEMS

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisites: 49021 Evaluation of Energy Investments, 49024 Energy Modelling or equivalents
teaching school: Graduate School of Engineering
coordinator: Dr D Sharma

Policy context; energy resource system analysis; approaches to environmental impact assessment; analysis of pollution effects and control technologies; risk analysis of energy systems; costs and benefits of environmental management; institutional and regulatory issues.

Assessment: assignments 40 per cent, examinations 60 per cent

49031

INFORMATION STRUCTURES, PERCEPTION AND USER INTERFACE DESIGN

ME, MTech, GDE, GCE
6cp; 3hpw
teaching school: Graduate School of Engineering
coordinator: A/Prof A Ginige

This subject examines how authors create, and users access information. Topics include: methodologies for structuring, creating and accessing information; information classification and indexing schemes and their extension to hypermedia systems; user interface design in terms of human perception and access to information; the use of different media for effective communication.

Assessment: assignments 50 per cent, final examination 50 per cent

49040

GRADUATE SEMINAR

ME, MTech, GDE, GCE and research degrees
3cp; 3hpw over two or more semesters
teaching school: Graduate School of Engineering
coordinators: Prof W R Belcher, A/Prof B Samali

The subject enhances professional communication skills, in written and oral English, through the preparation, presentation and defence on a topic being studied at advanced level, in two or more public seminars. It also develops understanding of professional expectations and communication possibilities through attendance at other nominated seminars, and provides opportunities to present research or project work to an audience of peers, academic staff and professional practitioners, making use of modern technologies for presentation and audience participation within and beyond UTS. (Seminars are normally presented in rooms permitting full audio/video interaction.) Guidance in preparation is offered, and structured feedback from advisers and audience, on content and presentation.

Assessment: is criterion referenced and ungraded, and requires the submission of written materials, seminars relating to the candidate's concurrent research or project work

49041

ENGINEERING RESEARCH METHODOLOGY

ME, MTech, GDE, GCE and research degrees
6cp; 3hpw
prerequisite: enrolment in a UTS research or coursework programs at Master's level
teaching school: Graduate School of Engineering
coordinators: Prof W R Belcher, A/Prof B Samali

The subject familiarises students with a range of approaches used in engineering research, with an emphasis on approaches used in professional practice. Topics include the advantages and limitations of different research approaches and their applicability in different engineering contexts, the recognition and protection of intellectual

property, and the boundaries and interdependencies between research, development, design and innovation. Research ethics in engineering are also reviewed.

Students learn how to design research programs and to analyse and interpret data and reports. Participants solve problems creatively to access and utilise information resources to critically evaluate research work.

Assessment: is criterion referenced and ungraded, and based on assignments requiring preparation of a research critique, a research plan, a discussion group assignment and a seminar presentation

49042

GRADUATE PROJECT

ME, MTech
18–24cp
prerequisite: completion of coursework requirements for the award
teaching school: Graduate School of Engineering
coordinators: Prof W R Belcher, AlProf B Samali

The project is a capstone requirement of the course taken over one or two semesters, which provides an opportunity for the practical application and integration of the advanced skills and knowledge gained in part through other subjects taken during the course of study. The depth and extent of the project will vary with credit points required and will be set on the basis of an agreed project plan approved by the Head of the Graduate School of Engineering. The project may involve the development of new technology (hardware and/or software), the application of technology, or in special circumstances a critical review addressing a significant technical issue in the area of student's concentration, describing key contributions in the field covered by the project work undertaken, results achieved and a discussion of the significance and implications.

Assessment: is based on the preparation of a written report and a seminar presentation

49043

SPECIAL COURSE

ME, MTech
3–6cp; 3hpw
prerequisites: in accordance with the requirements of each specific subject
teaching school: Graduate School of Engineering
coordinators: Prof W R Belcher, AlProf B Samali

This subject offers students maximum educational opportunity to benefit from short courses and other learning experiences available through the Faculty of Engineering. Enrolment for credit is approved by the Head of the Graduate School, on the recommendation of the relevant Course Director for a program of study to be undertaken and assessed within a prescribed period. Approval requires demonstration by the candidate to the Course Director of a special learning need or development opportunity consistent with the other requirements of the candidate's program.

Assessment: according to proposed assessment for each individual subject or short course

49044

ENGINEERING COMMUNICATION AND DOCUMENTATION

ME, MTech, GDE, GCE
6cp; 3hpw
teaching school: Graduate School of Engineering
coordinator: Mrs H McGregor

High level communication skills are essential for professional engineers. This subject explores communication theories which support effective practice. It investigates the role of information as an engineering resource. The increasing importance of engineering documentation is analysed and strategies for producing and managing documentation are developed.

Assessment: continuous assessment of a variety of assignments negotiated by the student with the Coordinator

49045

ENGINEERING FOR LAWYERS

Graduate Certificate in Law for Court Referees
6cp; 3hpw
prerequisites: postgraduate enrolment in a Faculty of Law research or coursework program
teaching school: Graduate School of Engineering
coordinator: Prof W R Belcher

Many disputes require that referees have an overview of issues and concepts which relate to engineering. This subject will enable referees to develop the understanding of engineering practice.

Assessment: participation 10 per cent, preliminary assignment 30 per cent, final assignment 60 per cent

49046

NUMERICAL METHODS IN ENGINEERING

ME, MTech, GDE, GCE
6cp; 3hpw
teaching school: Graduate School of Engineering
coordinators: Dr P Huynh, Dr B Rodanski

This subject treats at advanced level a selection of numerical methods widely applicable to mathematical modelling and analysis in engineering. Typically the topics would include finite difference and finite element methods, sparce matrices and neural networks.

49047

FINITE ELEMENT APPLICATIONS IN STRUCTURAL ANALYSIS

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisites: 47133 Computations 2 and 47151 Structural Analysis 2 or 46240 Solid Mechanics 3 or equivalents.
teaching school: Graduate School of Engineering
coordinators: Mr R Wiltshire, Dr A Saleh

This subject extends understanding of Finite Element Analysis (FEA) techniques and their application to problems in engineering, particularly in solid and structural mechanics, and develops problem formulation and modelling skills in FEA. Topics include a review of matrix analysis methods; the derivation of element stiffness, force and field matrices; geometrical and material nonlinearity; and dynamic analysis and stability; each illustrated by engineering applications. The subject requires the use of general purpose FEA programs in assignments and project work.

Assessment: six assignments 60 per cent, project 20 per cent, quiz 20 per cent

49080

STATISTICAL SYSTEMS DESIGN

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: 45145 Engineering Statistics or equivalent
teaching school: Graduate School of Engineering
coordinator: Prof W R Belcher

Students develop an understanding of the analytic process of large-scale systems design and the concepts involved in a top-down, requirements-driven design process, and the statistical nature of systems as many-element entities.

Assessment: three assignments 20 per cent each; final examination 40 per cent

49101

ENVIRONMENTAL PLANNING

GDLGE, ME, MTech, GDE, GCE
6cp; block release totalling 36hrs
teaching school: Civil Engineering
coordinator: Mr K Halstead

Provides the Local Government Engineer with a solid background in the principles and procedures of environmental planning, as affecting the engineering functions in local government; the knowledge to manage physical, economic and social resources within environmentally acceptable parameters; and a clear understanding of the legal framework of the NSW environmental planning legislation.

Topics to be covered include evolution of planning, NSW planning legislation, the planning process, planning the neighbourhood, development control

and the civil engineer, land and environment court, State and regional planning, environmental impact assessment, traffic noise in the urban context, and local approvals review program.

Assessment: project 40 per cent, examination 60 per cent

49102

TRAFFIC AND TRANSPORTATION

GDLGE, ME, MTech, GDE, GCE
6cp; block release totalling 36hrs
teaching school: Civil Engineering
coordinator: Mr P Kenny

This subject provides the student with the knowledge to implement traffic engineering principles in the local government area in accordance with current practice in NSW. The student will be introduced to standards adopted by the Roads and Traffic Authority, NSW and AUSTROADS.

The subject provides the basic principles of transportation planning and traffic engineering, and an analysis of the influence of environmental, political, and technical aspects.

Assessment: project 40 per cent, examination 60 per cent

49103

MANAGEMENT AND INDUSTRIAL RELATIONS

GDLGE, ME, MTech, GDE, GCE
6cp; block release totalling 36hrs
teaching school: Civil Engineering
coordinator: Mr C Holmes

This subject examines the concept of management: its principles, functions, structures, processes, systems and their application, and how management systems can be operated in a cohesive fashion to achieve effectiveness, efficiency and economy in 'real world' situations. Topics include management concepts, principles and systems, management process, organisational behaviour, functional management, managing effectiveness.

Assessment: major assignment 50 per cent, examination 40 per cent, class work 10 per cent

49104

ASSET MAINTENANCE MANAGEMENT

GDLGE, ME, MTech, GDE, GCE
6cp; block release totalling 36hrs
teaching school: Civil Engineering
coordinator: Mr W Neville

Aims to enhance the skills and capacity of the local government engineer to develop an awareness of the real cost of owning, operating and maintaining assets and services. The student will gain an understanding of the planning, design, maintenance, and monitoring concepts and methods, with a view to optimising life cycle cost/benefits; develop knowledge of the methods for assessing and controlling potential losses and risks, and understand how these aims interact with, and support the requirements of management, logistics, reporting and accounting guidelines.

Topics include legislative and other requirements, basic maintenance strategies, maintenance support strategies, risk assessment and control, maintenance management systems.

Assessment: project 40 per cent, examination 60 per cent

49105

WATER SUPPLY AND WASTEWATER MANAGEMENT

GDLGE, ME, MTech, GDE, GCE
6cp; block release totalling 36hrs
prequisites: nil, although some previous experience in Public Health or Environmental Engineering is assumed
teaching school: Civil Engineering
coordinator: A/Prof S Vigneswaran

This subject concentrates on the operation and maintenance of municipal wastewater treatment plants, sewerage systems and water supply systems. At the completion of this subject the student will understand drinking water and sewage treatment plants, sewerage systems and water reticulation systems in terms of their purpose, basic design concepts, operation and maintenance, identifying and quantifying major

problems, and the operation of these systems to avoid or overcome problems.

Topics to be covered include statutory requirements, constituents and quality of wastewaters, description, operation and control of treatment processes, sewerage and water supply systems, performance monitoring, trouble shooting and problem solving.

Assessment: two assignments 30 per cent, mid-semester examination 25 per cent, formal final examination 45 per cent

49106

ROAD ENGINEERING PRACTICE

GDLGE, ME, MTech, GDE, GCE
6cp; block release totalling 36hrs
teaching school: Civil Engineering
coordinator: Mr P Kenny

This subject aims to equip students with the ability to design, construct and maintain roads (including pavement design and the geometric design of roads) in accordance with current practice in NSW. The subject embraces the standards adopted by the Roads and Traffic Authority, NSW, AUSTROADS and the Australian Road Research Board. Particular attention will be paid to the requirements of the residential street network. Students will develop an understanding of current issues in road engineering, particularly quality assurance contracts, road safety needs of pedestrians and cyclists, and the use of innovative techniques in road construction and maintenance.

Assessment: assignments 40 per cent, examination 60 per cent

49107

STORM RUNOFF REGULATION

GDLGE, ME, MTech, GDE, GCE
6cp; block release totalling 36hrs
prerequisites: nil, though some previous experience in hydraulics and hydrology is assumed
teaching school: Civil Engineering
coordinator: A/Prof G G O'Loughlin

This subject reviews basic principles and methods of hydraulics and hydrology; familiarises students with the methods of urban drainage set out in recent manuals, with an emphasis on flood protection and stormwater quality enhancement; and provides an overview of rural design flood estimation, erosion protection, flood mitigation and coastal engineering.

Topics include urban drainage design; design flood estimation techniques; culvert design; floodway design, detention or retarding basin design, erosion and scour protection; flood mitigation practice and coastal engineering.

Assessment: five assignments 50 per cent, final examination 50 per cent

49108

LOCAL GOVERNMENT LAW

GDLGE, ME, MTech, GDE, GCE
6cp; block release totalling 36hrs
teaching school: Civil Engineering
coordinator: Mr K Halstead

This subject aims to provide the local government engineer with the necessary skills to operate within the legal framework of legislative requirements and procedures governing Local Government in NSW; the appropriate knowledge of the law to operate effectively within environmental, economic, social and physical constraints; and the knowledge and expertise to manage the environment in a practical and effective manner.

Topics include: the history of Local Government in NSW, the local government engineer as a senior officer, *Local Government Act* and Companion

Legislation 1993, Local Government Regulations, and the *Roads Act 1993*.

Assessment: project 40 per cent, examination 60 per cent

49111

COASTAL ENGINEERING

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisites: sound knowledge of Mathematics and Fluid Mechanics
teaching school: Civil Engineering
coordinator: Dr M Patarapanich

This subject deals with engineering design of coastal structures, with particular reference to the natural behaviour of water waves and their interactions with the coastline. Topics covered include: wave generation processes and wave forecasting methods; linear and nonlinear wave theories and their limits of validity; wave characteristics in deep, intermediate and shallow water depths; wave shoaling and breaking; wave refraction and diffraction; wave scattering and radiation; full and partial standing waves; field measurements and statistical analysis of random waves; estimation of extreme waves; tides and other long period water level fluctuations; estuarine hydraulics; coastal sedimentation; coastline management; physical and computer models.

Assessment: assignments/reports 60 per cent, examinations 40 per cent

49112

URBAN STORMWATER FLOOD MANAGEMENT

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: 47155 Hydrology or equivalent
teaching school: Civil Engineering
coordinator: A/Prof G G O'Loughlin

The subject provides a strong grounding in the design and analysis of urban stormwater drainage systems for protection against flooding and the safe removal of water likely to cause inconvenience. Students consider flood protection systems in terms of social and environmental requirements, and the rationale for their design and operation. They are required to understand the integration between flood protection and the pollution prevention measures covered in the companion subject 49113 Urban Stormwater Pollution Management. By performing exercises (mostly using software packages), they become familiar with standard design procedures and aware of problems encountered in practice.

Assessment: continuous assessment involving eight assignments

49113

URBAN STORMWATER POLLUTION MANAGEMENT

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisites: 47155 Hydrology, 47152 Public Health Engineering or equivalents
teaching school: Civil Engineering
coordinator: A/Prof G G O'Loughlin

The subject develops understanding of the nature of pollution processes and levels in urban situations, and of engineering systems for the reduction of pollution, particularly in receiving waters. Students consider pollution management systems in terms of social and environmental requirements, and the rationale for design and implementation of remedial measures. They are also to understand the integration between pollution prevention and the flood protection measures covered in the companion subject 49112 Urban Stormwater Flood Management. Through a series of assignments, they become familiar with commonly used procedures and aware of problems encountered in practice.

Assessment: continuous assessment involving six assignments

49114

STATISTICAL HYDROLOGY

ME, MTech, GDE, GCE
6cp; block release totalling 24hrs
teaching school: Civil Engineering
coordinator: A/Prof G G O'Loughlin

This subject provides students with experience in a field of hydrology with a range of statistical tools and knowledge of statistical methods which can be usefully employed in hydrological practice. Such methods are presently mainly employed in Australia in only a limited way for design flood estimation. Examples will be drawn from surface water hydrology, including problems relating to reservoir yield, design flood estimation and continuous modelling of water resources systems. Topics include: concepts of probability, statistics and risk, joint probability problems and methods; statistical descriptors of data; distributions commonly employed in hydrology – their use, parameter estimation and limitations; selecting an appropriate distribution and testing the adequacy of fit; tests of hypotheses; standard errors of estimation and their use; use of statistical methods in decision problems; model testing and the statistical interpretation of model results; the use of simulation in hydrology; applied regression and correlation; introduction to stochastic models in hydrology.

49121

ENVIRONMENTAL ASSESSMENT AND PLANNING

GCEEM, ME, MTech, GDE, GCE
6cp; 3hpw
teaching school: Civil Engineering
coordinator: Dr J Broadbent

This subject analyses the principles of sustainable development and the expectations which they place on various aspects of human interaction with the environment. Existing and proposed measures by governments are examined in the areas of environmental legislation, environmental economics and land use planning in relation to sustainable development.

Assessment: two essays 20 per cent, class exercises 30 per cent, formal examination 50 per cent

49122

INTRODUCTION TO ENVIRONMENTAL ENGINEERING AND MANAGEMENT

GCEEM, ME, MTech, GDE, GCE
6cp; 3hpw
teaching school: Civil Engineering
coordinators: A/Prof S Vigneswaran, Dr M Dawson

Ecological systems and processes; basic ecological principles, bio geochemical cycles, development of ecosystems, interaction between physical ecosystems; global environmental issues such as greenhouse effect, ozone depletion, acid rain, human impact on ecosystems; importance of sustainable development; an overview of major environmental problems; their effect and remedies; air pollution, noise pollution, water pollution, soil pollution solid and hazardous wastes. Case studies.

Assessment: assignments 30 per cent, examinations 70 per cent

49123

WASTE MINIMISATION AND ADVANCES IN POLLUTION CONTROL

GCEEM, ME, MEP, MTech, GDE, GCE
6cp; 3hpw
teaching school: Civil Engineering
coordinators: A/Prof S Vigneswaran, Dr J Broadbent

Waste minimisation and pollution control are treated in an integrated and comprehensive manner, permitting evaluation of the benefits of waste minimisation to industry and of pollution reduction in the environment. Topics include: environmental auditing of the product life cycle; leading-edge technologies of waste minimisation and pollution control; raw materials extraction and refinement: product development, design and manufacture, product use, product reuse/recycling, solid/hazardous wastes, liquid wastes; effective management of the

product life cycle; institutional barriers to improving the technologies of waste minimisation and pollution control; reviews of advanced technology and management practices adopted in domestic waste pollution control; economic considerations; case studies: pulp and paper industry, metal-plating industry, food and dairy industry, household waste, waste recycling in buildings.

Assessment: assignments and class presentations 50 per cent, examinations 50 per cent

49124

URBAN WATER QUALITY MANAGEMENT

GCEEM, ME, MTech, GDE, GCE
6cp; 3hpw
teaching school: Civil Engineering
coordinator: A/Prof G G O'Loughlin

This subject examines urban water systems including natural water bodies (streams, estuaries, groundwater), and related human infrastructure (water supply, sewerage, stormwater drainage systems), and provides an assessment of the impacts, and methods of monitoring pollution in these environments in relation to water quality, natural flora and fauna, aesthetic quality and public health, and will enable the students to gain a general knowledge of these systems, their vulnerability to pollution and degradation, and remedial measures.

Assessment: two essays 20 per cent, class exercises 30 per cent, quiz and final examination 50 per cent

49125

ENVIRONMENTAL RISK ASSESSMENT

ME, MTech, GDE, GCE
6cp; block release totalling 45hrs
teaching school: Civil Engineering
coordinator: Mr J Irish

This subject provides graduates working in environmental engineering, environmental auditing or environmental impact assessment with an introduction to methods of risk assessment. An understanding of the concepts of risk perception, risk acceptability and the modification of risks and their application to environmental engineering, impact assessment and auditing will also be developed.

Assessment: four assignments 25 per cent each

49126

LAND RESOURCE AND ENVIRONMENTAL MANAGEMENT

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: 47142 Environmental Engineering or equivalent
teaching school: Civil Engineering
coordinator: Dr P Hazelton

Introduces students to basic concepts and principles of land resource planning and environmental management. On completion of the subject the student should be able to interpret and evaluate physical limitations and their effects on urban planning and development, and clearly understand the various stages of management of land with special problems such as contaminated land, effluent and sludge disposal sites and recreational and open space.

Assessment: laboratory experiments 15 per cent, problems 10 per cent, computing assignment 15 per cent, design assignment 20 per cent, examination 40 per cent

49130

MARINE STRUCTURES

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: 49111 Coastal Engineering or equivalent
coordinators: Dr M Patarapanich, Dr J Ivering

This subject develops engineering capability relevant to the analysis, design and protection of various types of marine structures. Topics include: classifications of coastal, maritime and offshore structures; site investigations; port planning; harbours and navigation channels; wave penetration into harbours; rubble mound and vertical wall

breakwaters; wharves, piers and bulkheads; dolphins and moorings; bulk cargoes and container terminals; marinas; port operation and services; dredging and reclamation; shore protection structures; river entrance training jetties; offshore structures; submarine pipelines; ocean outfalls; corrosion in marine environment.

Assessment: assignments/design project 75 per cent, quiz 25 per cent

49131

MEDIUM SPAN BRIDGES

ME, MTech, GDE, GCE
6cp; 3hpw
teaching school: Civil Engineering
coordinator: Dr J Ivering

This subject develops competence in the area of bridge design and analysis. It includes assignments requiring the design of major components of a typical bridge structure in accordance with the Australian Code for Bridge Design. Each student is also required to undertake an investigation project involving analysis and design of a selected modern bridge structure and to submit a report with supporting calculations at the end of the investigation.

Assessment: three major design assignments 35 per cent, investigation, report and/or design of a modern bridge structure 30 per cent, two quizzes 35 per cent

49132

STABILITY OF STRUCTURES

ME, MTech, GDE, GCE
6cp; 3hpw
teaching school: Civil Engineering
coordinator: Dr A Saleh

The behaviour of slender members subjected to compression and/or flexure is examined in this subject. Factors which contribute to the onset of buckling in single members and slender frames are analysed to develop an understanding of structural loads and their effects. In addition, students learn how to assess the stability of practical frames using computer-based methods of analysis.

Assessment: continuous assessment 60 per cent, informal final examination 40 per cent

49133

STEEL AND COMPOSITE DESIGN

ME, MTech, GDE, GCE
6cp; 3hpw
teaching school: Civil Engineering
coordinator: Dr S Parsanejad

This subject provides an understanding of web buckling and post-buckling behaviour of composite beams, columns and connections and of plastically deformed steel frames. The course will develop familiarity with both Australian and overseas code provisions and their underlying concepts. The teaching strategy will consist of formal and informal lectures, with student participation.

Assessment: composite beam project 30 per cent, plastic design projects 20 per cent, 2 quizzes 25 per cent each

49134

STRUCTURAL DYNAMICS

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisites: 47133 Computations 2, 47151 Structural Analysis 2 or equivalents
teaching school: Civil Engineering
coordinator: A/Prof B Samali

This subject introduces students to the concepts and techniques of structural dynamics and their application to the design and analysis of dynamically sensitive structures, such as tall buildings, towers, chimney stacks and foot bridges. Students develop an understanding of the nature of dynamic (time varying) loads, produced by wind, earthquake, rotating machinery, trains, human beings and other sources; ability

to assess the response of civil engineering structures to such loads, taking into account load-structure interaction; and structural design approaches satisfying both strength and serviceability requirements.

Assessment: assignments (including a project) 50 per cent, two quizzes 25 per cent each

49135

WIND ENGINEERING

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisites: 47133 Computations 2, 47277 Loading on Building Structures or equivalents
teaching school: Civil Engineering
coordinator: A/Prof B Samali

Introduces students to basic concepts and fundamental principles in wind engineering and their application to structural design and analysis of structures, such as buildings, towers, chimney stacks and bridges in accordance with strength, stability and serviceability limit states design criteria. On completion of the subject the student should understand the nature of wind loads acting on buildings due to along and cross-wind actions, and be able to prevent aerodynamic instabilities, such as flutter, galloping, torsional divergence and others by proper design. Wind tunnel testing techniques as a means of determining wind-induced dynamic response of structures and cladding pressures are introduced, and the environmental effects of severe winds around buildings and other structures studied in terms of human safety and comfort.

Assessment: assignments 50 per cent, two quizzes 25 per cent each

49136

APPLICATION OF TIMBER IN ENGINEERED STRUCTURES

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisites: 47127 Mechanics of Solids or equivalent, 47141 Structural Analysis or equivalent
teaching school: Civil Engineering
coordinator: Prof S L Bakoss

This subject will present recent advances that have enhanced the role of timber as a versatile renewable resource with a wide range of applications in engineered structures. It will familiarise students with the structural behaviour of timber and timber-based manufactured products to faciltiate the choice of materials, design, construction and maintenance procedures to produce cost-effective, durable and aesthetically pleasing structures. Quality control and reliability issues will form an important focus. Particular requirements of large span industrial structures (including connection design), multistorey buildings and bridges and the use of the limit states version of AS1720 will be addressed.

Assessment: assignments 30 per cent, quizzes 30 per cent, seminar 10 per cent, major project 30 per cent

49141

ADVANCED GEOMECHANICS

ME, MTech, GDE, GCE
6cp; 3hpw
teaching school: Civil Engineering
coordinator: Dr G L Ring

This course consists of two separate components. The first deals with the study of rock mechanics, including the description of rock and the quantification of rock properties, sampling and testing techniques and the three-dimensional analysis of rock discontinuities. The course considers how these properties can be incorporated into the analysis and design of various structures such as underground openings, slopes and foundations. Methods of reinforcing

rock masses using anchors and bolts are also treated.

The second component deals with computer applications in geomechanics. After a theoretical overview, it concentrates on the finite element and boundary element methods and provides considerable hands-on experience using PC-based software. Students are expected to solve problems of seepage, deformation associated with the nonlinear analysis of structural interaction, and stress around underground openings.

Assessment: assignments 50 per cent, projects 50 per cent

49142

ADVANCED GROUND MODIFICATION

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: 47156 Soil Engineering or equivalent
teaching school: Civil Engineering
coordinator: A/Prof M R Hausmann

The subject provides practical guidelines and methods of analysis for improving the engineering properties of soils and rocks – for example, by increasing strength, reducing compressibility, controlling permeability and volume change, or reducing liquefaction potential and variability. The main topics covered are compaction, dewatering, admixtures, grouting, anchorage and soil reinforcement. In addition, the theoretical principles of preloading, electro-osmosis and soil heating and freezing are introduced.

Assessment: classwork, assignments and quizzes 50 per cent, project requiring laboratory testing programs or literature review 50 per cent

49151

ADVANCED CONCRETE TECHNOLOGY

ME, MTech, GDE, GCE (Elective)
6cp; 3hpw
prerequisite: 47154 Concrete Technology
teaching school: Civil Engineering
coordinators: Dr R Sri Ravindarajah, Dr H W Chung

This subject aims to update knowledge in concrete technology and covers several specialised topics. An opportunity to gain research experience through mini-projects is provided. Main topics: structure of concrete; supplementary cementing materials; special cements; admixtures; rheology of concrete; production and quality control of concrete; strength prediction methods; application of fracture mechanic to concrete; predictions methods for deformations; concrete practices – large-pours; underwater concreting; cold- and hot-weather concreting; and pumping concrete; special concretes – high-strength concrete; polymer concrete; fibre-reinforced concrete; and light-weight concrete.

Assessment: assignments 30 per cent, quizzes 30 per cent, major report 40 per cent

49152

DAMAGE AND REPAIR OF CONCRETE STRUCTURES

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: 47154 Concrete Technology or equivalent
teaching school: Civil Engineering
coordinators: Dr R Sri Ravindrarajah, Dr H W Chung

This subject provides understanding of the mechanisms of damage in concrete structures and of the methods for in-situ assessment and repair. An individual project is an essential part of the subject. Main topics include: causes of damage; corrosion of steel in concrete; in-site strength of concrete; no-destructive testing; repair materials selection; repair procedures and techniques; prevention,

protection and maintenance of concrete structures.

Assessment: assignments 30 per cent, quizzes 30 per cent, seminar 10 per cent, major report 30 per cent

49201

INTEGRATED SERVICES NETWORKS

ME(Tel), ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: 45661 Communications Networks or equivalent
teaching school: Electrical Engineering
coordinator: Prof K W Yates

Switching methods, CCITT recommendations, SDH, ISDN technology, ISDN signalling, broadband ISDN, ATM standards, resource sharing and multiple access (ALOHA, CS/CD, CSMA/CD, Token Bus, Token Ring, QPSX, FDDI).

Assessment: assignments 25 per cent, laboratory project 25 per cent, final examination 50 per cent

49202

COMMUNICATIONS PROTOCOLS

ME(Tel), ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: 45661 Computer Networks or equivalent
teaching school: Electrical Engineering
coordinator: A/Prof A Seneviratne

To study at an advanced level the concepts and protocols associated with each of the seven layers in the ISO Reference model for Open Systems Interconnection (OSI) with applications examples from a wide range of network types.

Assessment: practical work 40 per cent, closed book examination 60 per cent

49203

TELECOMMUNICATIONS SIGNAL PROCESSING

ME(Tel), ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: 45152 Signal Theory 2 or equivalent
teaching school: Electrical Engineering
coordinator: Prof K W Yates

Extraction of information contained in samples of an analogue signal. Analysis of discrete systems. DSP Hardware. FIR and IIR filter design. Advanced topics in filter design. Detection, estimation, Wiener filtering. Spectral estimation. Speech coding algorithms. Image coding. Adaptive signal processing. Communications signal processing. Case study: DSP modem. The implementation of a complete DSP modem will be reviewed (V.29). DSP implementation of fast transforms.

Assessment: design assignment 20 per cent, written examination 80 per cent

49204

ADVANCED TELETRAFFIC ENGINEERING

ME(Tel), ME, MTech, GDE, GCE
6cp; 3hpw
prerequisites: 45145 Engineering Statistics, 45176 Systems Engineering or equivalent
corequisite: 49201 Integrated Services Networks (recommended)
teaching school: Electrical Engineering
coordinator: A/Prof T Buczkowska

The subject exposes students to theoretical and practical aspects of modern communication network design, including teletraffic engineering and network performance modelling. It covers an overview of relevant statistics and probability theory; traffic characterisation; traffic intensity measures; traffic data collection, measurement and forecasting techniques; queuing theory; mathematical models for loss and delay in systems; modelling and analysis of circuit, packet and fast-packet switched networks. Students analyse practical examples of network dimensioning for capacity, and network performance

evaluation using simulation software package (BoNES or OPNET).

On completion of the course students are able to apply an appropriate mathematical model to any communication network, to dimension the primary route and alternate route trunking, switching facilities, and to evaluate the network performance either using a mathematical approach and/or by using simulation. Case studies included in the course provide the student with capabilities to make a choice in networking solutions based on the performance/cost analysis to meet user expectations.

Assessment: four assignments 60 per cent, final examination 40 per cent

49205
TRANSMISSION SYSTEMS

ME(Tel), ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: 41866 Telecommunications Signal Processing, or equivalent.
teaching school: Electrical Engineering
coordinator: A/Prof S Reisenfeld

The subject covers major aspects of digital transmission systems at an advanced level, including modulation, coding, synchronisation, and multiple access. Case studies of optical and satellite links demonstrate how the effects of performance degradations are incorporated into the link budget.

Assessment: design assignment 20 per cent, written examination 80 per cent

49206
ADVANCED STUDIES IN ELECTROMAGNETIC COMPATIBILITY

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: 45264 Fields and Waves or equivalent
teaching school: Electrical Engineering
coordinator: Dr A M Sanagavarapu

Compliance with Electromagnetic Compatibility regulation is becoming mandatory for engineering products. This course provides an understanding of the underlying concepts for the analysis, modelling and design for achieving electromagnetic compatibility.

Assessment: continuous assessment of a variety of assignments negotiated by the student with the coordinator

49207
WAVE PROPAGATION FOR MICROWAVE MOBILE COMMUNICATIONS

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: 45264 Fields and Waves or equivalent
teaching school: Electrical Engineering
coordinator: Dr A M Sanagavarapu

Information transmission using radio propagation is becoming increasingly significant with the introduction of mobile communication services. This course explores the fundamental issues of microwave propagation in typical communication environments and introduces channel modelling and design methodologies.

Assessment: continuous assessment of a variety of assignments negotiated by the student with the coordinator

49208
TELECOMMUNICATIONS MANAGEMENT

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: 45145 Engineering Statistics or equivalent
teaching school: Electrical Engineering
coordinator: A/Prof T Buczkowska

The subject provides an integrated technology management perspective on communications infrastructure and services and the changing telecommunications and information technology environment. It focuses on techniques and tools for strategic telecommunications planning, and covers the evaluation of systems and selection procedures. Software packages are used for network modelling, dimensioning and performance evaluation.

On completion of the course, students are able to assess corporate telecommunications requirements, to collect statistical

data required for corporate telecommunications planning, to prepare a strategic telecommunications plan capitalising on technology and market trends, and to evaluate the performance and cost of the planned system.

Assessment: assignments 60 per cent, mid-semester quiz 10 per cent, final examination 30 per cent

49211
SOFTWARE ENGINEERING PRINCIPLES

ME, MTech, GDE, GCE
4cp; block release
teaching school: Electrical Engineering
coordinator: Mr J R M Leaney

This subject provides an overview of the field of Software Engineering. A framework is developed into which more detailed material regarding specific aspects of the software engineering process, techniques, and issues can fit. This includes an introduction to such issues as software systems, software quality, the software development process, process models (waterall and its variants, prototyping, exploratory programming, formal transformations etc.), development paradigms (functional, structured, logic, object-oriented), development methodologies, and software project management.

Assessment: classwork, assignments, examinations 50 per cent, major project with (where possible) industry involvement 50 per cent

49212
OBJECT-ORIENTED SOFTWARE DEVELOPMENT

ME, MTech, GDE, GCE
4cp; block release
prerequisite: 49211 Software Engineering Principles or equivalent
teaching school: Electrical Engineering
coordinator: Mr J R M Leaney

This subject provides an introduction to the object-oriented approach to software development. It includes a detailed coverage of the basic OO concepts. Various methodologies (Rumbaugh, Shlaer-Mellor, Coad-Yourdon, Booch) are discussed and compared. The available tools are considered (CASE tools, code generators, development environments etc.) and the most common languages compared (C++, Smalltalk, Eiffel, Ada etc.).

Assessment: classwork, assignments, and examinations 50 per cent, major project with (where possible) industry involvement 50 per cent

49213
SOFTWARE STRUCTURED ANALYSIS AND DESIGN

ME, MTech, GDE, GCE
4cp; block release
prerequisite: 49211 Software Engineering Principles or equivalent
teaching school: Electrical Engineering
coordinator: Mr J R M Leaney

This subject provides an introduction to the structured analysis and design approach to software development. It introduces a discussion of the fundamental basis of the SASD approach, and then progresses to considering how this approach can be implemented as a methodology. A review of available CASE tools is included, and the subject concludes by considering the relationship between SASD and software implementation in procedural languages.

Assessment: classwork, assignments, and examinations 50 per cent, major project with (where possible) industry involvement 50 per cent

49214
UNIX AND C

ME, MTech, GDE, GCE
4cp; block release
teaching school: Electrical Engineering
coordinator: Mr J R M Leaney

This subject provides a detailed introduction to both the UNIX operating system and the C programming language. The two halves of the subject run in parallel. The first half provides an introduction to the UNIX operating system, and then shows how it can be used to develop software. This will include issues such as the UNIX command shells, the file management

system, development tools, network tools, and graphical environments. The second half of the subject develops the ability to implement software systems in the C programming language, including language elements, syntax, program structure etc.

Assessment: classwork, assignments, and examinations 50 per cent, major project with (where possible) industry involvement 50 per cent

49215

ADA PROGRAMMING LANGUAGE

ME, MTech, GDE, GCE
4cp; 3hpw block release
prerequisite: 49214 UNIX and C or equivalent
teaching school: Electrical Engineering
coordinator: Mr J R M Leaney

The goal of this subject is to learn to build software systems using the Ada language. The subject covers the basic concepts of Ada (control structures, types, packages etc.), software component coding, an in-depth study of the basic concepts (such as derived types and generics), and real time project sequential component coding.

Assessment: classwork, assignments and examinations 50 per cent, major project with (where possible) industry involvement 50 per cent

49216

ALGORITHMS AND DATA STRUCTURES

ME, MTech, GDE, GCE
4cp; 3hpw
prerequisites: 49214 UNIX and C, 49215 Ada Programming Language or equivalents
teaching school: Electrical Engineering
coordinator: Mr J R M Leaney

The goal of this subject is to develop an ability to understand and develop algorithms and associated data structures by successive fine tuning. The subject covers the concept of abstraction (hierarchy of abstractions, action = operation + data), control structures, common data structures (arrays, lists, queues, stacks, graphs), pseudocode, algorithm models, program structure and translation of algorithms and data structures to code.

Assessment: classwork, assignments, and examinations 50 per cent, major project with (where possible) industry involvement 50 per cent

49217

SOFTWARE VERIFICATION AND VALIDATION

ME, MTech, GDE, GCE
4cp; 3hpw block release
prerequisite: 49211 Software Engineering Principles or equivalent
teaching school: Electrical Engineering
coordinator: Mr J R.M Leaney

This subject aims to provide an understanding of the meaning, role and usage of verification and validation in the software development process. The subject covers all aspects of software verification and validation. This includes unit testing, integration testing, system testing, acceptance testing, development of test plans. The subject details development of testing, testing techniques, testing documentation, use of testing tools etc.

Assessment: classwork, assignments, and examinations 50 per cent, major project with (where possible) industry involvement 50 per cent

49218

DEVELOPMENT OF REAL-TIME SOFTWARE

ME, MTech, GDE, GCE
4cp; 3hpw
prerequisites: 49214 UNIX and C, 49215 Ada Programming Language, 49216 Algorithms and Data Structures or equivalents
teaching school: Electrical Engineering
coordinator: Mr J R M Leaney

This subject aims to provide an ability to develop real-time systems, including real-time specification, design, and implementation. The subject covers real-time extensions to both structured and object-oriented development methodologies. Specification activities are considered, as are the methods of modifying systems to include real-time

issues. The subject uses SA/RT as a basis for much of the discussion.

Assessment: classwork, assignments, and examinations 50 per cent, major project involving (where possible) industry involvement 50 per cent

49219

PROGRAM CONFIGURATION AND MANAGEMENT

ME, MTech, GDE, GCE
4cp; 3hpw
prerequisite: 49211 Software Engineering Principles
teaching school: Electrical Engineering
coordinator: Mr J R M Leaney

The goal of this subject is to provide an understanding of configuration management mechanisms, software project management techniques, and their application to real projects. The subject covers software configuration management during development, including activities, objects, and planning. Project planning, software teams, software maintenance issues, cost estimation are all considered.

Assessment: classwork, assignments, and examinations 50 per cent, major project with (where possible) industry involvement 50 per cent

49220

REAL-TIME PROGRAMMING

ME, MTech, GDE, GCE
4cp; 3hpw
prerequisites: 49214 UNIX and C or equivalent, 49215 Ada Programming Language or equivalent
teaching school: Electrical Engineering
coordinator: Mr J R M Leaney

The goal of this subject is to develop an ability to solve real-time problems in both Ada and C. The subject covers the basic concepts of real-time programming (tasks, semaphores, events, communication models etc.) and then applies these to programming in both Ada (concurrency, tasking, cross production chains) and C (POSIX, VRTX etc.). Cross development and programming recommendations are also considered.

Assessment: classwork, assignments, and examinations 50 per cent, major project with (where possible) industry involvement 50 per cent

49221

SOFTWARE DOCUMENT PRODUCTION

ME, MTech, GDE, GCE
4cp; 3hpw
prerequisite: 49211 Software Engineering Principles
teaching school: Electrical Engineering
coordinator: Mr J R M Leaney

The subject illustrates issues related to the production of documentation for software projects and their management. It covers types of documentation (specifications, design documents, manuals, test plans etc.), document structure (organisation, style, components, criteria), documentation preparation systems (tps), documentation tools (automatic document generation, requirements traceability, version control etc.) and use of a document environment.

Assessment: classwork, assignments, and examinations 50 per cent, major project with (where possible) industry involvement 50 per cent

49222

DATABASES

ME, MTech, GDE, GCE
4cp; 3hpw
teaching school: Electrical Engineering
coordinator: Mr J R M Leaney

This subject provides an understanding of databases and database design. Topics include an introduction to databases, database models (objects, assemblies, relationships, entities, relationship handling, notional diagram), physical models, relational models (considering Oracle and Ingres), data handling languages, and database security and integrity.

Assessment: classwork, assignments, and examinations 50 per cent, major project with (where possible) industry involvement 50 per cent

49223

HUMAN/MACHINE INTERFACES

ME, MTech, GDE, GCE
4cp; 3hpw
prerequisite: 49214 UNIX and C or equivalent
teaching school: Electrical Engineering
coordinator: Mr J R M Leaney

The goal of this subject is to provide an understanding of databases and database design. The subject provides an introduction to databases, database models (objects, assemblies, relationships, entities, relationship handling, notional diagram), physical models, relational models (considering Oracle and Ingres), data handling languages, and database security and integrity.

Assessment: classwork, assignments, and examinations 50 per cent, major project with (where possible) industry involvement 50 per cent

49224

SOFTWARE FOR AUTOMATION

ME, MTech, GDE, GCE
4cp; 3hpw
prerequisite: 49211 Software Engineering Principles or equivalent
teaching school: Electrical Engineering
coordinator: Mr J R M Leaney

This subject develops understanding of the software requirements of robotic and other automated systems, fostering awareness of robotics, computer numerical control (CNC), and flexible manufacturing in computer-integrated manufacturing (CIM) environments. The implications for software development are considered, with the functional requirements of an assembly line providing a case study focus for software design, implementation and evaluation.

Assessment: classwork, assignments, and examinations 50 per cent, major project with (where possible) industry involvement 50 per cent

49241

HYPERMEDIA TECHNOLOGIES

ME, MTech, GDE, GCE
6cp; 3hpw
teaching school: Electrical Engineering
coordinator: A/Prof A Ginige

This subject provides an introduction to Hypermedia. It introduces basic components and the structure of hypermedia systems (Hyper components and the Dexter Model), underlaying technologies for capturing, compressing and structuring of different media (text, images, video and sound) and will discuss issues related to storage and transmission of large volume of data including temporal media and synchronisation.

Assessment: assignments 50 per cent, final examination 50 per cent

49242

IMAGE COMPUTING

ME, MTech, GDE, GCE
6cp; 3hpw
teaching school: Electrical Engineering
coordinator: Dr D Lowe

In this course we will first introduce basic image operations as developed in image processing, computer vision and computer graphics. We will then consider a few applications in which computing approaches have to be used to make information in images explicit for access and retrieval. Using concrete applications we will discuss the basic concepts behind image operations and use these operations to solve real life problems.

Assessment: project 60 per cent, final examination 40 per cent

49243

DESIGN OF HYPERMEDIA INFORMATION SYSTEMS

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisites: 49241 Hypermedia Technologies, 49242 Image Computing, 49031 Information Structures, Perception and User-Interface Design or equivalents
teaching school: Electrical Engineering
coordinator: Dr R Meegoda

This subject provides experience in the design of hypermedia information

systems, including the selection and integration of different technologies appropriate to the system requirement. Topics include the selection and integration of technologies; hypermedia standards (MHEG, HyTime, JPEG, MPEG, H.261 etc.); life cycle considerations and project management in Hypermedia Systems development; and non-technical issues such as copyright and social impact.

Assessment: project 75 per cent, quiz 25 per cent

49251

POWER SYSTEM EQUIPMENT

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: 45252 Power Apparatus and Systems or equivalent
teaching school: Electrical Engineering
coordinators: Prof V Ramsden, Dr J Carmo

The subject prepares students for advanced studies in power systems analysis and protection, focusing on equivalent circuit modelling of power systems equipment, methods of measuring and calculating equipment parameters, and principles governing design and construction. Topics include: the 3-phase power system; power transformers; synchronous alternators; induction motors; 3-phase transmission line; compensating and regulating plant; circuit breakers; earthing; measuring equipment and load characteristics.

Assessment: three assignments 50 per cent, two quizzes 50 per cent

49252

POWER SYSTEM ANALYSIS

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: 49251 Power System Equipment or equivalent
teaching school: Electrical Engineering
coordinators: Dr J Carmo, Mr P McLean

The subject develops engineering expertise in modelling and analysis of power systems, and covers the representation of 3-phase system elements; computation of power flows and steady faults; on-line state estimation; economic load dispatch; computation of asymmetric faults using symmetrical components and phase coordinates; harmonics; 3-phase switching transients; re-striking, ferroresonance and in-rush transients; modal analysis of 3-phase power lines; lightning surges; electromechanical transients in 2-machine and multimachine systems.

Assessment: experiments 20 per cent, problems 20 per cent, computing assignments 60 per cent

49253

POWER SYSTEM PROTECTION

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: 49251 Power System Equipment or equivalent
teaching school: Electrical Engineering
coordinators: Dr J Carmo, Mr P McLean

The subject develops engineering expertise in modern power systems protection, and covers the purpose, terminology and fault statistics of protection; the construction and operation of fuses, electromechanical, thermal, gas and oil relays; the induction disc relay; overcurrent protection IDMT and DT characteristics; grading; directional schemes; circulating current and voltage balance unit protection; biased and high impedance relays; application to feeder, transformer, motor, generator and capacitor protection; distance protection; derivation of relaying quantities; reactance, mho, quadrilateral characteristics; effect of power swings and load encroachment; overvoltage protection; insulation coordination and surge diverters.

Assessment: experiment 10 per cent, problems 30 per cent, assignment 60 per cent

49261

BIOMEDICAL INSTRUMENTATION

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisites: 91403 Medical Imaging or equivalent, 91461 Physiological Modelling or equivalent, 91421 Principles of Human Biology or equivalent
teaching school: Electrical Engineering
coordinator: A/Prof H Nguyen

This study covers general concepts that are applicable to all medical instrumentation systems, measurements of biopotentials and critical-care analytes for diagnostic purposes, and principles and design of biomedical devices for therapeutic purposes. There are three modules in this subject; sensors and amplifiers, vital sign monitoring for diagnostic purposes, and physiological intervention/closed-loop control.

Assessment: project work 50 per cent, seminar 20 per cent, final examination 30 per cent

49271

COMPUTER ARCHITECTURE

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisites: 45143 Computer Hardware, 45364 Digital Systems or equivalents
teaching school: Electrical Engineering
coordinator: Mr N J Carmody

The subject explores at an advanced level the issues that impact upon the hardware design of modern computers. This experience will enable the student with a quantitative definition of an application requirement to evaluate a propriety system, to develop a hardware system using standard sub-assemblies, and to design system components, such as specialised processor elements, which meet the application requirement.

Assessment: final examination 50 per cent, laboratories 30 per cent, assignments 20 per cent

49272

ADAPTIVE AND MULTIVARIABLE CONTROL

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: 45581 Analogue and Digital Control or equivalent
teaching school: Electrical Engineering
coordinator: Dr J G Nicol

This subject covers advanced techniques for modelling, analysis and design of systems suited to multivariable, adaptive or optimal control. Laboratory projects are conducted on a continuous basis through the semester. Topics include: direct and inverse Nyquist arrays, characteristic locus, robust control, pole shifting techniques, identification algorithms, minimum variance control, self-tuning adaptive regulators, linear quadratic regulatory design, state estimation and the Kalman filter.

Assessment: laboratory work including two seminar presentations 50 per cent, three out of four assignments 50 per cent

49273

RANDOM SIGNAL THEORY

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisites: 45145 Engineering Statistics or equivalent
teaching school: Electrical Engineering
coordinator: A/Prof S Reisenfeld

This subject provides fundamental background in probability theory, random variables, random processes, random sequences and the characteristics of special classes of random processes. It provides the basic mathematical prerequisites for practice and research in signal detection, estimation and stochastic control.

Assessment: assignments 30 per cent, final examinations 70 per cent

49274

ADVANCED ROBOTICS

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisites: 45123 Software Development, 45342 Electromechanical Systems
teaching school: Electrical Engineering
coordinator: Dr R Meegoda

This subject covers advanced topics in robotics and robot programming, including mechanical manipulation using robots, actuation, sensing and vision systems, and robotic applications. Upon completion of the course, the student is expected to be competent to program and control robots with up to six degrees of freedom. In addition, the student is expected to have sufficient understanding to build robots with two-dimensional (terrestrial) and three-dimensional (aquatic) motions using advanced techniques, such as subsumption architecture and artificial intelligence.

Assessment: assignments 30 per cent, laboratories and quizzes 10 per cent, final examination 60 per cent

49275

NEURAL NETWORKS AND FUZZY LOGIC

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisites: 45583 Adaptive and Multivariable Control, 45663 Digital Transmission or equivalents
teaching school: Electrical Engineering
coordinator: A/Prof H Nguyen

The principal objective of this subject is to introduce students to neural networks and fuzzy theory from an engineering perspective. In the identification and control of dynamic systems, neural networks and fuzzy systems can be implemented as model-free estimators and/or controllers. As trainable dynamical systems, these intelligent control systems can learn from experience with numerical and linguistic sample data.

49284

ADVANCED TOPICS IN COMPUTER-AIDED DESIGN OF ELECTRONIC CIRCUITS

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisites: 45153 Analogue Electronics, 45265 Numerical Methods or equivalents
teaching school: Electrical Engineering
coordinator: Dr B Rodanski

This subject is designed to give the students the knowledge and understanding of advanced concepts and techniques of computer-aided analysis and design of analogue electronic circuits and systems, with special emphasis on theoretical foundations and modelling principles.

Assessment: project 60 per cent, examination 40 per cent

49308

RAPID RESPONSE ENGINEERING

ME, MTech, GDE, GCE
6cp; 3hpw
teaching school: Mechanical Engineering
coordinator: A/Prof R M Spencer

World best practice in rapid response manufacturing is bench marked for applicability to Australian industry. Rapid response is linked through project and operational strategies in design and manufacture with time to market, concurrent engineering, forecasting uncertainty, lead time reduction, group technology, flexibility and modularity of products and processes.

Assessment: assignments, projects and tests

49309

QUALITY PLANNING AND AUDITING

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: an introduction to statistics as part of a completed degree in Engineering or a cognate discipline
teaching school: Mechanical Engineering
coordinators: Dr Y Bhasin and Dr H Chung

This subject provides an understanding of the philosophy, tools and techniques

applied to the development of total quality management through problem identification, costing, design, vendor supplies, customer service, institute quality auditing and the development of a quality assurance manual complying with relevant Australian Standards and supplier assessment schemes.

Assessment: assignments 35 per cent, examination 65 per cent

49311

ADVANCED HEAT TRANSFER

ME, MTech, GDE, GCE
6cp; 3hpw
teaching school: Mechanical Engineering
coordinator: Dr P Huynh

This subject develops concepts and methods for dealing with some advanced topics in heat transfer. These include boiling, natural convection and radiation. Numerical simulation and practical laboratory experiments are important components of the course.

Assessment: assignments, projects and/or an examination

49312

COMPUTATIONAL FLUID DYNAMICS

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisites: 46430 Thermofluids, 46830 Numerical Analysis, 46811 Computer Programming (FORTRAN or Pascal or C) or equivalents
teaching school: Mechanical Engineering
coordinators: Dr A Mack and Mr L Reece

This subject develops an appreciation of the nature of Computational Fluid Dynamics (CFD), its advantages and disadvantages, its capabilities and limitations. The subject provides knowledge of the numerical methods in CFD codes and experience in the practical application of commercial CFD packages. Importantly, it develops skill in the evaluation of solution integrity. On completion, students should have sufficient proficiency to undertake leadership roles in this rapidly developing field.

Assessment: projects 80 per cent, oral examination 20 per cent

49313

TURBOMACHINERY

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisites: 46430 Thermofluids or equivalent
teaching school: Mechanical Engineering
coordinator: Mr L Reece

Following a summary of relevant thermodynamics, fluid mechanics and energy transfer principles, the design and operation of a selection of axial flow machines incuding compressors, turbines, fans and pumps will be undertaken with reference to Newtonian and non-Newtonian fluids and slurry.

Assessment: assignments 30 per cent, laboratory reports 20 per cent, examination 50 per cent

49314

INTERNAL COMBUSTION ENGINES

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisites: 46430 Thermofluids, 46431 Heat Transfer or equivalents
teaching school: Mechanical Engineering
coordinator: Dr G Hong

This subject emphasises solutions to environmental and energy resource problems in the design and development of internal combustion (IC) engines. The contents include standards related to IC engine pollution, fundamentals of combustion, generation of emissions and noise, turbo charging, techniques for IC engine pollution control, alternative fuels, application of engine electronic control and management systems.

Assessment: assignments 20 per cent, laboratory 20 per cent, projects 60 per cent

49315

ADVANCED THERMAL SYSTEMS

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisites: 46430 Thermofluids, 46444 Power Cycles or equivalents
teaching school: Mechanical Engineering
coordinators: Mr J McCaffrey, Mr P Essam

There are a number of competing power generation technologies whose future depends upon economic performance under increasingly more stringent environmental protection requirements. New advanced technologies are now emerging which meet these goals and will eventually replace current pulverised coal technologies. The purpose of this course is to analyse the development of advanced coal fired, natural gas, including combined and cogeneration cycles, and biomass powered generation systems, with emphasis on efficiencies and the environmental protection features of each technology. Understanding these technologies requires the application of combustion chemistry, fluid mechanics, thermodynamics and heat transfer.

Assessment: assignments 40 per cent, projects: 60 per cent

49348

STOCHASTIC PROCESSES IN ENGINEERING

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: 31626 Probability and Statistics or equivalent
teaching schools: Mechanical Engineering and Civil Engineering
coordinators: Dr G Hong, A/Prof B Samali

This subject applies random process theory to engineering practice with emphasis on reliability analysis, prediction of statistical properties and the application of analytical results to engineering planning, design and quality control. Probability theory, random processes and relevant distributions are summarised; failure data collection and its analysis, experimental designs and linear and nonlinear systems with stochastic predictions are investigated.

Assessment: assignments and projects 50 per cent, final examination 50 per cent

49376

ADVANCED KINEMATICS AND DYNAMICS

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: 46130 Dynamics of Mechanical Systems
teaching school: Mechanical Engineering
coordinator: Dr F C O Sticher

This subject develops techniques in planar kinematics, synthesis of mechanisms and applies these techniques to real problems. It also presents the elements of spatial kinematics geometry, matrix transformations and dual number quaternion algebra with applications in robotics. Spatial dynamics is applied to whirling shaft problems with flywheels and gyroscopic motion with general applications such as initial guidance. Stress is placed upon conceptual understanding and the building of kinematic models, using computer-aided techniques where appropriate.

Assessment: four major assignments 70 per cent, one 'free-form' industrial assignment 30 per cent

49377

PROCESS CONTROL STUDIES

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: 46531 Control Engineering I or equivalent
teaching school: Mechanical Engineering
coordinator: Mr K Stillman

This subject explores the synthesis of control theory and computer systems as a means of controlling industrial plant and enhancing its productivity. Topics include: constraint control, statistical process control, override control, on-line optimisation and adaption. It includes visits to automated industrial plants to

study their design and the means of auditing their performance.

Assessment: tutorials 20 per cent, assignments 20 per cent, reports 20 per cent, final examination 40 per cent

49381

APPLICATIONS OF OPTIMISATION IN ENGINEERING

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: 46830 Numerical Analysis or equivalent
teaching school: Mechanical Engineering
coordinators: Mr K Stillman, Mr R Wiltshire

Following a review of the theoretical background of a selection of standard optimisation procedures, this subject applies the procedures to engineering problems. Software packages will be used for generating and testing the solutions. On completion, students should be able to formulate the objective function and constraints for a problem, make an informed choice of an appropriate algorithm and validate the solution in terms of sensitivity and local optimums. Contents include: linear programming and its extensions, unconstrained and constrained continuous problems, discontinuous problems and 'genetic' algorithms.

Assessment: assignments 70 per cent, final examination 30 per cent

49382

COMPUTER-BASED DATA AQUISITION AND ANALYSIS

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: 45163 Real-time Software and Interfacing or equivalent
teaching school: Mechanical Engineering
Coordinators: A/Prof R Stere, Mr D Webster, A/Prof H Nguyen.

This subject develops capability in the analysis, design, and practical implementation of Data Acquisition and Distribution Systems (DADS) interfacing computers to plant and installations.

Assessment: laboratory work, projects and assignments 60 per cent, examination 40 per cent

49383

VEHICLE DYNAMICS

ME, MTech, GDE, GCE
6cp; 3hpw
prerequisite: 46130 Dynamics of Mechanical Systems or equivalent, (46140 Kinematics and Dynamics or equivalent an advantage)
teaching school: Mechanical Engineering
coordinator: Dr F C O Sticher

Applies dynamic principles to the aims associated with the comfort and handling of road-going vehicles. Practical suspension, aerodynamic and transmission problems will be addressed.

49451

ENVIRONMENT OF PROFESSIONS IN LOCAL GOVERNMENT

MLGM, ME, MTech, GDE, GCE
6cp; block release totalling 36hrs
teaching school: Centre for Local Government Education and Research
coordinator: A/Prof J V Parkin

Establishes an understanding of cross-disciplinary competencies available in the professions working in local government. This provides a foundation for exploring management applications in later subjects.

Assessment: essay 40 per cent, class presentation 15 per cent, professional analysis 30 per cent, debate 15 per cent

49452

ENVIRONMENTAL MANAGEMENT

MLGM, ME, MTech, GDE, GCE
6cp; block release totalling 36hrs
prerequisite: 49451 Environment of Professions in Local Government
teaching school: Centre for Local Government Education and Research
coordinator: A/Prof J V Parkin

Examines current environmental issues and their implication at the local level. global, national and local policy approaches are evaluated as a basis for developing local government multi-disciplinary management approaches.

Assessment: three assignments 25 per cent each, case studies 15 per cent, debate 10 per cent

49453

INFRASTRUCTURE MANAGEMENT

MLGM, ME, MTech, GDE, GCE
6cp; block release totalling 36hrs
prerequisite: 21731 Resource Management or equivalent
teaching school: Centre for Local Government Education and Research
coordinator: Mr K Halstead

Examines current and likely future roles of local government in the provision of urban and regional infrastructure. Future infrastructure technologies are examined (such as information transfer), as are methods of public and private provision.

Assessment: essay on infrastructure 25 per cent, project 35 per cent, major assignment 40 per cent

49454

MANAGING LOCAL ENTERPRISE

MLGM, ME, MTech, GDE, GCE
6cp; block release totalling 36hrs
prerequisites: 21729 Human Resource Management (Public), 49453 Infrastructure Management or equivalents
teaching school: Centre for Local Government Education and Research
coordinator: A/Prof K Sproats

This subject, together with 21758 Strategic Management (Public) form the capstone of the course. Students prepare a management plan for a selected local development issue (such as unemployment or environmental degradation). The emphasis is on issues in a council's external environment.

Assessment: essay 20 per cent, presentation of case study 30 per cent, local enterprise management plan 50 per cent

49550

COMPUTING FOR GROUNDWATER SPECIALISTS (NON CREDIT)

MEGM, GDGM, ME, MTech, GDE, GCE
no cp; 3hpw
teaching school: National Centre for Groundwater Management
coordinator: A/Prof M J Knight

Provides the computing background needed for students with varying degrees of computer literacy. Topics covered include introduction to FORTRAN programming, mainframe, microcomputer operation systems, databases, spreadsheets, word processing, statistical and graphical packages with applications relating to groundwater processes.

Assessment: continuous assessment involving assignments and problems

49551

SURFACE HYDROLOGY AND GROUNDWATER

MEGM, GDGM, ME, MTech, GDE, GCE
5cp; 3hpw
teaching school: National Centre for Groundwater Management
coordinator: A/Prof M J Knight

This subject provides the interface process link between surface hydrology and groundwater. Topics include hydrological cycle, water and energy balances and circulation, precipitation, interception, infiltration, storm runoff, hydrograph analysis, evaporation and transpiration, surface and groundwater interactions, land-use effects, artificial recharge.

Assessment: continuous assessment involving assignments and problems and short examinations

49554

GROUNDWATER COMPUTING

MEGM, GDGM, ME, MTech, GDE, GCE
5cp; 3hpw
teaching school: National Centre for Groundwater Management
coordinator: A/Prof M J Knight

This subject provides a strong computing basis for groundwater management especially in the area of statistics and graphics as applied to groundwater problems involving computing. Introduction to FORTRAN programming, mainframe, microcomputer operation systems, databases, spreadsheets, word processing, elements of geostatistics and graphical packages with applications related to groundwater processes, groundwater computing project.

Assessment: continuous assessment involving assignments and problems.

Assignments and problems assessed at a more advanced level than 49550 Computing for Groundwater Specialists

49555

GROUNDWATER MODELLING

MEGM, GDGM, ME, MTech, GDE, GCE
5cp; 3hpw
corequisite: 49550 Computing for Groundwater Specialists
teaching school: National Centre for Groundwater Management
coordinator: A/Prof M J Knight

The subject provides the computer modelling tools required for practical groundwater resource management underpinned by an adequate appreciation of the underlying theory and computer algorithms. Topics include conceptual modelling, analytical modelling, numerical modelling and solution algorithms applied to the governing differential equations. Emphasis is placed on finite difference and finite element methods. Applications to groundwater resource studies, borefield management, optimisation problems.

Assessment: continuous assessment involving assignments, problems and short examinations

66014

HYDROGEOLOGY

MEGM, GDGM
5cp; 3hpw

This subject provides a knowledge of geological occurrence and hydraulics of groundwater flow, exploration techniques, extraction engineering and field management

66015

HYDROGEOCHEMISTRY

MEGM, GDGM
5cp; 3hpw

The subject covers the chemical basis for understanding how the chemistry of groundwater evolves both naturally and in the case of contamination. Both practical field measurement and computer modelling will be covered.

66016

GEOPHYSICS AND REMOTE SENSING

MEGM, GDGM
5cp; 3hpw

This subject examines both theoretically and practically the geophysical and remote sensing techniques applicable to groundwater resources evaluation and other environmental problems.

66017

GEOPOLLUTION MANAGEMENT

MEGM, GDGM
5cp; 3hpw

This subject studies the relationship between groundwater contamination and water quality together with appropriate waste management and disposal methods for minimal environmental impact. Contaminated land issues are also addressed.

66018

GROUNDWATER GEOPHYSICS

MEGM, GDGM
5cp; 3hpw

This subject presents an advanced application of geophysical techniques for groundwater research, resource management and includes contamination assessment and monitoring.

66025

CONTAMINATED SITE MANAGEMENT

MEGM, GDGM
5cp; 3hpw

The course content includes: regulatory requirements, site assessment methodology, physical, chemical and biological properties and behaviour of contaminants, health issues, risk assessment, site assessment technology, techniques and operation.

POSTGRADUATE SUBJECT NAMES IN ALPHABETICAL ORDER

SUBJECT SELECTION GUIDE FOR GRADUATE PROGRAM CONCENTRATIONS IN COURSEWORK DEGREES

This subject selection guide is intended for use by students in all programs leading to the following awards:

- Master of Engineering (by coursework)
- Master of Engineering Practice
- Master of Technology
- Graduate Diploma in Engineering
- Graduate Certificate in Engineering

SUBJECT AVAILABILITY

The Faculty of Engineering aims to offer an array of graduate subjects which allow flexibility in the development of programs matched to the professional objectives of its students.

The list of subjects in the postgraduate subject selection table indicates capability within the Faculty. The number of subjects which can be offered in any year is necessarily limited. Subjects scheduled for offer in any year will be determined by evidence of demand for places; the availability of academic staff; arrangements with visiting contributors from industry and overseas; and commitments to currently enrolled students. The 1995 timetable, to be finalised in December 1994, will provide details of subjects to be offered, modes of delivery (i.e. standard one-semester pattern, block release, short course etc.) and times.

Provision also exists for candidates in the above courses to undertake subjects offered by other faculties at UTS, other Universities (through their faculties of engineering), and other approved providers, including the Australian Graduate School of Engineering Innovation Ltd (AGSEI).

1995 PROGRAMS

The Faculty of Engineering has identified the following program concentrations for graduate studies in engineering in 1995:

- Local Government Engineering A
- Local Government Management B
- Water Engineering C
- Environmental Engineering D
- Structural Engineering E
- Groundwater Management F
- Telecommunications Engineering G
- Software Engineering H
- Information Systems Engineering I
- Power Systems Protection Engineering J
- Control Engineering K
- Energy Systems Engineering L
- Engineering Design M
- Engineering Management N
- Energy Planning and Policy O
- Manufacturing Engineering and Management P
- Microwave and Antenna Engineering Q

Further program concentrations may also be offered. The Faculty is constantly alert to the need to develop new subjects in areas of strong demand, particularly where this is accompanied by the possibility of industry involvement.

Note that some of these program concentrations (i.e. B, F, G and N) may be taken by students enrolling in a UTS course leading to one of the following awards:

- Master of Engineering in Telecommunications Engineering
- Master of Engineering in Groundwater Management
- Master of Engineering Management
- Master of Local Government Management

- Graduate Diploma in Engineering in Groundwater Management
- Graduate Diploma in Engineering in Local Government Engineering
- Graduate Certificate in Environmental Engineering and Management.

APPROVED SUBJECTS

The list of currently approved subjects available through the Graduate School of Engineering and which can be taken for credit as part of the courses listed above, is given in the postgraduate subject selection table on the following pages. Subjects which can only be taken through a single award course are not listed in Table 1.

This list may be amended prior to enrolment in January/February 1995; subjects to be offered in 1995 will be advised to applicants in December 1994.

The table lists graduate subjects in Engineering under a program classification. **This classification is indicative rather than prescriptive.**

Any additional subjects to be presented in 1995 which are not listed will be separately advertised.

These will typically be offered as short courses or in block-release mode.

APPROVAL OF PROGRAMS

Individual programs are approved at enrolment.

The selection of subjects should assure a coherent study program. Students may combine subjects from two or more program concentrations.

Individual subjects which are core to specific award courses may be taken as electives in a general program, class sizes permitting.

Normally students will not be allowed to take more than two subjects in either the Software Engineering or the Energy Planning and Policy concentrations without enrolling in the complete concentration.

GUIDE TO TABLE 1

The table shows how subjects might be combined to form coursework programs in each of the illustrative program concentrations A to Q described above. For each specified program concentration, subjects are classified in the table as follows

C a designated core subject

R a strongly recommended subject

E a suitable elective

As noted above, this classification is offered as a guide only, with the exception of subjects classified as core requirements of particular programs.

Candidates are encouraged to select subject combinations appropriate to their career needs, academic background, engineering experience and prior learning, in consultation with an academic adviser.

Candidates intending to include subjects from the postgraduate subject selection table for credit towards the Master of Engineering Practice degree should consult the Head of the Graduate School of Engineering for details of supplementary assessment requirements and credit weightings.

Details of subjects offered by other faculties at UTS, by AGSEI and by other metropolitan universities, and which may be recognised for credit, are given in the relevant handbooks.

ADVICE

Further advice on program and subject selection can be provided through consultation with an Academic Adviser.

POSTGRADUATE SUBJECT SELECTION TABLE

Code: *C = Designated core subject in specified program concentration*
R = Recommended elective for specified program concentration
E = Suitable elective in specified program concentration

Subject Number	Subject Name	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
	LOCAL GOVERNMENT ENGINEERING																	
49101	Environmental Planning	R			E		E								E			
49102	Traffic and Transportation	R	E		E													
49103	Management and Industrial Relations	R	E	E	E	R	E								E		E	
49104	Asset Maintenance Management	R	E	E	E	R	E								E		E	
49105	Water Supply and Wastewater Management	R	E	E	E		E											
49106	Road Engineering Practice	R	E		E													
49107	Storm Runoff Regulation	R	E	R	E		E											
49108	Local Government Law	R	E		E										E			
	LOCAL GOVERNMENT MANAGEMENT[1]																	
49451	Environment of Professions in Local Government	E	R															
49452	Environmental Management	E	R		R		E								R			
49453	Infrastructure Management	E	R												E			
49454	Managing Local Enterprise	E	R												E			
	WATER ENGINEERING																	
49111	Coastal Engineering	E	E	R	E													
49112	Urban Stormwater Flood Management	E	E	R	E		E											
49113	Urban Stormwater Pollution Management	E	E	R	E		E											
49114	Statistical Hydrology	E		R	E		E											
	ENVIRONMENTAL ENGINEERING[1]																	
49121	Environmental Assessment and Planning	E			R		E											
49122	Introduction to Environmental Engineering and Management	E			R		E								E		E	
49123	Waste Minimisation and Advances in Pollution Control	E			R													
49124	Urban Water Quality Management	E		R	R		E											
49125	Environmental Risk Assessment	E		E	R		E											
49126	Land Resource and Environmental Management	E	R	E	R		R							E				

Subject Number	Subject Name	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
	STRUCTURAL ENGINEERING																	
49130	Marine Structures	E		E		R												
49131	Medium Span Bridges	E				R								E				
49132	Stability of Structures	E				R						E		E				
49133	Steel and Composite Design					R								E				
49134	Structural Dynamics					R						E		R				
49135	Wind Engineering	E			E	R												
49136	Application of Timber in Engineered Structures	E				R								R				
	GEOTECHNICAL ENGINEERING																	
49141	Advanced Geomechanics	E			E	R	E							E				
49142	Advanced Ground Modification	E	E		E	R	E							E				
	MATERIALS ENGINEERING																	
49151	Advanced Concrete Technology					R												
49152	Damage and Repair of Concrete Structures	E				R												
	GROUNDWATER MANAGEMENT[1]																	
49550	Computing for Groundwater Specialists (non credit)						R											
49551	Surface Hydrology and Groundwater	E		R	E		R											
49554	Groundwater Computing			R	E		R											
49555	Groundwater Modelling	E		R	E		R											
	TELECOMMUNICATIONS ENGINEERING																	
49201	Integrated Services Networks							R	E	E								E
49202	Communication Protocols							R	E	E								E
49203	Telecommunications Signal Processing							R	E	E	E			E				E
49204	Advanced Teletraffic Engineering							R	E									E
49205	Transmission Systems							R	E									E
49206	Advanced Studies in Electromagnetic Compatibility							R	E		E			R				R
49207	Wave Propagation for Microwave and Mobile Communciations							R	E					E				R
49208	Telecommunications Management							R							E			E
	SOFTWARE ENGINEERING																	
49211	Software Engineering Principles	E		E	E	E	E	E	C	E	E	E	E	E		E	E	E
49212	Object-oriented Software Development							E	C	E								
49213	Software Structured Analysis and Design							E	C	E		E						

Subject Number	Subject Name	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
	SOFTWARE ENGINEERING (continued)																	
49214	UNIX and C							E	C	E								
49215	ADA Programming Language							E	C	E								
49216	Algorithms and Data Structures							E	C	E								
49217	Software Verification and Validation							E	C	E		E						
49218	Development of Real-time Software							E	C	E		E						
49219	Program Configuration and Management	E	E			E		E	C	E		E			E			
49220	Real-time Programming							E	R	E		E						
49221	Software Document Production							E	R	E		E			E			
49222	Databases							E	R	E		E						
49223	Human/Machine Interfaces							E	R	E		E					E	
49224	Software for Automation							E	R	E		E					E	
	INFORMATION SYSTEMS ENGINEERING[1]																	
49241	Hypermedia Technologies			E		E		E	R	R		E		E				
49242	Image Computing							E	R	R		E		E				
49243	Design of Hypermedia Information Systems							E	R	R				E				
49031	Information Structures, Perceptions and User Interface Design							E	R	R				E				
	POWER SYSTEMS PROTECTION ENGINEERING																	
49251	Power System Equipment										R			E				
49252	Power System Analysis				E						R							
49253	Power System Protection										R							
	BIOMEDICAL ENGINEERING																	
49261	Biomedical Instrumentation							E	E		E			E				
	CONTROL ENGINEERING																	
49271	Computer Architecture							E	E		E	E		E			E	
49272	Adaptive and Multivariable Control								E		R	R	E	E			E	
49273	Random Signal Theory							E		E	E	E		E			E	E
49274	Advanced Robotics								E			E		E			R	
49275	Neural Networks and Fuzzy Logic							E	E	E	E	R	E	E			E	
49376	Advanced Kinematics and Dynamics											E		E			E	
49377	Process Control Studies			E								R		E			E	

Subject Number	Subject Name	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
	ENERGY SYSTEMS ENGINEERING																	
49311	Advanced Heat Transfer											E	R	E			E	
49312	Computational Fluid Dynamics												R	E			E	
49313	Turbomachinery												R	E			E	
49314	Internal Combustion Engines												R	E			E	
49315	Advanced Thermal Systems												R	E			E	
	ENGINEERING DESIGN																	
49080	Statistical Systems Design							E				E	E	R			E	E
49381	Applications of Optimisation in Engineering										E	E	E	R			E	
49382	Computer-based Data Acquisition and Analysis											R	E	R			R	
49383	Vehicle Dynamics											E		E			E	
49284	Advanced Topics in Computer-aided Design of Electronic Circuits							E						R			E	E
	ENGINEERING MANAGEMENT[2]																	
49001	Management Decisions	E	E	E	E	E	E	E	E	E	E	E	E	E	R	E	R	E
49002	Project Management	E	E	E	E	E	E	E	E	E	E	E	E	E	R	E	R	E
49003	Economics for Engineers	E	E	E	E	E	E	E	E	E	E	E	E	E	R		R	E
49004	Systems Engineering and Decision Modelling	E	E	E	E	E	E	E	E	E	E	E	E	E	R	E	R	E
49005	Technological Change		E		E					E					R		R	
49007	Social Impacts of Engineering	E	E	E	E	E	E	E	E	E	E	E	E	E	R	E	R	E
49308	Rapid Response Engineering													E	R		R	
49309	Quality Planning and Auditing	E	E	E	E			E		E				E	R		R	
	ENERGY PLANNING AND POLICY																	
49021	Evaluation of Energy Investments	E	E		E						E		E		E	C		
49022	Energy Resources and Technology		E		E						E		E		E	C		
49023	Energy Economics	E	E		E						E		E		E	C		
49024	Energy Modelling	E	E		E						E		E		E	C		
49025	Methods for Energy Analysis										E					C		
49026	Electricity Sector Planning										E					R		
49027	Energy Demand Analysis and Forecasting										E					R		
49028	Policy and Planning of Energy Conservation				E								E			R		
49029	Environmental Policy for Energy Systems				E											R		

	GRADUATE SCHOOL SERVICE SUBJECTS																	
49040	Graduate Seminar	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
49041	Engineering Research Methodology	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
49042	Graduate Project (MASTER'S COURSES ONLY)	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
49043	Special Course	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
49044	Engineering Communication and Documentation	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
49045	Engineering for Law[3]																	
49046	Numerical Methods in Engineering					E		E			E	E	E	R				
49047	Finite Element Applications in Structural Mechanics					R								E				
49348	Stochastic Processes in Engineering											E		E			E	
49006	Risk Management in Engineering	E	E	E	E	E	E	E	E	E	E	E	E	E	R	E	R	E

[1] Entries here do not include subjects in this program concentration offered by the Faculty of Humanities and Social Sciences and other faculties at UTS.

[2] Entries here do not include subjects in this program concentration offered by the Faculty of Business and other faculties at UTS.

[3] Intended mainly for legal practitioners.

POSTGRADUATE TEACHING STAFF

	Room	Ext
Graduate School of Engineering		
Head of School		
Professor W R Belcher	1/2419C	2423
Associate Head of School		
Associate Professor B Samali	513	2632
Director of Management Studies in Engineering		
Associate Professor J V Parkin	2/520	2638
School of Civil Engineering		
Building 2, Level 5		
Head of School		
Associate Professor G G O'Loughlin Water Engineering	511C	2644
Deputy Head of School		
Mr E A Brady Surveying	511A	2627
Professors of Civil Engineering		
Emeritus Professor K A Faulkes Concrete Structures	526	2646
Professor S L Bakoss Structural Mechanics	528	2629
Associate Professors		
Associate Professor T A Anderson Construction and Management	521	2639
Associate Professor M R Hausmann Soil Engineering	527	2645
Associate Professor B Samali Structural Dynamics and Structural Mechanics	513	2632
Associate Professor S Vigneswaran Environmental Engineering	523	2641
Academic Staff		
Dr S Beecham Water Engineering	507	2623
Dr H W Chung Construction Materials	519	2637
Mr K Crews Timber Enginneering	503	2619
Mr K J Halstead Local Government Engineering	522	2640
Dr J W Ivering Civil Engineering Design	529	2647
Mr E Jankulovski Structural Stability, Seismic Design	525	2021

Dr M R Karim Structural Mechanics	505	2621
Mr P J Kenny Road Engineering	502	2618
Dr K L Lai Design and Construction	510	2626
Mr P C Liu Civil Engineering Design	508	2624
Dr S Parsanejad Design of Steel Structures, Structural Analysis	504	2620
Dr M Patarapanich Water Engineering	524	2642
Mr W G Peters Civil Engineering Design	518	2636
Dr G L Ring Soil Engineering	506	2622
Dr A Saleh Structural Mechanics and Analysis	517	2635
Mr K Shafiuddin Water Engineering	501	2617
Dr R Sri Ravindrarajah Concrete Technology	509	2625
Mr C Wilkinson Structural Mechanics – Fabric Structures	537	2631
School of Electrical Engineering		
Building 1, Levels 22 to 25		
Professor of Electrical Engineering and Head of School Professor K W Yates Communication System Theory, Signal Processing, Digital Radio Transmission and Multiple Access, Spread Spectrum Communications	2427	2436
Deputy Head of School Mr W G Hooper Power Systems, Electromagnetic Theory, Educational Psychology, Electrical Plant Design	2428	2438
Professors of Electrical Engineering		
Professor W R Belcher Antenna & Microwave Systems, Communication Systems, Systems Engineering	2419C	2423
Professor C R Drane Satellite Positioning Systems, Multimedia Telecommunications, Software Engineering	2221B	2390

Professor V S Ramsden Electrical Machines, Electrical Variable Speed Drives, Rehabilitation Engineering, Field Theory, Electromagnetics	2417C	2420
Associate Professors		
Associate Professor P Bryce Microhydro-electricity, Appropriate Technology, Fibre Optic Communications, Electromagnetic Theory	2420A	2425
Associate Professor T Buczkowska Microcomputer System Design, Software Engineering, Computer Networks, Data Communications	2542	2458
Associate Professor A Ginige Digital Systems, Systems Engineering, Image Processing, Real-time Systems, Rehabilitation Engineering, Computer Networks, Rehabilitation Engineering	2224B	2393
Associate Professor H T Nguyen Control Systems Theory, Power Electronics, Control Theory, Instrumentation, Machine Control, Production Processes, Real-time Signal Processing, Computer Simulation, Computer Systems	2517	2451
Associate Professor C E Peterson Computer-integrated Manufacturing, Image Analysis, Process Control, Robotics, Artificial Intelligence	2220A	2392
Associate Professor S Reisenfeld Communication Systems, Satellite Communication, Information Theory, Modulation Channel Coding, Synchronisation	2512B	2448
Associate Professor A Seneviratne Data Communications, Protocol Design, Software Engineering, Computer Networks	2431	2441
Other academic staff		
Dr J D Carmo Electromagnetics, Reliability Theory, Numerical Methods and Optimisation	1921	2338

Mr N J Carmody Microcomputer System Design, Operating Systems, Computer Architecture, VLSI, Digital Control Systems	2221C	2391
Mr K K Fung Parallel Processing, Software Engineering	2225	2394
Mr G I Gedgovd Power Systems, Computer Applications, Operations Research, Numerical Methods and Optimisation, Educational Research	2420E	2429
Ms T Ginige Telecommunications	2323B	1911
Mr J R M Leaney System Engineering, Software Engineering, Computer Systems Design, Real-time Computing, Microprocessor-based Instrumentation, Industrial Control	2221A	2389
Mr Peter Lewis Engineering Education, Engineering Management, Project Management	2420C	2431
Dr David Lowe Software Engineering, Image Processing	2211	2526
Ms V McKain Biomedical Engineering	2433	2443
Mr P McLean Power Systems	1921	2339
Dr R Meegoda CASE Tools and Expert Systems, Communications and Protocol Design, CSI, MAP, TOP, Computer Integrated Manufacture and Robotics, CAD/CAM, Control Systems	2227	2396
Ms S Murray Computer Hardware	2520A	1553
Dr J G Nicol Control Theory, Optimal Control, Multivariable Control	2431	2370
Dr V Ramaswamy Power Electronics, Electrical Machines, Computer Systems	2417A	2418
Dr B S Rodanski Device Modelling for CAD, Numerical Methods, Computer-aided Design, Software Engineering	2420	2426

Dr A M Sanagavarapu Electromagnetic Compatibility, Antennas	2512A	2447
Dr D Sharma Energy Planning and Policy, Energy Economics, Energy Management, Decision Process Modelling, Institutional Restructuring Project, Planning and Performance	2419C	2422
Dr T J Stevenson Signal Processing, Communication Systems, Electromagnetics	2545	2460
Ms E A Taylor Sociology and Engineering, Engineering Education, Appropriate Technology, Law and Engineering	2432	2442
Mr J G Zhu Electrical Machines, Electrical Variable Speed Drives, Field Theory, Electromagnetics	1823	2318
Adjunct Professors		
Professor E W Aslaksen Systems Engineering, Professional Development	--	2433
Associate Professor R Stere Instrumentation and Control	--	2433
School of Mechanical Engineering		
Building 2, Level 6		
Head of School Associate Professor S F Johnston Design, Ergonomics, Social Context of Technology	612B	2668
Deputy Head of School Mr K A Stillman Control Engineering, Chemical Engineering, Real-time Computing, Simulation, Optimisation	624	2682
Professor of Mechanical Engineering Professor J P Gostelow Turbomachinery, Gas Turbines, Fluid Mechanics, Innovation	429B 627	2603 2685
James N Kirby Professor of Manufacturing Engineering Professor F B Swinkels Design for Manufacturing, Materials, Computer-aided Design and Computer-aided Manufacturing	416	2588

Associate Professors

Associate Professor C T Mathews Control Engineering, Industrial Instrumentation, Energy Resources, Technical Change, Engineering Management, Manufacturing, Engineering Education	628	2686
Associate Professor R M Spencer Production Planning and Control, Product Process Design and Development, Computer-aided Manufacture, Metrology/CMM, Robotics	606	2660

Other academic staff

Dr Y P Bhasin Operations Management, Work Study, Planning and Control, Engineering Economics, Quality and Reliability, Manufacturing Processes	605	2659
Mr A J Burfitt Stress Analysis, Photoelasticity, Design	630	2689
Dr G Hong Turbulence Transition, Internal Combustion Engines, Thermodynamics, Engineering Statistics	619	2677
Dr B P Huynh Computational Mechanics, Fluid Mechanics, Heat Transfer	616	2675
Dr A N F Mack Computing, Aerodynamics, Finite Element Methods, Computational Fluid Dynamics	626	2684
Mr G M Marks Appropriate Technology, Industry Development Policy, Mechanics, Engineering Education	625	2683
Mrs H McGregor Human Communication, Engineering and Social Issues, Engineering Documentation Education and Professional Development	620	2678
Mr L E Reece Turbomachinery, Computer-aided Engineering, Thermofluids, Ergonomics, Philosophy of Technology	613	2673
Mr S Spain Design, Control Engineering	629	2688

Dr F C O Sticher Advanced Kinematics and Dynamics, Instrumentation	623	2681
Dr R B Ward Engineering Management, Technical Communication, Maintenance, Hazard and Risk Analysis	621	2679
Mr R M Wiltshire Stress Analysis, Structural and Vehicle Dynamics, Machine Design, Computer-aided Engineering	416	2586
National Centre for Groundwater Management		
Centre Director		
Associate Professor M J Knight Groundwater Contamination – Waste-disposal	1/1715	1984
Senior Lecturers		
Dr W A Milne-Home Hydrogeology, Pump Test Analysis, Isotope Applications	1/1715	1984
Mr N P Merrick Groundwater Modelling and Geophysics	1/1715	1984
Lecturer		
Dr R McLaughlan Groundwater Contamination, Bore Corrosion and Performance.	1/1715	1984
Centre for Local Government Education and Research		
Centre Director		
Associate Professor K Sproats	1/1714	330 2643

SCHEDULE 1.1

EXEMPTIONS/ADVANCED STANDING BASED ON COMPLETED TAFE ASSOCIATE DIPLOMAS

TAFE course: 2974 Associate Diploma of Engineering (Civil Engineering)

UTS courses: Bachelor of Engineering in Civil Engineering
Bachelor of Engineering in Structural Engineering

Specified Credit:

Subject Number	Name	Credit Points	Related TAFE Subject(s)	
47110	Intro Civil Eng	3	6999Z	Civil Eng Contextual Studies
47120	Graphics	3	2959A	Drawing
47113	Computer Programming	3	2973A	Computer Graphics and Applns I
			2973B	Computer Graphics and Applns II
47118	Surveying 1A	3	2959B	Surveying I
47128	Surveying 1B	3	2960C	Surveying II
51131	Communication 1	3	8979D	Communication Studies
			8979E	Communication Workshop
47149	Construction	3	2959F	Building and Engineering Construction
47154	Concrete Technology	3	2959M	Concrete Technology II
47146	Soil Mechanics	4	2960B	Soil Technology I
Additional Credit for holders of 2974 Associate Diploma of Engineering (Civil Engineering) with Distinction				
51161	Communication 2	3	8979D	Communication Studies
			8979E	Communication Workshop
47178	Project Economics	3	2959J	Engineering Management
47135	Fluid Mechanics	4	2974B	Hydraulics
47144	Timber Design	3	2960C	Structures
	Project and Electives	6		

Comments

a) Based on completed Credit grade Associate Diploma with A or B level passes in individual subjects.

b) Academic and industrial requirements of the BE have to be individually satisfied, and exemption from one one does not imply pro rata exemption from the other.

SCHEDULE 1.2

EXEMPTIONS/ADVANCED STANDING BASED ON COMPLETED TAFE ASSOCIATE DIPLOMAS

TAFE course: 2973 Associate Diploma of Engineering (Structural Engineering)

UTS courses: Bachelor of Engineering in Civil Engineering
Bachelor of Engineering in Structural Engineering

Specified Credit:

Subject Number	Name	Credit Points	Related TAFE Subject(s)	
47110	Intro Civil Eng	3	6999Z	Civil Eng Contextual Studies
47120	Graphics	3	2959A	Drawing
47113	Computer Programming	3	2973A	Computer Graphics and Applns I
			2973B	Computer Graphics and Applns II
47118	Surveying 1A	3	2959B	Surveying I
51131	Communication 1	3	8979D	Communication Studies
			8979E	Communication Workshop
47149	Construction	3	2959F	Building and Engineering Construction
47154	Concrete Technology	3	2959M	Concrete Technology II
47140	Concrete Design 1	3	2959K	Reinforced Concrete Drawing and Design A level pass
47161	Steel Design 1	3	2959L	Structural Steel Drawing and Design
47117	Statics	4	2959G	Structural Principles and Drawing II
47127	Mechanics of Solids 1	4	2959G	Structural Principles and Drawing II

Additional Credit for holders of 2973 Associate Diploma of Engineering (Structural Engineering) with Distinction

51161	Communication 2	3	8979D	Communication Studies
			8979E	Communication Workshop
47137	Domestic Building Design and Constr	3	2959F	Building and Eng Construction
47128	Surveying 1B	3	2959B	Surveying 1
47178	Project Economics	3	2959S	Engineering Management

Comments

a) Based on completed Credit grade Associate Diploma with A or B level passes in individual subjects. If A level pass is the specific requirement, this is noted in the listing.

b) Academic and industrial requirements of the BE have to be individually satisfied, and exemption from one one does not imply pro rata exemption from the other.

SCHEDULE 1.3

EXEMPTIONS/ADVANCED STANDING BASED ON COMPLETED TAFE ASSOCIATE DIPLOMAS

TAFE course: 2975 Associate Diploma of Engineering (Survey Drafting)

UTS course: Bachelor of Engineering in Civil Engineering

Specified Credit:

Subject Number	Name	Credit Points	Related TAFE Subject(s)	
47110	Intro Civil Eng	3	6999Z	Civil Eng Contextual Studies
47120	Graphics	3	2907J	General Survey Drafting
47113	Computer Programming	3	2962E	Computing Techniques and Graphics
47118	Surveying 1A	3	2907F	Land and Engineering Surveying
51131	Communication 1	3	8979D	Communication Studies
			8979E	Communication Workshop

Comments

a) Based on completed Credit grade Associate Diploma with A or B level passes in individual subjects.

b) Academic and industrial requirements of the BE have to be individually satisfied, and exemption from one one does not imply pro rata exemption from the other.

SCHEDULE 1.4

EXEMPTIONS/ADVANCED STANDING BASED ON COMPLETED TAFE ASSOCIATE DIPLOMAS

TAFE course: 2976 Associate Diploma of Engineering (Surveying)

UTS course: Bachelor of Engineering in Civil Engineering

Specified Credit:

Subject Number	Name	Credit Points	Related TAFE Subject(s)	
47110	Intro Civil Eng	3	6999Z	Civil Eng Contextual Studies
47120	Graphics	3	2976C	Data Presentation
47113	Computer Programming	3	2976M	Advanced Computations
47118	Surveying 1A	3	2976A	Surveying I
47128	Surveying 1B	3	2976F	Surveying II
47168	Surveying 2	3	2976Q	Advanced Surveying
51131	Communication 1	3	8979D	Communication Studies
			8979E	Communication Workshop

Comments

a) Based on completed Credit grade Associate Diploma with A or B level passes in individual subjects.

b) Academic and industrial requirements of the BE have to be individually satisfied, and exemption from one does not imply pro rata exemption from the other.

SCHEDULE 1.5

EXEMPTIONS/ADVANCED STANDING BASED ON COMPLETED TAFE ASSOCIATE DIPLOMAS

TAFE course: 2840 Associate Diploma of Electrical Engineering

UTS courses: Bachelor of Engineering in Electrical Engineering
Bachelor of Engineering in Computer Systems Engineering

Specified Credit:

Subject Number	Name	Credit Points	Related TAFE Subject(s)	
35101	Mathematics 1	6	2840W	Engineering Mathematics
45113	Digital Techniques	3	2840BG	Digital Electronics 2
45116	Electrical Engineering 1	3	Credit or Distinction level Diploma	
45123	Software Development 1	6	2390E	Data Entry Techniques
			2840AC	Engineering Software I
			2840CX	Engineering Software II
			2840AJ	Computer Systems
63734	Materials Technology	3	1191Q	Engineering Materials Electrical
45134	Network Theory	6	2840AF	Circuit Analysis I
			2840BA	Circuit Analysis II
			2840CD	Circuit Analysis III
			2840BP	Power Circuit Principles
45135	Eng Communication	3	2840BH	Drawing Principles
45144	Electronic Devices and Ccts	6	2840AG	Electronics 1A
			2840AK	Electronics 1B
			2840BM	Electronics 2A
			2840BN	Electronics 2B
45115	Engineering Practice	3	Credit or Distinction level Diploma	
45125	Engineering Discovery	3	Credit or Distinction level Diploma	

Additional credit for holders of 2840 Associate Diploma of Engineering (Electrical Engineering) with Distinction

45155	Project A	3	Distinction level Diploma
	Professional Elective	3	Distinction level Diploma

Comment:

a) Based on completed Credit grade Associate Diploma with A or B passes in individual subjects.

b) Academic and industrial requirements of the BE have to be individually satisfied, and exemption from one does not imply pro rata exemption from the other.

SCHEDULE 1.6

EXEMPTIONS/ADVANCED STANDING BASED ON COMPLETED TAFE ASSOCIATE DIPLOMAS

TAFE course: 7703 Associate Diploma of Engineering (Mechanical Engineering)

UTS courses: Bachelor of Engineering in Mechanical Engineering
Bachelor of Engineering in Manufacturing Systems Engineering

Specified Credit:

Subject Number	Name	Credit Points	Related TAFE Subject(s)	
46311	Engineering Graphics	4	7703A	Engineering Drawing
46710	Materials Processing	4	5299K 5299L	Workshop A Workshop B
46620	Eng Communication	4	6990S	Industrial Communication
63127	Elect Eng 1 (Mech)	4	2890S	Electrical Technology
46810	Intro to Computing	4	7703C 7703N	Eng Computing 1 Eng Computing 2
33121	Engineering Maths 1A	3	6992L	Mathematics D

Additional credit for holders of Associate Diploma of Engineering (Mechanical Engineering) with Distinction

46110	Mechanics 1	6
46310	Intro to Engineering	4
65023	Engineering Chemistry	6*
67021	Materials Engineering 1	4*
68011	Eng Physics (Mech)	4**

* With achievement of at least 70 per cent in 2-unit HSC Chemistry
** With achievement of at least 70 per cent in 2-unit HSC Physics

Comments

a) Based on completed Credit grade Associate Diploma with A or B level passes in individual subjects.
b) Academic and industrial requirements of the BE have to be individually satisfied, and exemption from one does not imply pro rata exemption from the other.
c) Students with a pass grade Associate Diploma are not normally admitted to the BE degree program.

SCHEDULE 1.7

EXEMPTIONS/ADVANCED STANDING BASED ON COMPLETED TAFE DIPLOMAS

TAFE course: 7705 Diploma of Engineering in Industrial Engineering

UTS courses: Bachelor of Engineering in Manufacturing Systems Engineering

Specified Credit:

Subject Number	Name	Credit Points	Related TAFE Subject(s)	
46715	Manufacturing Processes	6	5299K	Workshop A
			5299L	Workshop B
46741	Flexible Manufacturing	4	7705J	Application of JIT
			7705EV	Flexible Manuf. Systems
46311	Engineering Graphics	4	7703A	Engineering Drawing 1
46742	Production and Cost Control	4	7705F	Process Planning
			7705G	Cost Control
46810	Intro to Computing	4	7703C	Eng Computing 1
			7703N	Eng Computing 2
33121	Engineering Maths 1A	3	6992L	Mathematics D
	Professional Elective	4	7705EL	Plastics Technology

Comments

a) Based on completed Credit grade Associate Diploma with A or B level passes in individual subjects.

b) Academic and industrial requirements of the BE have to be individually satisfied, and exemption from one does not imply pro rata exemption from the other.

c) Holders of Distinction level Associate Diplomas may be entitled to additional credit on application.

d) Students with a pass grade Associate Diploma are not normally admitted to the BE degree program.

FACULTY BOARD IN ENGINEERING

as at 30 September 1994

Ex officio members

Dean of the Faculty
Professor P J Parr

Head, School of Civil Engineering
Associate Professor G G O'Loughlin

Head, School of Mechanical Engineering
Associate Professor S F Johnston

Head, School of Electrical Engineering
Professor K W Yates

Head, Graduate School of Engineering
Professor W R Belcher

Director, National Centre for Groundwater Management
Associate Professor M J Knight

Director, Industrial Liaison
Mr J G Crowe

Professors
Professor C R Drane
Professor K A Faulkes
Professor J P Gostelow
Professor A Pattison
Professor V S Ramsden
Professor F B Swinkels
Professor S L Bakoss

Nominated members

Nominee of the University Librarian
Ms A Newton

Nominee of the Director, Centre for Learning and Teaching
Associate Professor E Hazel

Nominee of the Dean from the Faculty Board in Business
Mr K Pearson

Nominee of the Dean from the Faculty Board in Mathematical and Computing Sciences
Dr G McLelland

Nominee of the Dean from the Faculty Board in Science
Dr D C Green

Elected members

Six academic staff members of the School of Civil Engineering
Associate Professor T A Anderson
Mr E A Brady
Dr M R Karim
Dr S Parsanejad
Dr R Sri Ravindrarajah
Associate Professor B Samali

Six academic staff members of the School of Electrical Engineering
Mr K K Fung
Mr W G Hooper
Associate Professor C E Peterson
Dr B S Rodanski
Dr A M Sanagavarapu
Dr T J Stevenson

Six academic staff members of the School of Mechanical Engineering
Dr Y P Bhasin
Mr A J Burfitt
Dr G Hong
Ms H McGregor
Mr K A Stillman
Associate Professor R M Spencer

One member of support staff from the Faculty
Mr A C Curgenven

One undergraduate student elected by and from the students of the School of Civil Engineering
vacant

One undergraduate student elected by and from the students of the School of Electrical Engineering
Mr D Ciocarelli

One undergraduate student elected by and from the students of the School of Mechanical Engineering
vacant

Two postgraduate students of the Faculty, one of whom shall be elected by and from the students undertaking coursework degrees
Mr M Evans
Mr W Mubaiwa

Up to three members appointed by the Faculty Board on the recommendation of the Dean
Associate Professor C T Mathews
Associate Professor J V Parkin
Associate Professor K Sproats

COMPOSITION OF SCHOOL BOARDS

Head of School (Chair);

All permanent or fractional (but not part-time) members of academic staff;

Not less than two nor more than five members of professional, technical and administrative staff appointed by the Head of School;

A member of academic staff from each of the other two schools, nominated by the head of School;

Two students of the School, elected by the School Assembly.

ADVISORY COMMITTEES

SCHOOL OF CIVIL ENGINEERING ADVISORY COMMITTEE

Chairperson

Mr Neil Turner
Director
Government Programs
NSW Department of Public Works

Industry members

Mr Alan Chappel
Managing Director
Connell Wagner NSW Pty Ltd

Dr John Nutt
Senior Partner
Ove Arup and Partners Consulting Engineers

Mr Geoff Youdale
General Manager – Technology Development
Roads and Traffic Authority

Mr Chris Little
Divisional Manager, Engineering
Hurstville City Council

Mr Terry Gibson
Associate Director
McMillan Britton and Kell Pty Ltd

Ms Sue Ribbons
Engineer
Bewsher Consultants

UTS staff

Professor Peter Parr
Dean, Faculty of Engineering

Associate Professor Geoff O'Loughlin
Head, School of Civil Engineering

Mr Alan Brady
Deputy Head, School of Civil Engineering

Secretary

Ms Deborah Carraro, Faculty Administrator

Observer

Mr John Crowe, Director, Industrial Liaison

SCHOOL OF ELECTRICAL ENGINEERING ADVISORY COMMITTEE

Chairperson

Mr Edwin Matiuk
Managing Director
Siemens Plessey Electronic Systems Pty Ltd

Industry members

Ms Karen Ganschow
Services Product Manager
Optus Communications Pty Ltd

Mr Noel Godfrey
Engineering Manager
BHP Engineering Pty Ltd

Dr Jim Harvey
Managing Director
Microwave Networks Australia Pty Ltd

Mr Ian Stuart
Chief Manager, Engineering
Pacific Power

Dr Robert Gill
Project Leader
Ultrasonics Laboratory
CSIRO Division of Radiophysics

UTS staff

Professor Peter Parr
Dean, Faculty of Engineering

Professor Warren Yates
Head, School of Electrical Engineering

Professor Chris Drane
School of Electrical Engineering

Secretary

Ms Deborah Carraro, Faculty Administrator

Observer

Mr John Crowe, Director, Industrial Liaison

SCHOOL OF MECHANICAL ENGINEERING ADVISORY COMMITTEE

Chairperson

Mr Bob McGregor

Industry members

Mr Michael Kirby
Sales Director
James N Kirby Pty Ltd

Mr Paul Dewar
Engineering Manager – Boilers, Fuel & Water Systems
Power Plant Engineering
Pacific Power Services

Mr John Planner
Principal
GHD – Black and Veatch Pty Ltd
Consulting Engineers

Dr Darryl Smith
Regional General Manager
Boral Gas Ltd

Mr Andrew McColl
Manager
Organisation Effectiveness
Comalco Rolled Products

Mr John Burke
Manager
EMSYS Coordinator
Qantas Airways Ltd

Mr Robert Mander
Manager
Composite Can Division NSW
Containers Packaging

Ms Fiona Herbert
Engineer
Cyanamid Pty Ltd

UTS staff

Professor Peter Parr
Dean, Faculty of Engineering

Associate Professor Stephen Johnston
Head, School of Mechanical Engineering

Professor Frank Swinkels
Professor of Manufacturing Engineering

Secretary

Ms Deborah Carraro, Faculty Administrator

Observer

Mr John Crowe, Director, Industrial Liaison

BACHELOR OF TECHNOLOGY COURSE REVIEW COMMITTEE

Industry members

Mr David Lewis
Manufacturing Systems
Manufacturing Training Division of TAFE

Ms Rilda Mossop
National Coordinator
National Metals and Engineering Training Board

Mr Con Lyras
Manager Planning and Facilities
QANTAS Airways Ltd

Mr Alan Whiteley
General Manager (Development)
Warman International Ltd

Mr Ian McArthur
Chief Engineer
Hawker de Havilland Ltd

Mr Jan Waszczuk
Production Technology Manager
Exicom

Mr Michael Kirby
Sales Director
James N Kirby Pty Ltd

Mr Mark Connolly
Team Leader Engineering Officer/ Professional Officer Programs
Pacific Power

UTS staff

Professor Peter Parr
Dean, Faculty of Engineering

Associate Professor Clive Mathews
Director, Bachelor of Technology (MSE Eng)
Faculty of Engineering

Professor Allan Pattison
Faculty of Engineering

Secretary

Ms Ruth Ciudad
Administrative Secretary
Faculty of Engineering

STAFF LIST

Professor of Electrical Engineering and Dean of Engineering
P J Parr, MSc, PhD (Belf), FIEAust, CPEng

Secretary to the Dean
E Tu

Faculty Administrator
D J Carraro, BA (NE)

Professor
A Pattison, MSc, PhD (Stan), ASTC, FIEAust, CPEng

Associate Professor and Director, Management Studies in Engineering
J V Parkin, MSc, MEnvStud, PhD (UNSW), FIEAust, CPEng, FICE

Associate Professor and Director, Bachelor of Technology
C T Mathews, BE (Syd), MSc, PhD (UNSW), FIEAust, CPEng, FIICA

Director, Industrial Liaison
J G Crowe, BE (Qld), MEngSc (UNSW), FCIT, MIEAust, CPEng

Women in Engineering Coordinator
M Boman, BA, BTec (Lond), GradCertAppSc (Deakin)

Associate Lecturer
C Killen, BSc (Virginia)

Assistant Director, Industrial Liaison
K Fiddy

Administrative Officers
B Buckenmaier
M Rothery

Administrative Assistants
M R Collison (P/T)
P J Doyle (P/T)

Administrative Secretaries
R Ciudad
L B Smith

Engineering Workshop Manager
J R Grove

Graduate School of Engineering

Professor of Electrical Engineering and Head of School
W R Belcher, BE, MEngSc (Qld), PhD (Lond), DIC, FIEAust, CEng, MIEE, FIREE

Associate Professor and Associate Head of School
B Samali, BS, MS, DSc (GWU), MIEAust, CPEng, MASCE

School of Civil Engineering

Associate Professor and Head of School
G G O'Loughlin, BE, PhD (UNSW), CPEng, MIEAust, MASCE

Senior Lecturer and Deputy Head of School
E A Brady, BSurv, MSurvSc (UNSW), MISAust

Professor of Civil Engineering
S L Bakoss, BE (Syd), MEngSc (UNSW), MS (Calif), PhD (UNSW), FIEAust, CPEng, MASCE

Emeritus Professor
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ISSN 1036-0670

Price $7