Engineering Faculty Handbook 1994

UTS

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This handbook should be read in conjunction with the UTS Calendar and Student Information Guide. The University attempts to ensure that the information contained in the handbook is correct as at 22 September 1993. The University reserves the right to vary any matter described in the handbook at any time without notice.

UTS

UNIVERSITY OF TECHNOLOGY, SYDNEY
ADDRESSES AND TELEPHONE NUMBERS

POSTAL ADDRESS

PO Box 123
Broadway
New South Wales 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
- 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

Balmain Campus

(Being replaced by a new building in Harris Street, Ultimo, end 1994)

Corner Mansfield and Batty Streets
Balmain

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

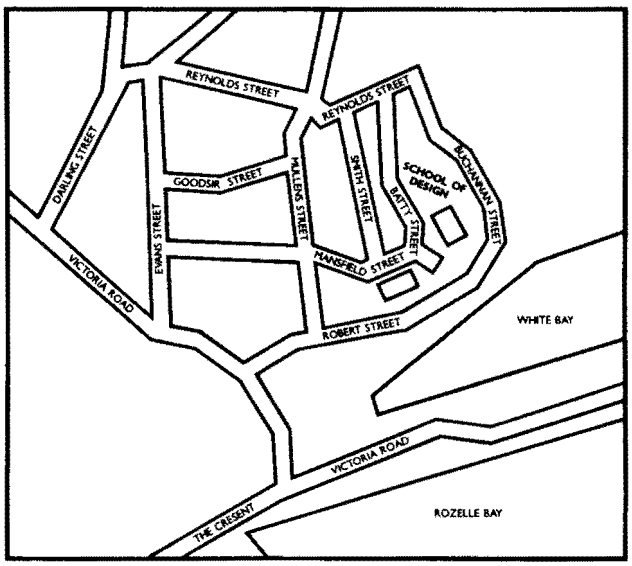
Stroud

Lot AFP 161894
The Bucketts Way
Booral 2425

CAMPUS MAPS

Balmain Campus

Corner Mansfield and
Batty Streets
Balmain



City Campus

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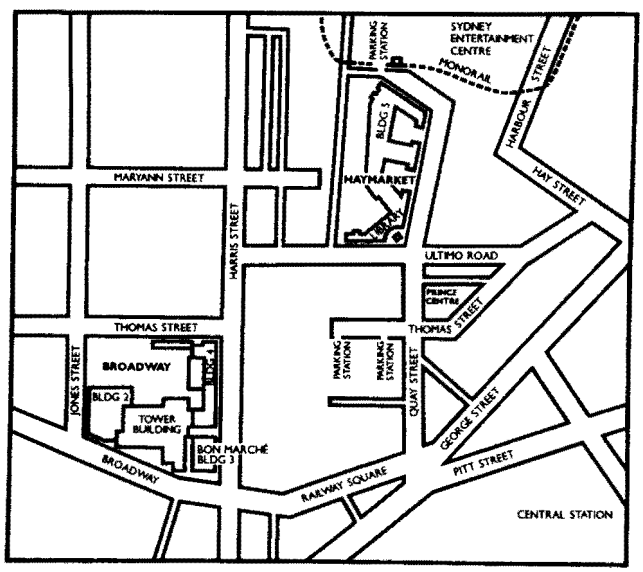
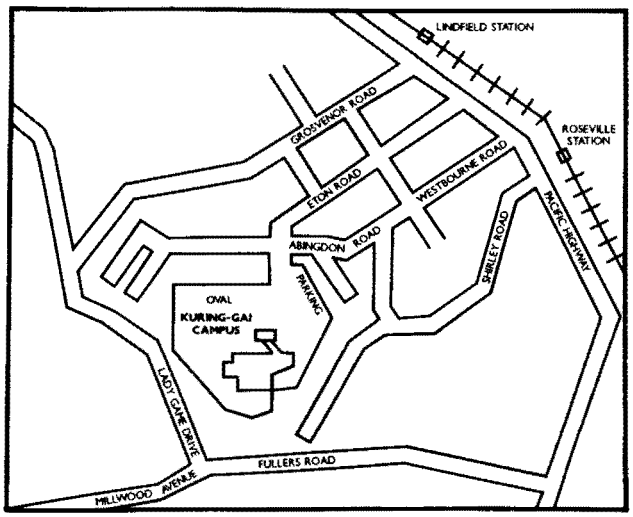
  3 Smail Street, Ultimo
- Wembley House
  839-847 George Street
  Sydney



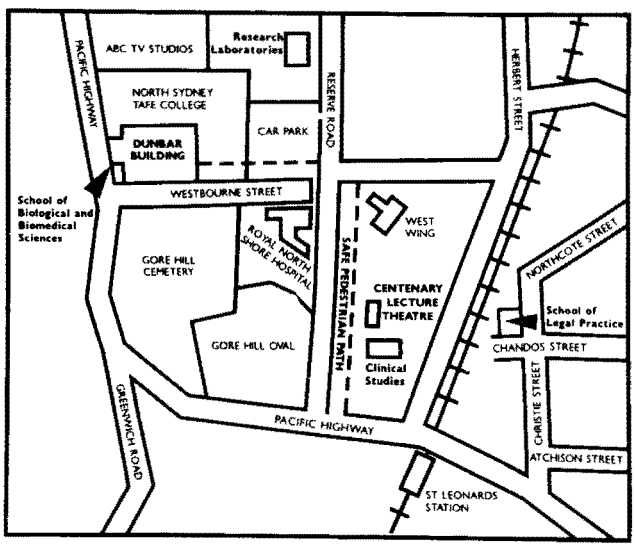
CAMPUS MAPS

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 ten publications comprising the University *Calendar* and nine faculty handbooks: Business; Design, Architecture and Building; Education; Engineering; Law and Legal Practice; Mathematical and Computing Sciences; Nursing; Science; and Social Sciences. 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.

The University also publishes a *Student Information Guide*, copies of which 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, you should contact the UTS Information Service or your Faculty office. The latter will provide additional information on courses, methods of assessment, book lists and other faculty-specific information. If in doubt, don't hesitate to ask.

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.

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 1994 [1]

AUTUMN SEMESTER

January

5 School of Legal Practice enrolment day at St Leonards campus
10 Release of HSC results
14 Formal supplementary examinations for 1993 Spring semester students
17 Closing date for changes of preference to the Universities Admissions Centre (UAC) from 1993 NSW HSC applicants (by 4.30 pm)
20-31 Enrolment of students at City campus
26 Australia Day
28 Public school holidays end

February

1-17 Enrolment of students at City campus
2-7 Enrolment of new undergraduate students at City campus – includes UAC and direct applicants
7 Enrolment of Teacher Education students at Kuring-gai campus
21 Enrolment of School of Biological and Biomedical Sciences students at St Leonards campus
28 Classes begin

March

11 Last day to enrol in a course or add subjects
11 Last day to change to upfront HECS payment
25 Last day to apply for leave of absence without incurring student fees/charges
31 HECS Census Date
31 Last day to withdraw from a subject without financial penalty

April

1 Public school holidays begin
1 Good Friday
4 Easter Monday
5-8 Vice-Chancellors' Week (non-teaching)
6 Graduation period begins
8 Public school holidays end
8 Last day to withdraw from a subject without academic penalty[2]
8 Last day to withdraw from a course without academic penalty[2]
22 Graduation period ends
25 Anzac Day
30 Last day to apply to graduate in Spring semester 1994

May

31 Closing date for undergraduate/postgraduate applications for Spring semester

June

13 Formal examination period begins
27 Public school holidays begin

SPRING SEMESTER

July

1 Formal examination period ends
4 School of Legal Practice enrolment day at St Leonards campus
4-8 Vice-Chancellors' Week (non-teaching)
8 Public school holidays end
22 Release of Autumn semester examination results
22 Formal supplementary examinations for Autumn semester students
25-29 Confirmation of Spring semester programs
26-27 Enrolment of new and readmitted students and students returning from leave/concurrent study

August

1 Applications available for undergraduate and postgraduate courses
1 Classes begin
4 Last day to withdraw from full-year subjects without academic penalty[2]
12 Last day to enrol in a course or add subjects
12 Last day to change to upfront HECS payment
26 Last day to apply for leave of absence without incurring student fees/charges (Spring enrolments only)
31 HECS Census Date
31 Last day to withdraw from a subject without financial penalty
31 Last day to apply to graduate in Autumn semester 1995

September

9 Last day to withdraw from a subject without academic penalty[2]
9 Last day to withdraw from a course without academic penalty[2]
26 Public school holidays begin
26 Graduation period begins
26-30 Vice-Chancellors' Week (non-teaching)

30 Closing date for undergraduate applications via UAC (without late fee)
30 Closing date for inpUTS Special Admission Scheme applications
30 Closing date for postgraduate applications (*to be confirmed*)
30 Graduation period ends

October

7 Public school holidays end
31 Closing date for postgraduate research and course award applications
31 Closing date for undergraduate applications via UAC (with late fee)
31 Closing date for undergraduate applications direct to UTS (without late fee)

November

14 Formal examinations begin

December

2 Formal examinations end
19 Public school holidays begin
23 Release of Spring semester examination results

[1] Information is correct as at 5 November 1993. The University reserves the right to vary any information described in Principal Dates for 1994 without notice.

[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 Engineering

Bachelor of Engineering (in Mechanical or Manufacturing Engineering) and Master of Design

The Graduate School of Engineering

Doctor of Philosophy

Master of Engineering (by thesis)

Master of Engineering Management

Master of Engineering Practice

Master of Local Government Management

Master of Engineering in Telecommunications Engineering

Master of Engineering in Groundwater Management

Graduate Diploma in Local Government Engineering

Graduate Diploma in Engineering and Graduate Certificate in Engineering

Graduate Diploma in Engineering in Groundwater Management

Graduate Certificate in Environmental Engineering and Management

Graduate Certificate in Software Engineering

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 Appliquees de Lyon (France)
- The University of Waterloo (Canada)
- 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. Some require participating students to develop foreign language skills prior to departure from Australia. Selection of a particular university requires careful consideration and planning well in advance.

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 to UTS Engineering students are listed below. Full details are published in the University *Calendar*.

General

- IEAust MEM Prize
- 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 Engineers Australia (IMEA) - NSW Division Medal
- Pioneer Concrete (Stage 5) Prize

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

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

Faculty Office

Level 4, Building 2
Broadway, City campus

Postal Address:
PO Box 123
Broadway NSW 2007

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

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. 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, 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
Educational Developer, Women in Engineering		
K Yasukawa	412	2602 2601
Graduate Studies Officer		
B Buckenmaier	433	2606
Administrative Officer - Finance and Operations		
M G Rothery	429C	2600
Administrative Secretaries		
L B M Smith	433	2604
R Ciudad	433	2604 2664
Industrial Liaison Officers (Part-time)		
M R Collison		
P J Doyle	433	2605

COURSE CODES

EE03	Bachelor of Engineering in Electrical Engineering
EE04	Bachelor of Engineering in Computer Systems Engineering
EE06	Bachelor of Engineering in Telecommunications Engineering
EC03	Bachelor of Engineering in Civil Engineering
EC07	Bachelor of Engineering in Civil and Environmental Engineering
EC04	Bachelor of Engineering in Structural Engineering
EM03	Bachelor of Engineering in Mechanical Engineering
EM04	Bachelor of Engineering in Manufacturing Engineering
E006	Bachelor of Technology in Manufacturing Engineering
E003	Bachelor of Engineering Bachelor of Arts in International Studies
EM06	Bachelor of Engineering Master of Design
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
EE55	Graduate Certificate in Software Engineering
EC53	Graduate Diploma in Local Government Engineering
EC54	Graduate Diploma in Engineering (Civil)
EE52	Graduate Diploma in Engineering (Electrical)
EM54	Graduate Diploma in Engineering (Mechanical)
E061	Graduate Diploma in Engineering in 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)
E052	Master of Engineering Management
EB52	Master of Local Government Management
EE54	Master of Engineering in Telecommunications Engineering
E057	Master of Engineering in Groundwater Management
E053	Master of Engineering Practice
EC55	Doctor of Philosophy (Civil)
EE53	Doctor of Philosophy (Electrical)
EM55	Doctor of Philosophy (Mechanical)
E055	Doctor of Philosophy in Engineering (Groundwater Management)

UNDERGRADUATE COURSES

Bachelor of Engineering

DESCRIPTION

Undergraduate courses are available in Civil, Structural, Civil and Environmental, Electrical, Computer Systems, Telecommunications, Mechanical, and Manufacturing 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.9). 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 M Des) will be introduced in 1994.

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 UTS 1994.*)

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 1992 NSW HSC examination the required levels of TER were 77.35 for Civil/Structural Engineering, 77.35 for Electrical Engineering, 91.05 for Computer Systems Engineering, and 73.90 for Mechanical/Manufacturing Engineering. For the new courses required levels of TER have been set at 75 for Civil and Environmental, 80 for Telecommunications Engineering, and 80 for the Bachelor of Engineering Bachelor of Arts.

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 a 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 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 who 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

In 1993, 18 students were awarded Engineering Co-op Scholarships. It is expected that the same number of scholarships will be available in 1994.

Scholarships will be awarded to students who are successful at the 1993 Higher School Certificate examinations (or equiva-

lent) and who are either Australian citizens or permanent residents of Australia.

Selection is 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 their scholarship.

Sponsors: In 1993 sponsors of the Engineering Co-op Scholarship program were: BP Australia Ltd, Canon Australia Ltd, Comalco Aluminium Ltd, GHD Group, Leighton Contractors Pty Ltd, Noyes-Clough, Ove Arup & Partners, Pacific Power, Schneider, Sinclair Knight & Partners, State Rail Authority and Sydney Electricity.

Applications: Application forms will be available from Careers Advisers by August 1994 for the 1995 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 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

A new program will be introduced in 1994, leading to the joint degrees of Bachelor of Engineering and Bachelor of Arts in 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 will link 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 will be 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 Engineering;
Mechanical Engineering;
Structural Engineering;
Telecommunications Engineering.

Engineering and international studies will be integrated throughout the program, and the two degrees will be awarded jointly on completion. It is not possible to complete either degree separately at an intermediate point.

The program will require 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 will include 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.

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

Semester	Subject	CP
1, 2	Group meetings	0
3	Asian and Pacific Politics	6
(alternatives available to students wishing to study outside of the Pacific rim)		
4	Language and Culture 1	8
5	Language and Culture 2	8
6	Language and Culture 3	8
7	Language and Culture 4 (Overseas)	12
	Practice of Engineering (Overseas university/ industry)	12
8	Practice of Engineering (Overseas university)	24
9	Review of Overseas Experience	2
12	Australian Engineering and Asia	2
	Electives (inter-faculty)	8
	International Studies Project	6

Subject titles are indicative and may change as detailed arrangements continue to develop.

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

Selected subjects will be omitted from the standard BE curricula in order to accommodate the BA component. These will be partially replaced by subjects studied overseas. An individual program will be developed in consultation with each student, and will vary with career aspirations and with subject availability in the particular overseas country and university to be visited.

The program is expected in due course to gain full accreditation by The Institution of Engineers, Australia.

ADMISSION

Entry requirements will be those of the relevant Bachelor of Engineering course, plus competency in foreign languages. Selection will be on the basis of TER or equivalent, plus an interview. Minimum TER has been set at 80.0.

Students entering the program, who already possess competency in the language they propose to study, can apply for limited **advanced standing.** The aim will be to develop each student's capabilities to the fullest possible extent.

ATTENDANCE

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

The program requires satisfactory completion of ten semesters of academic work, plus at least 60 weeks of appropriate industrial experience in Australia (further details in relation to industrial experience appear under the relevant BE course). The overseas year will normally count as two semesters of academic work, as well as providing opportunity for additional industrial experience. A student who takes less than a full academic program during the overseas year will make up the balance on return to UTS.

The program is designed to be completed in six years.

Bachelor of Engineering Master of Design

DESCRIPTION

This joint program is offered in 1994 as a Bachelor of Engineering in Mechanical or Manufacturing 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 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 phone during office hours on 330 2666.

Bachelor of Technology in Manufacturing Engineering

DESCRIPTION

The Bachelor of Technology Degree in Manufacturing Engineering is an initiative of the Faculty of Engineering. It is aimed at the skills development of middle-level engineering technologists in manufacturing industry. The course 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 manufacturing group 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 to a Bachelor of Engineering degree, although progression to that degree is possible. It is expected that the Bachelor of Technology degree in Manufacturing Engineering will qualify graduates for entry to the Institution of Engineers, Australia in the Engineering Technologist grade.

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.

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.

Selection: It is anticipated that 40 places will be made available in 1994. 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.

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 undergone formal accreditation by the Institution. The Course Director will be happy to discuss this with students.

ENQUIRIES

General enquiries can be made by phone 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, 15-73 Broadway NSW 2007.

SCHOOL OF CIVIL ENGINEERING

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

Civil engineers are key professionals involved in the design, construction and operation of the facilities and services which are not only characteristic of today's societies, but which also safeguard the quality of the physical environment for the future. Examples would be the design of a new harbour, or of a water supply system or of an integrated transport system.

Structural engineering involves the design, construction and operation of a variety of structures that may be as diverse as the fuselage of an aeroplane, a highway bridge or an offshore platform. The structural engineer plays an important role wherever something is built which has to carry load or resist forces to perform its function.

Civil and structural engineers will find themselves searching for cost-effective, safe and environmentally appropriate solutions, and efficient construction processes which requires an understanding of a wide range of technical, economic and social issues.

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, which will enable graduates to function as professional environmental engineers in the context of civil engineering projects.

All three degrees provide a thorough foundation in the physical sciences and applied engineering sciences which underpin the engineering practice subjects undertaken in 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 which are vital to professional practice, particularly as individual

engineers will often be working in multi-disciplinary teams with other engineering professionals and technicians, as well as architects, economists and social planners.

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
47113	Computations 1	4	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	3	3
47127	Mechanics of Solids	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	Computations 2	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
47153	Computations 3	3	3
47150	Concrete Design 2	4	3
47151	Structural Analysis 2	4	3
47156	Soil Engineering	3	3
47154	Concrete Technology	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
47163	Computations 4	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 Engineering	3	3
47177	Transportation Engineering	3	3
47178	Project Economics	3	3
47179	Construction Contracts	3	3
47003	Project [2]		
	Electives [3]		
Stage 8			
47189	Management for Engineers	4	3
	Electives [3]	6	
	Project [2]		

PART-TIME ATTENDANCE PATTERN

Academic requirements [1]

		CP	HPW
Stage 1			
Autumn semester			
33121	Engineering Mathematics 1A	3	3
47117	Statics	4	3
47120	Graphics	3	3
68022	Engineering Physics (part-time)	3	3
Spring semester			
33122	Engineering Mathematics 1	3	3
47110	Introduction to Civil Engineering	3	3
47113	Computations 1	4	3

47118	Surveying 1A	3	3
68022	Engineering Physics (part-time)	3	3

Stage 2

Autumn semester

47127	Mechanics of Solids 1	4	3
47128	Surveying 1B	3	3
51131	Communication 1	3	3
65023	Engineering Chemistry	6	6

Spring semester

33221	Engineering Mathematics 2A	3	3
47131	Structural Mechanics	3	3
47133	Computations 2	3	3
47149	Construction	3	3

Stage 3

Autumn semester

47137	Mechanics of Solids 2	3	3
47142	Environmental Engineering	3	3
67022	Materials Science for Engineers	3	3
66032	Geology for Engineers	3	3

Spring semester

47135	Fluid Mechanics	4	3
47141	Structural Analysis 1	3	3
47146	Soil Mechanics	4	3
47134	Construction Materials	3	3

Stage 4

Autumn semester

47140	Concrete Design 1	3	3
47144	Timber Design	3	3
47152	Public Health Engineering	3	3
47153	Computations 3	3	3

Spring semester

47145	Hydraulics	3	3
47150	Concrete Design 2	4	3
47154	Concrete Technology	3	3
51161	Communications 2	3	3

Stage 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
47163	Computations 4	3	3
47162	Advances in Pollution Control	3	3
47160	Concrete Design 3	3	3

Stage 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[3]		

Spring semester

47155	Hydrology	3	3
47171	Steel Structures and Concept Design	4	3
47175	Water Engineering	3	3
47179	Construction Contracts	3	3
47003	Project[2]		
	Elective[3]		

Stage 7

Autumn semester

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

Spring semester

47189	Management for Engineers	4	3
	Electives [3]		
	Projects [2]		

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

[2] 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

[3] Electives to be between 9 and 15 credit points such that the course requirements at 192 credit points is met.

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
47113	Computations 1	4	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	3	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	Computations 2	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
47141	Structural Analysis 1	3	3
47140	Concrete Design 1	3	3
47144	Timber Design	3	3
47146	Soil Mechanics	4	3
47237	Domestic Building Design and Construction	3	3
47149	Construction	3	3
51161	Communications 2	3	3
Stage 5			
47153	Computations 3	3	3
47151	Structural Analysis 2	4	3
47161	Steel Design 1	3	3
47150	Concrete Design 2	4	3
47156	Soil Engineering	3	3
47154	Concrete Technology	3	3
47159	Project Planning	3	3
Stage 6			
47160	Concrete Design 3	3	3
47163	Computations 4	3	3
47164	Metals Technology	3	3
47265	Finite Element Analysis	3	3
47267	Approximate Methods in Structural Analysis	3	3
47268	Dynamics of Structures	3	3
47171	Steel Structures and Concept Design	4	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
Stage 1			
Autumn semester			
33121	Engineering Mathematics 1A	3	3
47117	Statics	4	3
47120	Graphics	3	3
68022	Engineering Physics (part-time)	3	3
Spring semester			
33122	Engineering Mathematics 1B	3	3
47110	Introduction to Civil Engineering	3	3
47113	Computations 1	4	3
47118	Surveying 1A	3	3
68022	Engineering Physics (part-time)	3	3
Stage 2			
Autumn semester			
47127	Mechanics of Solids 1	4	3

47128	Surveying 1B	3	3
51131	Communications 1	3	3
65023	Engineering Chemistry	6	6

Spring semester

33221	Engineering Mathematics 2A	3	3
47131	Structural Mechanics	3	3
47133	Computations 2	3	3
47149	Construction	3	3

Stage 3

Autumn semester

47137	Mechanics of Solids 2	3	3
47142	Environmental Engineering	3	3
67022	Materials Science for Engineers	3	3
66032	Geology for Engineers	3	3

Spring semester

47134	Construction Materials	3	3
47135	Fluid Mechanics	4	3
47146	Soil Mechanics	4	3
47141	Structural Analysis 1	3	3

Stage 4

Autumn semester

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

Spring semester

47161	Steel Design 1	3	3
47150	Concrete Design 2	4	3
47154	Concrete Technology	3	3
51161	Communications 2	3	3

Stage 5

Autumn semester

47151	Structural Analysis 2	4	3
47156	Soil Engineering	3	3
47159	Project Planning	3	3
47267	Approximate Methods in Structural Analysis	3	3

Spring semester

47160	Concrete Design 3	3	3
47163	Computations 4	3	3
47268	Dynamics of Structures	3	3
47265	Finite Element Analysis	3	3
47179	Construction Contracts	3	3

Stage 6

Autumn semester

47164	Metals Technology	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	4	3
47189	Management for Engineers	4	3
47270	Concrete Design 4	3	3
47275	Bridge Design	3	3

Stage 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
	Electives [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
47117	Statics	4	3
47110	Introduction to Civil Engineering	3	3
47118	Surveying 1A	3	3
68021	Engineering Physics	6	6
65023	Engineering Chemistry	6	6

Stage 2

33122	Engineering Mathematics 1B	3	3
47113	Computations 1	4	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	3	3
47137	Mechanics of Solids 2	3	3
47142	Environmental Engineering	3	3
66032	Geology for Engineers	3	3
47134	Construction Materials	3	3
91651	Environmental Microbiology for Engineers	3	3

Stage 4

47133	Computations 2	3	3
47131	Structural Mechanics	3	3
47135	Fluid Mechanics	4	3
47140	Concrete Design 1	3	3
47146	Soil Mechanics	4	3
47149	Construction	3	3
47144	Timber Design	3	3
47449	Introduction to Environmental Economics and Law	3	3

Stage 5

47153	Computations 3	3	3
47141	Structural Analysis 1	3	3
51161	Communications 2	3	3
47145	Hydraulics	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
47161	Steel Design 1	3	3
47167	Road Engineering	3	3
47156	Soil Engineering	3	3
47152	Public Health Engineering	3	3
47162	Advances in Pollution Control	3	3
47465	Environmental Hydraulics	3	3

Stage 7

47163	Computations 4	3	3
43160	Concrete Design 3	3	3
47175	Water Engineering	3	3
47168	Surveying 2	3	3
47178	Project Economics	3	3
47179	Construction Contracts	3	3
47476	Land Conservation	3	3
	Project	3	

Stage 8

47177	Transportation Engineering	3	3
47189	Management for Engineers	4	3
47482	Waste Minimisation	3	3
	Project	7	
	Electives	7	

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

Electives

Elective subjects are common to the Civil Engineering, Structural Engineering, and Civil and Environmental Engineering degree programs. Furthermore, Civil Engineering students may take core subjects from the Structural Engineering degree program as electives – similarly Structural Engineering students may take core Civil Engineering subjects as electives.

Electives are offered on demand, and not all are offered in every semester or even every year. The availability of a particular elective is determined at the beginning of each semester and classes scheduled only if sufficient numbers of students are enrolled.

Proposed electives 1994:

		CP	HPW
47304	Coastal Engineering	3	3
47306	Geomechanics	3	3
47301	Railway Engineering	3	3
47305	Risk and Reliability	3	3
47308	Road Materials	3	3
47302	Welding	3	3
47303	Land Development	3	3
47307	Construction Management	3	3
47318	Stormwater Drainage	3	3
47312	Water Supply and Sewerage	3	3

In 1994 two 6 credit point electives in Aboriginal Studies will be offered by the Faculty of Education and the Faculty of

Social Sciences (Introducing Aboriginal Cultures and Philosophies (T5115), and Aboriginal Social and Political History (54230)). Students enrolling in electives offered by other Schools should first seek approval from the School of Civil Engineering.

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 2/560A ext 2615.

	Room	Ext
Head of School		
Associate Professor G G O'Loughlin Water Engineering	511C	2629
Deputy Head of School		
Mr E A Brady Surveying	511A	2627
Professors of Civil Engineering		
Professor K A Faulkes Structural Engineering	528	2646
Professor S L Bakoss Structural Mechanics	–	–
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
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*		
Mr K Halstead Local Government Engineering	522	2640
Mr E Jankulovski Structural Dynamics, Seismic Design	525	2021
Mr C Wilkinson Structural Mechanics – Fabric Structures	537	2631
Support staff		
Secretary to Head of School		
Mrs L Venglinsky	511	2630

Office Manager		
Mr B Blakeway	560A	2615
General Secretary		
Mrs S Ali	512	2650
P/T Word Processor Operator		
Ms J Chetcuti	560	2616
Engineer in Charge		
Mr M J Taragel	114	2519
Engineers		
Mr I A Hutchings	116J	2512
Mr D A Tapner	116K	2513
Mr A Lah	1/2A252	1030
Ms L Punton	116L	2125
Engineering Research and Development		
Senior Technical Officer		
Mr J Holmes	542	2514
Technical Officers		
Mr M Benitez	116M	2516
Mr P M Chatfield	1/2A252	1024
Mr H Hefka	116	2515
Mr W House	102B	2502
Mr J P Martinus	1/2A252	1029
Mr J McMahon	204	2537
Mr H H Ngo	547	2653
Mr St J Parmigiani	116M	2517
Senior Laboratory Craftsmen		
Mr H Myers	1/2A253B	1026
Mr L Slade	253	1026
Eng Trade Assistant		
Mr D R Hooper	116N	2518
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			
33110	Engineering Mathematics 1	6	6
68031	Engineering Physics 1	6	6
45115	Engineering Practice[2]	3	3
33100	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
33210	Engineering Mathematics 2	6	6
45123	Software Development 1	3	3
45124	Electrical Engineering 2	6	6
Stage 3			
45133	Software Development 2	3	3
45135	Engineering Communication	3	3
33310	Engineering Mathematics 3	6	6
45134	Network Theory	6	6
68033	Engineering Physics 3	3	3
67023	Materials Technology	3	3
Stage 4			
45144	Electronic Devices and Circuits	6	6
45145	Engineering Statistics	3	3
45242	Electromagnetics	3	3
45141	Continuous and Discrete Systems	6	6
45143	Computer Hardware	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	3	3
45274	Physical Design and Production	3	3
	Electives	6	6
Stage 8			
45681	Communications Systems	6	6
45183	Thesis 2	12	6
	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	3	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	12	6
68034	Electric 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	3	3
45274	Physical Design and Production	3	3
	Elective 3	3	3

Stage 8

45583	Adaptive and Multi-variable Control	3	3
45582	Computer-aided Design of Electronic Circuits	3	3
45183	Thesis 2	12	6
	Social Science Elective	6	3

PART-TIME ATTENDANCE PATTERN

Academic requirements [1]

		CP	HPW

Stage 1

Autumn semester

33110	Engineering Mathematics 1	6	6
68031	Engineering Physics 1	6	6
45115	Engineering Practice [2]	3	3

Spring semester

33100	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

33210	Engineering 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]

Stage 1

		CP	HPW
33110	Engineering Mathematics 1	6	6
68031	Engineering Physics 1	6	6
45115	Engineering Practice[2]	3	3
33100	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
33210	Engineering 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
46701	Robotics and Flexible Manufacturing	3	3

31141	Database Structures and Management	3	3
	Social Science Elective	3	3

Stage 7

45661	Communications Networks	3	3
45265	Numerical Methods	3	3
45182	Thesis 1	3	3
45176	Systems Engineering	3	3
45562	Data Acquisition and Distribution Systems	6	6
31163	Knowledge-based Systems	3	3
	Electives	6	6

Stage 8

45382	Computer Systems Design	3	3
45183	Thesis 2	12	6
45177	Project B	3	3
	Elective 4	3	3

PART-TIME ATTENDANCE PATTERN

Academic requirements [1]

Stage 1

		CP	HPW
Autumn semester			
33110	Engineering Mathematics 1	6	6
68031	Engineering Physics 1	6	6
45115	Engineering Practice[2]	3	3
Spring semester			
33100	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			
33210	Engineering 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
46701	Robotics and Flexible Manufacturing	3	3
	Social Science Elective	3	3

Stage 6

Autumn semester			
45661	Communication Networks	3	3
45562	Data Acquisition and Distribution Systems	6	6
45265	Numerical Methods	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
31163	Knowledge-based Systems	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			
33110	Engineering Mathematics 1	6	6
33100	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			
33210	Engineering 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	Numerical Methods	3	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
45151	Signal Theory 1	3	3
45242	Electromagnetics	3	3
55080	Information Issues in Telecommunications	6	3
Stage 6			
45661	Communication Networks	3	3
31141	Database Management	3	3
45152	Signal Theory 2	3	3
45264	Fields and Waves	3	3
27001	Commercial Issues in Telecommunications	6	3
	Social Science Elective	6	3
Stage 7			
45668	Teletraffic Engineering	3	3
45667	Integrated Services Networks	3	3
45182	Thesis 1	3	3
45166	Project Management	3	3
45662	Signal Processing	3	3
45663	Digital Transmission	3	3
79371	Legal Issues in Telecommunications	6	3
Stage 8			
45183	Thesis 2	12	6
45176	Systems Engineering	3	3
45681	Communications Systems	6	6
	Communication 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 Social Sciences. In 1994 a six credit point elective will be offered by the Faculty of Education (Introducing Aboriginal Cultures and Philosophies, T5115). Students enrolling in electives offered by other Schools should first seek approval from the School of Electrical Engineering.

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 2432.

	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
Associate Professor G E Beard Satellite Communication Systems, UHF, VHF and Microwave Electronics, Electrical Instrumentation, Analogue Electronics	2419B	2413
Professor W R Belcher Antenna and Microwave Systems, Communication Systems, Systems Engineering	2419C	2423
Mr A J Boswell Robotics, Software Engineering	2212	2382
Ms L Brodie Control Systems, Rehabilitation Engineering	2420D	2428
Associate Professor P Bryce Microhydroelectricity, Appropriate Technology, Fibre Optic Communications, Electromagnetic Theory	2420A	2425
Adjunct 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,	2227	2396

CSI, MAP, TOP, Computer Integrated Manufacture and Robotics, CAD/CAM, Control Systems

Mr S Murray 2520A 1553
Computer Hardware

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, Multi-variable 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 P J White 2315 2401
Antennas and Propagation, Microwave and RF Circuit Design, Analogue Electronics

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

Industrial Training Advisers
Dr D Sharma
Mr P G Lewis
Ms E Taylor

Support staff
Mrs E With 2423 2432
Student Administration

Mr W A Symons 2210B 2379
Vax Computer Manager

Mr R Jelliffe 2020 2355
Research Computing Centre Manager

Mr J B Vagg 2430 2440
Laboratory Manager

Mr P D Cooper 2324 2414
Engineer (Telecommunications)

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

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 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 and Manufacturing Engineering and a joint Bachelor of Engineering (in Mechanical or Manufacturing 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 and processes, including power generation and transport. 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 Engineering includes the design, development and optimisation of both product and process technology. This involves interacting with other professionals, including market researchers and industrial designers.

The courses in Mechanical and Manufacturing Engineering provides 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 skills are also important. The need for sensitivity to the social, economic and environmental context of engineering is incorporated 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 the Australian and International markets. The Bachelor of Engineering (in Mechanical or Manufacturing Engineering) and Master of Design program has been introduced to meet this need.

All students in the Mechanical and Manufacturing 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.

Bachelor of Engineering in Mechanical Engineering and Bachelor of Engineering in Manufacturing Engineering

SANDWICH ATTENDANCE PATTERN

Academic requirements [1]

		CP	HPW
Stage 1			
33121	Engineering Mathematics 1A	3	3
46110	Mechanics 1	6	6
46310	Introduction to Engineering	3	3
46311	Engineering Graphics	3	3
46810	Introduction to Computing	3	2
65023	Engineering Chemistry	6	6
Stage 2			
33122	Engineering Mathematics 1B	3	3
46111	Mechanics 2	4	3
46712	Manufacturing Processes 1A	3	2
46713	Manufacturing Processes 1B	2	2
46811	Computer Programming	4	4
68011	Engineering Physics (Mechanical)	4	4
67021	Materials Engineering 1	4	4
Stage 3			
33221	Engineering Mathematics 2A	3	3
46120	Mechanics 3	4	3
46220	Solid Mechanics 1	5	4
46420	Fluid Mechanics	4	4
46620	Engineering Communication	4	3
68012	Electrical Engineering 1 (Mechanical)	4	4
Stage 4			
33222	Engineering Mathematics 2B	3	3
46121	Mechanics of Machines	4	4
46320	Design 1	4	3
46421	Thermodynamics	5	4
46722	Manufacturing Processes 2A	3	2
46723	Manufacturing Processes 2B	2	2
46820	Engineering Statistics	3	3
Stage 5			
45931	Electrical Engineering 2 (Mechanical)	4	4
46130	Dynamics of Mechanical Systems	4	3
46230	Solid Mechanics 2	4	4
46430	Thermofluids	4	4
46630	Engineering and Society	4	3
46830	Numerical Analysis	4	3
Stage 6			
67061	Materials Engineering 2	4	4
46330	Computer-Aided Drafting and Design	5	4
46431	Heat Transfer	4	3
46530	Measurement and Instrumentation	4	4
46531	Control Engineering 1	4	4
46631	Engineering Management	3	3
During an industrial experience period			
46990	Industrial Review	3	3
Stage 7			
46033	Project A	6	4
46332	Design 2	4	3
46641	Commercial Issues for Engineers	3	3
	Elective 1 [2]	4	3
	Elective 2	4	3
Stage 8			
46034	Project B	6	4
46333	Design 3	3	3
46991	Professional Review	3	3
	Elective 3	4	3
	Elective 4	4	3
	Elective 5	4	3

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

[2] Four of the electives are to be done within the School. Electives are offered on demand and not all electives are offered every year.

PART-TIME ATTENDANCE PATTERN

Academic requirements [1]

		CP	HPW
Stage 1			
Autumn semester			
46110	Mechanics 1	6	6

33121	Engineering Mathematics 1A	3	3
46310	Introduction to Engineering	3	3
46810	Introduction to Computing	3	2

Spring semester

65023	Engineering Chemistry	6	6
46311	Engineering Graphics	3	3
68011	Engineering Physics (Mechanical)	4	4

Stage 2

Autumn semester

46111	Mechanics 2	4	3
33122	Engineering Mathematics 1B	3	3
46712	Manufacturing Processes 1A	3	2
67021	Materials Engineering 1	4	4

Spring semester

46220	Solid Mechanics 1	5	4
46811	Computer Programming	4	4
46713	Manufacturing Processes 1B	2	2
68012	Electrical Engineering 1 (Mechanical)	4	4

Stage 3

Autumn semester

46120	Mechanics 3	4	3
46420	Fluid Mechanics	4	4
46722	Manufacturing Processes 2A	3	2
46620	Engineering Communication	4	3

Spring semester

46421	Thermodynamics	5	4
33221	Engineering Mathematics 2	3	3
46723	Manufacturing Processes 2B	2	2
46320	Design 1	4	3

Stage 4

Autumn semester

46121	Mechanics of Machines	4	4
33222	Engineering Mathematics 2B	3	3
46820	Engineering Statistics	3	3
46630	Engineering and Society	4	3

Spring semester

46230	Solid Mechanics 2	4	4
46830	Numerical Analysis	4	3
46330	Computer-Aided Drafting and Design	5	4

Stage 5

Autumn semester

46130	Dynamics of Mechanical Systems	4	3
46430	Thermofluids	4	4
45931	Electrical Engineering 2 (Mechanical)	4	4

Spring semester

46431	Heat Transfer	4	3
46531	Control Engineering 1	4	4
46631	Engineering Management	3	3
46990	Industrial Review	3	3

Stage 6

Autumn semester

46530	Measurement and Instrumentation	4	4
67061	Materials Engineering 2	4	4
46641	Commercial Issues for Engineering	3	3
	Elective 1[2]	4	3

Spring semester

	Elective 2	4	3
46991	Professional Review	3	3
46332	Design 2	4	3

Stage 7

Autumn semester

46033	Project A	6	4
	Elective 3	4	3
46333	Design 3	3	3

Spring semester

46034	Project B	6	4
	Elective 4	4	3
	Elective 5	4	3

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

[2] Four of the electives are to be done within the School. Electives are offered on demand and not all electives are offered every year.

ELECTIVES

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

Mechanical Engineering elective subjects

Manufacturing and Management

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 and Control

46441 Combustion and Air Pollution
46442 Advanced Fluid Dynamics
46443 Refrigeration and Air-conditioning
46444 Power Cycles
46445 Fluid Machines
46540 Programmable Controllers
46541 Control Engineering 2
46542 Process Control
46840 Advanced Engineering Computing
46841 Operations Research
46842 Microprocessors

Ungrouped

46040 Ergonomics
65071 Corrosion Technology for Engineers
91379 Environmental Science for Engineers

Manufacturing Engineering elective subjects

Students selecting elective subjects from the following list, except where approved in writing on an individual basis by the Head of School, may graduate in Manufacturing Engineering, otherwise students graduate in Mechanical Engineering.

46640 Terotechnology
46642 Engineering Economics
46740 Quality and Reliability
46741 Flexible Manufacturing
46742 Production and Cost Control
46744 Computer-Aided Manufacturing
46142 Robotics
46342 Unitised Load Handling
46346 Bulk Materials Handling
46345 Industrial Design
46540 Programmable Controllers
46541 Control Engineering 2
46840 Advanced Engineering Computing
46841 Operations Research
46842 Microprocessors
46040 Ergonomics

Bachelor of Engineering Master of Design

Academic requirements [1]

Bachelor of Engineering subjects:

		CP	HPW
Stage 1			
33121	Engineering Mathematics 1A	3	3
46110	Mechanics 1	6	6
46310	Introduction to Engineering	3	3
46311	Engineering Graphics	3	3
46810	Introduction to Computing	3	2
65023	Engineering Chemistry	6	6
Stage 2			
33122	Engineering Mathematics 1B	3	3
46111	Mechanics 2	4	3
46712	Manufacturing Processes 1	3	2
46811	Computer Programming	4	4
68011	Engineering Physics (Mechanical)	4	4
67021	Materials Engineering 1	4	4
Stage 3			
33221	Engineering Mathematics 2	3	3
46120	Mechanics 3	4	3
46220	Solid Mechanics 1	5	4
46420	Fluid Mechanics	4	4
46620	Engineering Communication	4	4
68012	Electrical Engineering 1 (Mechanical)	4	4
Stage 4			
33222	Engineering Mathematics 2B	3	3
46121	Mechanics of Machines	4	4
46320	Design 1	4	3
46421	Thermodynamics	5	4
46722	Manufacturing Processes 2	3	2

84220 Industrial Design 2 (from the Industrial Design (ID) Course)

Stage 5

46130	Dynamics of Mechanical Systems	4	3
46230	Solid Mechanics 2	4	4
46430	Thermofluids	4	4
46630	Engineering and Society	4	3
46820	Engineering Statistics	3	3
xxxxx	Human Factors- Anatomy and Physiology		
and			
84330	Industrial Design 3 (from the ID Course)		

Stage 6

45931	Electrical Engineering 2 (Mechanical)	4	4
46330	Computer-Aided Drafting and Design	5	4
46631	Engineering Management	3	3
46830	Numerical Analysis	4	3
67061	Materials Engineering 2	4	4
84550	Industrial Design 5 (from the ID Course)		
46990	Industrial Review	3	3

Stage 7

46332	Design 2	4	3
46431	Heat Transfer	4	3
46530	Measurement and Instrumentation	4	4
46531	Control Engineering 1	4	4
46641	Commercial Issues for Engineers	3	3
	Elective 1	4	3
	Elective 2	4	3

Stage 8

46333	Design 3	3	3
46991	Professional Review	3	3

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

Master of Design subjects:

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 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 ext 2669.

	Room	Ext
Head of School		
Assoc Prof S F Johnston Design, Ergonomics, Social Context of Technology	612B	2668
Professor of Mechanical Engineering		
Prof J P Gostelow Turbomachinery, Gas Turbines, Fluid Mechanics, Innovation	429B 627	2603 2685
James N Kirby Professor of Manufacturing Engineering		
Prof F B Swinkels Design for Manufacturing, Materials, Computer-Aided Design and Computer- Aided Manufacturing	416	2588
Assoc Prof S L Hall Combustion, Acoustics, Instrumentation, Aero/Thermodynamics, Technology/Education Policy	608	2662

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 630 2689
Stress Analysis, Photoelasticity, Design

Dr K S Chan 604 2658
Applied Mechanics, Design, Materials Handling, Air-conditioning and Refrigeration

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 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

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

Mr K A Stillman 624 2682
Control Engineering, Chemical Engineering, Real-Time Computing, Simulation, Optimisation

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

Mr H G R Wiedemann 614 2674
Materials, Hydraulic and Pneumatic Transport of Solids, Machine Design, CAD/CAM

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 602 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 649A 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 Senior Laboratory Craftsperson	212	2545
Mr S M Gordon Senior Laboratory Craftsperson	212	2546
Mr J R Grove Workshop Supervisor	253B	1026
Mr L Stonard Technical Officer	253	1026
Mr L Slade Senior Laboratory Craftsman	253	1026
Mr F Drebber Laboratory Craftsperson	253	1026

FACULTY-BASED COURSES

Bachelor of Technology in Manufacturing Engineering

The Bachelor of Technology in Manufacturing Engineering, abbreviated as BTech (Mfg Eng), is offered through the Faculty of Engineering. This 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.

		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
25310	Financial Management for Manufacturing Engineering	4	3
Stage 4			
48040	Management for Manufacturing	4	3
48041	Computer-Aided Manufacturing	4	4
24221	Principles of Marketing	4	3
Stage 5			
48050	Engineering Documentation	3	3
48051	Metrology and Inspection	3	3
48052	Professional Review	3	2
48053	Technological Change and Strategic Planning	3	2
Stage 6			
48060	Quality for Manufacturing	3	3
48061	Design for Manufacture	3	3

48062	Terotechnology (Maintenance Management)	3	2
48043	Law and Contracts for Manufacturing	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 1900 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	269	2664

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 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'.

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

ME Bachelor of Engineering in Mechanical Engineering

MFG Bachelor of Engineering in Manufacturing Engineering

BT Bachelor of Technology in Manufacturing Engineering

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

Guide to subject descriptions

The subject descriptions shown below indicate the subject code and name, the number of credit points for the subject (ie, 3cp), the duration of the subject, indicated as semester weeks, if applicable, and the number of formal contact hours each week (ie, 4 hpw); for some subjects. 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.

24221 PRINCIPLES OF MARKETING

BT

(4cp); 3 hpw

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

(4cp); 3 hpw

subject coordinator K Pearson

Introduces the students to the terminology and basic concepts of economic and financial analysis and the application of financial management principals 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); 3 hpw

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

31163 KNOWLEDGE-BASED SYSTEMS

CSE

(3cp); 3 hpw

prerequisites 45342 Electromechanical Systems, 67023 Materials Technology

Introduces students to the theory, design and implementation of various knowledge-based techniques. While the emphasis will be on expert systems, there will be an overview of Artificial Intelligence, and some examples of knowledge-based systems will be examined in detail.

Topics include: overview of AI: reasoning and computation; knowledge representation, expert systems and knowledge elicitation. The course will be lecture based, however there will be several case studies and students will gain familiarity with a commercially available expert systems shell.

Assessment: project 35 per cent, assignment 25 per cent, final examination 40 per cent

33100 DISCRETE MATHEMATICS

EE/CSE/ET

(3cp); 3 hpw

The objective is for students to master the symbolism of discrete mathematics, as applied to set theory, logic and the predicate calculus; to introduce the concept of a formal system as a basis of description and proof; and to introduce proving techniques.

The course will cover formal systems and proof methods; propositional logic; quantifiers and predicate logic; method of induction; sets and set operations; indexing, mappings, relations and functions; equivalence relations; recursive definition of functions; partially ordered sets; semigroups, lattices and Boolean algebras and state machines; basic combinational techniques and applications; isomorphisms and graphs, trees, sequences.

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

33110 ENGINEERING MATHEMATICS 1 (ELECTRICAL)

CE/CSE/ET

(6cp); 6 hpw

prerequisite HSC 3-unit Mathematics is assumed

The objective is for students to master the fundamental mathematical operations used in most branches of electrical engineering. Specifically those of determinants, matrices, vectors and complex numbers; the basic computational methods of single variable differentiation and integration and the properties of elementary functions. Topics include matrices and determinants; solution of linear equations; Gaussian reduction; 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; trigonometric and hyperbolic functions; and L'Hopital's rule.

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

33121 ENGINEERING MATHEMATICS 1A

ME/MFG and CE/SE/CEE

(3cp); 3 hpw

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 and ME/MFG

(3cp); 3 hpw

prerequisite 33121 Engineering Mathematics 1A

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.

33210 ENGINEERING MATHEMATICS 2 (ELECTRICAL)

EE/CSE/ET

(6cp); 6 hpw

prerequisite 33110 Engineering Mathematics 1 (Electrical)

The fundamental aspects of differential calculus and the solution of ordinary differential equations, and the conceptualisation of abstract vector spaces.

This is achieved through development of expertise in some areas of theoretical linear algebra, in functions of several variables and partial derivatives and in ordinary differential equations and their solution by classical and Laplace transform methods. Topics include methods of integration; sequences and their convergence; series and their convergence; tests for convergence; power series; radius of convergence; Taylor series; vector spaces; linear independence; bases; inner products; linear transformations; rank of matrix; ordinary differential equations; first order linear and variable separate equations; solution of linear equations by auxiliary equation and un-determined coefficients; systems of linear equations; application of matrix exponentials; partial derivatives; gradient; Lagrange multipliers; Laplace transforms; application to ordinary differential equations; and convolution theorem. There will be emphasis on formally proving the fundamental concepts.

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

33221 ENGINEERING MATHEMATICS 2A

CE/SE/CEE and ME/MFG

(3cp); 3 hpw

prerequisite 33122 Engineering Mathematics 1B

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

33222 ENGINEERING MATHEMATICS 2B

ME/MFG

(3cp); 3 hpw

prerequisite 33221 Engineering Mathematics 2A

This is the fourth of a series of mathematics subjects which develop the mathematical skills and awareness needed by engineering students (in the ME and MFG degrees). This subject focuses on solution of more difficult equations.

Topics: 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

33310 ENGINEERING MATHEMATICS 3 (ELECTRICAL)

EE/CSE/ET

(6cp); 6 hpw

prerequisite 33210 Engineering Mathematics 2 (Electrical)

The series solution of differential equations and the conceptualisation of simple problems requiring multi-dimensional 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

45113 DIGITAL TECHNIQUES

EE/CSE/ET

(3cp); 3 hpw

subject coordinator Assoc Professor 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); 3 hpw

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, ie, 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); 3 hpw

corequisite 33110 Engineering Mathematics I (Electrical)

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); 6 hpw

prerequisite 45115 Engineering Practice, 33100 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); 6 hpw

prerequisite 45116 Electrical Engineering I; corequisite 33210 Engineering Mathematics 2 (Electrical)

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 eletromechanical 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); 3 hpw

prerequisite 45115 Engineering Practice

subject coordinator Mr P G Lewis

This subject is undertaken by students who gained admission with a TER score, ie, 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 or 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); 3 hpw

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); 6 hpw

prerequisites 45124 Electrical Engineering 2, 33210 Engineering Mathematics 2 (Electrical)

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); 3 hpw

prerequisite 45125 Engineering Discovery

subject coordinator Mr N J Carmody

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); 6 hpw

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 6 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); 3 hpw

prerequisites 45116 Electrical Engineering I, 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); 6 hpw

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); 3 hpw

prerequisites 33310 Engineering Mathematics 3 (Electrical), 45123 Fundamentals of Computing, 45124 Electrical Engineering 2

subject coordinator Mr 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); 3 hpw

prerequisite 45141 Continuous and Discrete Systems

subject coordinator Mr 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); 3 hpw
prerequisites 45151 Signal Theory 1, 45145 Engineering Statistics
subject coordinator Professor 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); 6 hpw
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 non-linear 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); 3 hpw
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 practice; 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); 3 hpw
prerequisite 45143 Computer Hardware; corequisites 45151 Signal Theory 1, 45153 Analogue Electronics
subject coordinator Assoc Professor G E Beard

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); 3 hpw

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); 3 hpw

prerequisite 45145 Engineering Statistics

subject coordinator Assoc Professor 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); 3 hpw

prerequisites 45166 Project Management, Industrial Experience 60 weeks minimum

subject coordinator Professor E W Aslaksen

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); 3 hpw

prerequisites 45155 Project A, 45176 Systems Engineering (recommended)

subject coordinator Assoc Professor P Bryce

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); 6 hpw

prerequisite 45182 Thesis I

subject coordinator Assoc Professor P Bryce

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); 3 hpw

prerequisites 33310 Engineering Mathematics 3 (Electrical), 45134 Network Theory

subject coordinator Assoc Professor 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); 6 hpw

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); 3 hpw

prerequisite 45242 Electromagnetics

subject coordinator Assoc Professor G E Beard

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); 3 hpw

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); 3 hpw

prerequisites 68033 Engineering Physics 3 (Electrical), 67023 Materials Technology

subject coordinator Assoc Professor 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 configura-

tions. 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); 3 hpw

prerequisite 45124 Electrical Engineering 2

subject coordinator Professor 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); 6 hpw

prerequisite 45163 Real-Time Software and Interfacing

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, multi-processor 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); 3 hpw

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, able to apply mathematical techniques to the programming process, 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); 3 hpw

prerequisite 45163 Real-Time Software and Interfacing

subject coordinator Assoc Professor 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); 3 hpw

prerequisites 45145 Engineering Statistics, 45363 Software Engineering

subject coordinator Professor 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 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); 3 hpw
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); 3 hpw
prerequisite 45372 Computer Systems Analysis
subject coordinator Professor 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); 3 hpw
prerequisites 45372 Computer Systems Analysis, 45176 Systems Engineering (recommended)
corequisite: 45382 Computer Systems Design
subject coordinator Assoc Professor C E Peterson

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); 3 hpw
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); 3 hpw

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); 3 hpw

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 sub-system, 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); 3 hpw

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); 3 hpw

prerequisite 45252 Power Apparatus and Systems

corequisite 45274 Physical Design and Production

subject coordinator Professor 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); 6 hpw

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); 3 hpw

prerequisites 45462 Power Electronics, 45481 Dynamics of Electrical Machines

subject coordinator Professor 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); 3 hpw

prerequisites 45143 Computer Hardware, 45123 Fundamentals of Computing

subject coordinator Assoc Professor 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); 6 hpw

prerequisites 45153 Analogue Electronics, 45163 Real-Time Software and Interfacing

subject coordinator Assoc Professor 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); 3 hpw

corequisites 45581 Analogue and Digital Control, 45562 Data Acquisition and Distribution Systems

subject coordinator Assoc Professor 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); 6 hpw

prerequisite 45141 Continuous and Discrete Systems

subject coordinator Assoc Professor 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); 3 hpw

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 MULTI-VARIABLE CONTROL

EE

(3cp); 3 hpw

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); 3 hpw

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

45661 COMMUNICATION NETWORKS

EE/ET

(3cp); 3 hpw

corequisite 45665 Data Communications

subject coordinator Assoc Professor 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); 3 hpw

prerequisite 45152 Signal Theory 2

subject coordinator Professor 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); 3 hpw

prerequisite 45152 Signal Theory 2

subject coordinator Assoc Professor 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); 3 hpw

prerequisites 45151 Signal Theory I, 45153 Analogue Electronics, 45264 Fields and Waves

subject coordinator Assoc Professor G E Beard

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 non-linearities 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

45665 DATA COMMUNICATIONS

EE/CSE

(3cp); 3 hpw

prerequisite 45145 Engineering Statistics

subject coordinator Assoc Professor T Buczkowska

Introduces the network layering concept and develops in detail the functions of three lower levels of the Open Systems Interconnection Model. The emphasis is placed on the mathematical treatment of systems with delays in order to develop the base for the introduction to routing in data networks and topological design. On completion students should be able to evaluate the performance of a data link, determine the

routing and flow control strategies and perform some basic delay/throughput analysis.

Assessment: assignments 20 per cent, laboratory 20 per cent, final examination 60 per cent

45667 INTEGRATED SERVICES NETWORKS

ET

(3cp); 3 hpw

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); 3 hpw

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); 3 hpw

prerequisite/corequisite either 45662 Signal Processing or 45665 Data Communications

subject coordinator Assoc Professor 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 3 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); 6 hpw

prerequisite 45663 Digital Transmission

subject coordinator Assoc Professor 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 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.

45931 ELECTRICAL ENGINEERING 2 (MECHANICAL)

ME/MFG

(4cp); 4 hpw

prerequisite 68012 Electrical Engineering I (Mechanical)

Introduces fundamental Electronic/Electrical devices and circuits to undergraduate students in the School of Mechanical and Manufacturing 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 10 of this book.

46033 PROJECT A

ME/MFG
part-time and sandwich
(6cp); 4.5 hpw
subject coordinators Assoc Professor 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

ME/MFG
part-time and sandwich
(6cp); 4.5 hpw
corequisite 46033 Project A
subject coordinators Assoc Professor 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

ME/MFG
(4cp); 3 hpw
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

ME/MFG
(6cp); 6 hpw
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)

46111 MECHANICS 2

ME/MFG
(4cp); 3 hpw
prerequisites 46110 Mechanics 1, 33121 Engineering Mathematics IA
corequisite 33122 Engineering Mathematics IB
subject coordinators Mr G M Marks, Dr K S Chan

An analysis of three-dimensional force systems in equilibrium, followed by area moments and mass of inertia and the kinematics and dynamics of relative motion extended to systems of bodies. This subject completes the discussion of particle mechanics introduced in Mechanics 1. The subject concludes with a preparatory discussion of planar rigid body kinematics.

Assessment: assignments 15 per cent, examination 85 per cent

46120 MECHANICS 3

ME/MFG
(4cp); 3 hpw
prerequisite 46111 Mechanics 2
subject coordinator Dr F C O Sticher

This subject presents kinematics and dynamics in a more general way than Mechanics 2. 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.

Assessment: assignments 10 per cent, examinations 90 per cent

46121 MECHANICS OF MACHINES

ME/MFG
(4cp); 4 hpw
prerequisite 46120 Mechanics 3
subject coordinator Mr S Spain

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 20 per cent, examinations 80 per cent

46130 DYNAMICS OF MECHANICAL SYSTEMS

ME/MFG

(4cp); 3 hpw

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 multi-degree 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

ME/MFG

(4cp); 3 hpw

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

ME/MFG

(4cp); 3 hpw

prerequisite 46130 Dynamics of Mechanical Systems

Aims to introduce 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

ME/MFG

(4cp); 3 hpw

prerequisites 46722 Manufacturing Processes 2A, 46121 Mechanics of Machines, 46723 Manufacturing Processes 2B

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

ME/MFG

(4cp); 3 hpw

prerequisites 46120 Mechanics 3

subject coordinator Dr F C O Sticher

Aims to give perspective to the Newtonian model of the Universe (ie, 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

(5cp); 4 hpw
prerequisite 46111 Mechanics 2
subject coordinator Dr K S Chan

This is the first of two core subjects dealing with the basics of solid and structural mechanics. The concepts of stress and strain, material properties (both linear and non-linear) 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

ME/MFG
(4cp); 4 hpw
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 is the second of two core subjects dealing 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

ME/MFG
(4cp); 3 hpw
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 non-linearity, 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

ME/MFG
(4cp); 3 hpw
prerequisites 46240 Solid Mechanics 3, 46130 Dynamics of Mechanical Systems;
corequisite 46330 Computer-aided Drafting and Design
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 non-linearity, 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

ME/MFG

(3cp); 3 hpw

subject coordinator Ms H McGregor

Provides an overview or issues and concepts which are important to new engineering students, including the following: UTS rules and requirements; what is engineering?; what do professional engineers do? What are their inputs to choosing and formulating the problems they address?; essential engineering skills; design, a key focus for engineering activity; the engineering method – a systematic approach to the design process; creativity; and technology management.

Practical examples and exercises will be provided to assist students to explore issues for themselves.

The introduction to the profession will include discussion of the roles of the Institution of Engineers, Australia and its code of ethics; and the industrial body, the Association of Professional Engineers and Scientists, Australia. 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

46311 ENGINEERING GRAPHICS

ME/MFG

(3cp); 3 hpw

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

46320 DESIGN 1

ME/MFG

(4cp); 3 hpw

prerequisites 46120 Mechanics 3, 46220 Solid Mechanics I

subject coordinator Mr H G R Wiedemann

An introduction to design methodology. The main emphasis is on the design of individual machine elements – bolted and welded joints, springs, shafts, gears, bearings and factors affecting materials selection. Power transmission systems are then discussed, including selection criteria, couplings, clutches, chain and belt drives.

It is the first in a sequence of three design subjects. The overall philosophy underlying these three subjects is to introduce the student to the various tasks and decisions associated with engineering design projects from the stage of problem formulation to final presentation. The subject involves the completion of a major project extending over approximately one-third of the course.

In all design subjects and projects students will be required to give particular attention to applicable codes and regulations, safety and requirements of the human operators, and the wider responsibilities of the engineer in preserving health, the environment and public safety.

Assessment: assignments 20 per cent, projects 20 per cent, examinations 60 per cent

46330 COMPUTER-AIDED DRAFTING AND DESIGN

ME/MFG
(5cp); 4 hpw
prerequisites 46722 Manufacturing Processes 2A, 46723 Manufacturing Processes 2B
subject coordinator Professor F B Swinkels

Students are introduced to the use of computers in 2D drafting and 3D wire frames, surface and solids modelling. These modelling techniques are then applied to determine 2D sectional properties and 3D mass properties. Computer-aided machine element design is introduced including mechanism design and analysis.

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

46332 DESIGN 2

ME/MFG
(4cp); 3 hpw
prerequisites 46320 Design I, 46130 Dynamics of Mechanical Systems
subject coordinator Mr A J Burfitt

This is the second subject in the three which comprise the core of the treatment of design in the course. The subject uses a number of projects to offer the student a creative and disciplined approach to the solution of problems. Specific systems are examined and further emphasis is given to methodology. Experimental stress analysis, weld and pressure vessel design are discussed. Occupational health and safety, and fatigue design are treated in detail.

Assessment: two major projects 50 per cent, assignments 25 per cent, final examination 25 per cent

46333 DESIGN 3

ME/MFG
(3cp); 3 hpw
prerequisite 46332 Design 2
subject coordinator Mr S Spain

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 driven subject.

Industrial visits will be arranged to provide state-of-the-art information. Students will undertake design projects, singly or in groups.

Assessment: projects 45 per cent, final examination 55 per cent

46340 STRUCTURES

ME/MFG
(4cp); 3 hpw
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.

Assignments 60 per cent, final examination 40 per cent

46341 MACHINE DESIGN

ME/MFG
(4cp); 3 hpw
prerequisites 46320 Design I, 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

ME/MFG
(4cp); 3 hpw
corequisite 46332 Design 2
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; pipe line 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

ME/MFG
(4cp); 3 hpw
prerequisites 46320 Design I, 46630 Engineering and Society

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

ME/MFG
(4cp); 3 hpw
prerequisite 46630 Engineering and Society; corequisite 46631 Engineering Management

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

ME/MFG
(4cp); 3 hpw
corequisite 46332 Design 2
subject coordinator Assoc Professor 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

ME/MFG
(4cp); 3 hpw
corequisite 46332 Design 2
subject coordinator Mr H G R Wiedemann

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

ME/MFG
(4cp); 4 hpw
prerequisites 33121 Engineering Mathematics IA, 46110 Mechanics I
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

ME/MFG

(5cp); 4 hpw

prerequisites 33121 Engineering Mathematics IA , 33122 Engineering Mathematics IB, 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

ME/MFG

(4cp); 4 hpw

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

ME/MFG

(4cp); 3 hpw

prerequisites 46420 Fluid Mechanics, 46421 Thermodynamics

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

46441 COMBUSTION AND AIR POLLUTION

ME/MFG

(4cp); 3 hpw

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

ME/MFG

(4cp); 3 hpw

prerequisites 46430 Thermofluids, 46830 Numerical Analysis

subject coordinator 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

ME/MFG
(4cp); 3 hpw
prerequisites 46430 Thermofluids, 46431 Heat Transfer
subject coordinator Dr G Hong

Gives student 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 is reviewed.

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

46444 POWER CYCLES

ME/MFG
(4cp); 3 hpw
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. It 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, lab 5 per cent

46445 FLUID MACHINES

ME/MFG
(4cp); 3 hpw
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

ME/MFG
(4cp); 4 hpw
prerequisites 45931 Electrical Engineering 2 (Mechanical), 46130 Dynamics of Mechanical Systems
corequisite 46531 Control Engineering I
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. Students are required to pass in each type of assessment.

46531 CONTROL ENGINEERING 1

ME/MFG

(4cp); 4 hpw

prerequisite 46130 Dynamics of Mechanical Systems

corequisite 46530 Measurement and Instrumentation

subject coordinator Mr K A Stillman

Aims to develop an understanding of simple feedback control systems and the classical control theory usually used to analyse and design these systems.

The methods and concepts required for classical control analysis are developed; mathematical models based on linear differential equations and their Laplace transforms are introduced and transfer functions and block diagrams are used to depict control loops. 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. 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

46540 PROGRAMMABLE CONTROLLERS

ME/MFG

(4cp); 3 hpw

prerequisite 45931 Electrical Engineering 2 (Mechanical

corequisite 46531 Control Engineering 1

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

ME/MFG

(4cp); 3 hpw

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.

This subject follows Control Engineering 1, extending the control system analysis to include Inverse Nyguist methods and Root Locus methods. Considerable time is devoted to the design of control systems using classical techniques. Additional topics then covered are state variable feedback and control, and a brief introduction to discrete and non-linear systems. A proportion of the course is devoted to laboratory studies of various real control systems.

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

46542 PROCESS CONTROL

ME/MFG

(4cp); 3 hpw

prerequisite 46531 Control Engineering 1

Aims to show control applications in the process industries and to familiarise students with a wide range of modern hardware used in this sector of industry.

It has been structured to complement the control theory subject Control Engineering 1. Control theory is applied to the control and instrumentation of process systems. While theory is important, the subject has an equally strong emphasis on practice and current industrial applications. The subject covers measuring transducers, transducers, control valves, controllers (analog and digital), programmable logic controllers and computer control. A small number of highly automated process plants are also studied and visited.

Assessment: tutorials 20 per cent, assignments 20 per cent, reports 20 per cent, final examination 40 per cent

46620 ENGINEERING COMMUNICATION

ME/MFG
(4cp); 3 hpw
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

ME/MFG
(4cp); 3 hpw
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

46631 ENGINEERING MANAGEMENT

ME/MFG
(3cp); 3 hpw
prerequisite 46630 Engineering and Society
subject coordinator Mr R B Ward

The over-riding 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.

Assessment: continuous assessment, assignments

46640 TEROTECHNOLOGY

ME/MFG
(4cp); 3 hpw
prerequisite 46820 Engineering Statistics;
corequisites 46332 Design 2,
46631 Engineering Management
subject coordinator Mr 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

46641 COMMERCIAL ISSUES FOR ENGINEERS

ME/MFG

(3cp); 3 hpw

prerequisite 46631 Engineering Management

subject coordinator Mr R B Ward

This subject deals in more detail with issues raised in 46631 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 would be introduced, such as quality, management of innovative technology, business ethics, and risk management.

Assessment: continuous assessment by reports and assignments

46642 ENGINEERING ECONOMICS

ME/MFG

(4cp); 3 hpw

prerequisite 46631 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); 3 hpw

prerequisites 45342 Electromechanical Systems, 67023 Materials Technology

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

46712 MANUFACTURING PROCESSES 1A

ME/MFG

part-time and sandwich

(3cp); 2 hpw

corequisite 67021 Materials Engineering I

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

This is the first of four related subjects. It covers classification of processes, safety engineering principles and processes of casting, permanent mould casting and hot working of metals.

Assessment: reports 20 per cent, assignments 15 per cent, examination 65 per cent

46713 MANUFACTURING PROCESSES 1B

ME/MFG

part-time and sandwich

(2cp); 2 hpw

corequisite 46712 Manufacturing Processes IA

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

This is the second of four related subjects. It covers principles and processes of welding and metal cutting.

Assessment: reports 40 per cent, assignment 10 per cent, examination 50 per cent

46722 MANUFACTURING PROCESSES 2A

ME/MFG

part-time and sandwich

(3cp); 2 hpw

prerequisite 46713 Manufacturing Processes IB

Continues to develop appreciation and understanding of processing principles and their application in manufacturing.

This is the third of four related subjects. It introduces strain hardening theory and its application, to forming processes. It covers the principles and processes associated with forming, sintering and inspection.

Assessment: reports 20 per cent, laboratory reports 15 per cent, examination 65 per cent

46723 MANUFACTURING PROCESSES 2B

ME/MFG

part-time and sandwich

(2cp); 2 semester hours (in one semester)
prerequisite 46713 Manufacturing Processes 1B
corequisite 46722 Manufacturing Processes 2A

Continues to develop the appreciation and understanding of processing principles and their application in manufacturing.

This is the fourth of four related subjects. It covers the principles and processes associated with plastic products, computerised numerical controlled (CNC) machines, robots, assembly and finishing.

Assessment: reports 20 per cent, assignments 15 per cent, examination 65 per cent

46740 QUALITY AND RELIABILITY

ME/MFG

(4cp); 3 hpw
prerequisite 46820 Engineering Statistics
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

46741 FLEXIBLE MANUFACTURING

ME/MFG

(4cp); 3 hpw
prerequisites 46722 Manufacturing Processes 2A, 46723 Manufacturing Processes 2B
subject coordinator Assoc Professor R M Spencer

Emphasises Australia's demographic structure in relation to domestic and international markets; illustrates the need for continuing development; illustrates the inherent flexibility of computer software; and considers the modular development of flexible manufacturing cells.

Topics treated will be chosen from the following: Planning – strategic management, marketing, flexibility, definition of flexible manufacturing; life cycles, types of forecasting; handling uncertainty by lead time reduction, inventory reduction, quality, reliability, JIT, maintenance, aggregation; group technology, coding, geometric and matrix flow analysis; facilities design, simulation, investment proposals. Equipment – axis servos, interpolators; N/C machine commissioning; material/part handling, robots, mobile carts, conveyors, pallets, loading/unloading, storage, assembly, inspection, modularity. Programming – controllers, sequential, servo; offline and online programming, N/C, robots, AGVs, CMMs, probes; unattended machining; interfacing problems, integration.

Assessment: reports 24 per cent, assignments 6 per cent, examination 70 per cent

46742 PRODUCTION AND COST CONTROL

ME/MFG

(4cp); 3 hpw
prerequisite 46631 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

46743 WORK STUDY

ME/MFG

(4cp); 3 hpw

prerequisites 46723 Manufacturing Processes 2B, 46820 Engineering Statistics

Aims to develop proficiency in the understanding and application of the principles of method improvement and work measurement with due consideration of human factors and environmental constraints.

This subject presents the basic techniques and skills required for method improvement and work measurement in industrial work situations. Emphasis is placed on the use of recording techniques and critical analysis. Work measurement techniques include study and PMTS systems for the development of standard times. Statistical approach is applied in work sampling and machine interference. Basic techniques are used to effect improvement in materials handling and plant layout. Knowledge of human factors in relation to the design of work-space and equipment and in relation to environmental constraints is presented.

Assessment: assignments 35 per cent, examinations 65 per cent

46744 COMPUTER-AIDED MANUFACTURING

ME/MFG

(4cp); 3 hpw

prerequisite 46330 Computer-Aided Drafting and Design

subject coordinator Professor 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

46810 INTRODUCTION TO COMPUTING

ME/MFG

(3cp); 2 hpw

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 COMPUTER PROGRAMMING

ME/MFG

(4cp); 4 hpw

prerequisites 46810 Introduction to Computing, 33121 Engineering Mathematics IA

subject coordinator Mr K A Stillman

Introduces the computer as a means of solving engineering problems and is designed to develop programming skills and competence in the use of a computer. Program structure that leads to uncomplicated and adaptable programs is emphasised.

FORTRAN 77 is the programming language used but others will be discussed. UNIX operating system and its text editing facilities will be used.

Assessment: assignments 45 per cent, quiz (open book) 15 per cent, final examination (open book) 40 per cent

46820 ENGINEERING STATISTICS

ME/MFG

(3cp); 3 hpw

prerequisite 33221 Engineering Mathematics 2A

subject coordinator Dr G Hong

Introduces the basic concepts of probability and statistics and show how they are used in prediction, assessment and quality control.

Topics include summarising data; probability, discrete and continuous distributions including the binomial, Poisson and normal distribution; sample statistics; estimation and confidence intervals; tests of hypotheses; regression and correlation; analysis of variance. Applications to experimental design and quality control are treated.

Assessment: assignments 15 per cent, quizzes 25 per cent, examinations 60 per cent

46830 NUMERICAL ANALYSIS

ME/MFG

(4cp); 3 hpw

prerequisite 46820 Engineering Statistics

subject coordinator Dr B P Huynh

Gives students experience in the application of numerical methods to the solution of engineering problems. It follows Computer Programming and makes extensive use of the computer. Topics include numerical precision and errors; integration; solution of equations (linear, non-linear, simultaneous); interpolation; differentiation; curve fitting; differential equations (ordinary, simultaneous, partial).

Assessment: assignments 30 per cent, examinations 70 per cent

46840 ADVANCED ENGINEERING COMPUTING

ME/MFG

(4cp); 3 hpw

prerequisite 46830 Numerical Analysis

subject coordinator Dr A N F Mack

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 data processing 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

46841 OPERATIONS RESEARCH

ME/MFG

(4cp); 3 hpw

Prepares the students in the various techniques of operations research to enable them to take management decisions effectively.

This is an introduction to the philosophy of operations research, and a more detailed treatment of selected techniques including simulation, linear programming, dynamic programming, network analysis (CPM, PERT, Least Cost Scheduling), and queuing theory.

Assessment: reports, assignments, examination

46842 MICROPROCESSORS

ME/MFG

(4cp); 3 hpw

prerequisites 46530 Measurement and Instrumentation, 46830 Numerical Analysis

Introduces the basic concepts of microprocessor architecture and programming, and develop the skills needed for the applications of the microprocessor in industrial systems. The programming models and basic features of microprocessor and microcomputer programming, encoding and number systems developed. The methodology of structured software design will be reviewed with an emphasis on microprocessor applications. The characteristics of the major microprocessor system components will be reviewed at the broad level. Input/output facilities, interrupt systems, and other ancillary devices related to control systems will be explored.

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

46990 INDUSTRIAL REVIEW

ME/MFG

(3cp); 3 hpw

corequisite 46631 Engineering Management

subject coordinator Mr G M Marks

Following selected reading and tutorial discussion, students will write essays reviewing aspects of the structure and operation of the firm with which they are employed. Topics for these essays will be chosen from topics including: 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: essays 100 per cent

46991 PROFESSIONAL REVIEW

ME/MFG

(3cp); 3 hpw

prerequisite 46990 Industrial Review

subject coordinator Assoc Professor C T Mathews

The objective of this subject is to review and assess the industrial component of the cooperative Bachelor of Engineering program. The different philosophies on cooperative education will be discussed. Each student will be required to present a report on their industrial experience and to give a seminar to the class, outlining this experience in the light of the course objectives.

Assessment: seminars 30 per cent, reports 70 per cent

46997 PROFESSIONAL EXPERIENCE (SANDWICH)

ME/MFG

46999 PROFESSIONAL EXPERIENCE (PART-TIME)

ME/MFG

This subject name/number is the Industrial Experience subject for Mechanical and Manufacturing 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.

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); 2 hpw

47003 PROJECT

CE

(3cp); 3 hpw

47004 PROJECT

CE

(4cp); 4 hpw

47006 PROJECT

CE

(6cp); 6 hpw

47009 PROJECT

CE

(9cp); 9 hpw

47012 PROJECT

CE

(12cp); 12 hpw

47015 PROJECT

CE

(15cp); 15 hpw

subject coordinator Dr G L Ring

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); 3 hpw

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

47113 COMPUTATIONS 1

CE/SE/CEE

(4cp); 3 hpw

subject coordinator Dr K L Lai

Aims to familiarise students with computing as a tool for solving engineering problems. The emphasis in the subject 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 30 per cent, mid-term quiz 20 per cent, final examination 50 per cent

47117 STATICS

CE/SE/CEE

(4cp); 3 hpw

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); 3 hpw

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

(3cp); 3 hpw

Course under review

47127 MECHANICS OF SOLIDS 1

CE/SE/CEE

(4cp); 3 hpw

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 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); 3 hpw

prerequisite 47118 Surveying IA

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 introduced to 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); 3 hpw

prerequisite 47127 Mechanics of Solids I

subject coordinator Dr K L Lai

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 COMPUTATIONS 2

CE/SE/CEE

(3cp); 3 hpw

prerequisites 47113 Computations I, 33121 Engineering Mathematics IA, 33122 Engineering Mathematics IB

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 theory, but some theory will be provided to assist in the understanding of the solution techniques.

Assessment: continuous assessment 35 per cent, final examination 65 per cent

47134 CONSTRUCTION MATERIALS

CE/SE/CEE

(3cp); 3 hpw

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); 3 hpw

prerequisites 47127 Mechanics of Solids I, 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); 3 hpw

prerequisite 47127 Mechanics of Solids I

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); 3 hpw

prerequisite 47127 Mechanics of Solids I;

corequisite 47137 Mechanics of Solids 2

subject coordinator Professor 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); 3 hpw

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); 3 hpw

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); 3 hpw

prerequisite 47127 Mechanics of Solids I

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); 3 hpw

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); 3 hpw

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); 3 hpw

subject coordinator Assoc Professor 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 actively participate 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); 3 hpw

prerequisite 47140 Concrete Design I

subject coordinator Professor 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); 3 hpw

prerequisites 47141 Structural Analysis I, 47133 Computations 2

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 non-linearities and to problems of elastic stability.

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

47152 PUBLIC HEALTH ENGINEERING

CE/SE/CEE

(3cp); 3 hpw

prerequisite 47142 Environmental Engineering

subject coordinator Dr S Vigneswaran

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 COMPUTATIONS 3

CE/SE/CEE

(3cp); 3 hpw

prerequisite 47133 Computations 2

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. The students will be introduced to statics software packages.

Assessment: assignments 10 per cent, either three mid-semester tests, 30 per cent each, or alternatively final examination 90 per cent.

47154 CONCRETE TECHNOLOGY

CE/SE/CEE

(3cp); 3 hpw

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); 3 hpw

prerequisite 47135 Fluid Mechanics

subject coordinator Assoc Professor G O'Loughlin

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); 3 hpw

prerequisite 47146 Soil Mechanics

subject coordinator Assoc Professor 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); 3 hpw

subject coordinator Assoc Professor 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); 3 hpw

prerequisite 47140 Concrete Design 1

corequisite 47150 Concrete Design 2

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); 3 hpw

prerequisite 47137 Mechanics of Solids 2

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); 3 hpw

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

47163 COMPUTATIONS 4

CE/SE/CEE

(3cp); 3 hpw

prerequisite 47153 Computations 3

subject coordinator Dr A Saleh

Familiarises students with a number of advanced computational techniques relevant to the solution of engineering problems. Emphasis will be given to the role of computer software packages, their advantages and limitations in solving such problems.

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

47164 METALS TECHNOLOGY

CE/SE

(3cp); 3 hpw

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); 3 hpw

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 Soil Mechanics and the methods of analysis treated in 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, fieldwork 20 per cent, design project 30 per cent, final examination 40 per cent

47167 ROAD ENGINEERING

CE/CEE

(3cp); 3 hpw

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); 3 hpw

prerequisite 47128 Surveying IB

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

CE/SE

(4cp); 3 hpw

prerequisites 47161 Steel Design I, 47141 Structural Analysis I, 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 preciously acquired knowledge.

Assessment: project 50 per cent, two quizzes 50 per cent

47175 WATER ENGINEERING

CE/CEE

(3cp); 3 hpw

prerequisites 47145 Hydraulics, 47155 Hydrology

subject coordinator Assoc Professor 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 (water supply, irrigation, eg) 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); 3 hpw
prerequisite 47156 Soil Engineering
subject coordinator Assoc Professor 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 engineering 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); 3 hpw
prerequisite 47167 Road Engineering
subject coordinator Mr P Kenny

Provides students with a basic understanding with 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); 3 hpw
prerequisite 47159 Project Planning
subject coordinator Assoc Professor 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); 3 hpw
subject coordinator Assoc Professor 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); 3 hpw
prerequisites 47149 Construction, 47159 Project Planning, 47179 Construction Contracts
subject coordinator Assoc Professor 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); 3 hpw
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); 3 hpw
prerequisites 47151 Structural Analysis 2, 47133 Computations 2
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); 3 hpw
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); 3 hpw
prerequisites 47151 Structural Analysis 2, 47133 Computations 2
subject coordinator Assoc Professor 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); 3 hpw
prerequisite 47150 Concrete Design 2;
corequisite 47160 Concrete Design 3
subject coordinator Professor 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); 3 hpw
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); 3 hpw
prerequisite 47268 Dynamics of Structures
subject coordinator Assoc Professor B Samali

Familiarises students with various types of loads and phenomena responsible for inducing stresses and strains in building structures, and to develop 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); 3 hpw
prerequisites 47151 Structural Analysis 2, 47133 Computations 2
subject coordinator Professor 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); 3 hpw
prerequisite 47171 Steel Structures and Concept Design
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: 2 projects 50 per cent, 2 quizzes 50 per cent

47285 DESIGN PROJECT

SE
(6cp); 6 hpw
prerequisites 47281 Steel Structures and Concept Design 2, 47160 Concrete Design 3
subject coordinator Professor 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); 3 hpw

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

SE

(3cp); 3 hpw

prerequisite 47277 Loading on Building Structures

subject coordinator Dr S Parsanejad

Enhances the understanding of the behaviour of structural systems with special reference to characteristics inherent in 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); 3 hpw

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); 3 hpw

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); 3 hpw

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

47304 COASTAL ENGINEERING (ELECTIVE)

CE

(3cp); 3 hpw

prerequisites 47145 Hydraulics, 47155 Hydrology

subject coordinator Dr M Patarapanich

Coastal Engineering is offered as an elective in the Water Engineering strand within the Civil Engineering course. The main objective is to provide a general introduction to natural behaviour of water waves and their interactions with the coastline and coastal structures. Topics covered: wave generation processes and wave forecasting; wave theories and their limits of validity; wave kinematics in deep and shallow water, shoaling; wave refraction; wave reflection; wave diffraction; wave forces on walls and piles; design of breakwater and marina; measurement and statistical analysis of random waves; estimation of extreme waves; tide and other long period water level fluctuations; coastal sediment transport and shore protection methods; marine outfall for sewage disposal; physical and computer models.

Assessment: assignments/reports 40 per cent, examinations 60 per cent

47305 RISK AND RELIABILITY ANALYSIS (ELECTIVE)

CE/SE

(3cp); 3 hpw

prerequisite 47113 Computations I

subject coordinator Assoc Professor 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, 2 quizzes 70 per cent

47306 GEOMECHANICS (ELECTIVE)

CE/SE

(3cp); 3 hpw

prerequisites 47156 Soil Engineering, completion of 47166 Geotechnical Engineering strongly recommended

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); 3 hpw

prerequisites 47149 Construction, 47159 Project Planning, 47179 Construction Contracts

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

47312 WATER SUPPLY AND SEWERAGE

CE/SE

(3cp); 3 hpw

prerequisites 47155 Hydrology, 47152 Public Health Engineering

Students will be made familiar with the nature of water supply and sewerage facilities. They are to see these in a 'systems' context and understand how the various components relate to each other, and the bases on which components should be designed. The emphasis is on hydraulics and the conveyance of water and waste water, rather than on treatment processes or pollution impacts. Through exercises, students are to gain an appreciation of design processes and tools.

Subject content includes purposes of water supply and sewerage systems; types of water supply system components – source, extraction facility, treatment works, pumps, conveyances, appurtenences, storages, distribution system; design principles – water demands, quality standards, reliability of supply; system hydraulics – pipe network analysis, water hammer; types of sewerage system components – collection system, pumping stations, conveyances, appurtenences, treatment works, receiving waters; design principles – sewage quantities and characteristics, overflow frequencies, effluent standards, gravity and pumped pipe system hydraulics, sulphide protection; and hydraulics of water and sewerage treatment works – rapid mixing, flocculation, sedimentation and filtration.

Assessment: assignments 100 per cent

47318 STORMWATER DRAINAGE (ELECTIVE)

CE/SE

(3cp); 3 hpw

prerequisite 47155 Hydrology

subject coordinator Assoc Professor G O'Loughlin

Students will be given a grounding in the design, analysis and maintenance of urban stormwater systems. They should see these in their social, environmental and economic settings, and understand the rationale for design and operation. They will be made familiar with standard design procedures and software packages.

Topics covered include: two problems – flooding and pollution; approach to design; hydrology and hydraulics; pipe system design – Rational Method and computer procedures; trunk drainage design – basic manual procedures and computer models; channel and culvert hydraulics; detention basins; erosion and sedimentation, stormwater pollution – sources, effects, remedial measures; interactions with sanitary sewers; roof and property drainage; drainage system safety.

Assessment: exercises and assignments 80 per cent, quiz 20 per cent

47449 INTRODUCTION TO ENVIRONMENTAL ECONOMICS AND LAW

CEE

(3cp); 3 hpw

prerequisite 47142 Environmental Engineering

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); 3 hpw

prerequisite 47142 Environmental Engineering

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); 3 hpw

prerequisite 47142 Environmental Engineering

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); 3 hpw

prerequisite 47145 Hydraulics

corequisite 47155 Hydrology

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); 3 hpw

prerequisite 47146 Soil Mechanics

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); 3 hpw

prerequisite 47142 Environmental Engineering

The course will stress an integrated approach to waste minimisation through the consideration of product lifecycles, 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: assignments (3) 20 per cent, quizzes (2) 40 per cent, major project and presentation 40 per cent

47997 PROFESSIONAL EXPERIENCE (SANDWICH)

CE/SE/CEE

47999 PROFESSIONAL EXPERIENCE (PART-TIME)

CE/SE/CEE

subject coordinator Dr G Ring

This is the Professional Experience subject for Civil and Structural 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); 3 hpw

subject coordinator Assoc Professor 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 manufacturing in Australia through interviews, site visits, and literature research.

Assessment: assignments 100 per cent

48011 COMPUTING FOR MANUFACTURING AND MANAGEMENT

BT

(4cp); 4 hpw

subject coordinator Dr A N F Mack

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, work 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); 3 hpw

subject coordinator Ms H 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); 4 hpw

prerequisite 48011 Computing for Manufacturing and Management

subject coordinator Assoc Professor C T Mathews

Builds on the students' knowledge of mathematics in the following areas and cover 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); 3 hpw

prerequisite 65026 Chemistry

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); 3 hpw

prerequisites 48020 Communication in Manufacturing and Management

subject coordinator Dr D Cobbin (Centre for Multidisciplinary Studies)

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); 4 hpw

prerequisite 48021 Numerical Methods

subject coordinator Professor F B Swinkels

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); 3 hpw
prerequisites 48020 Communication in Manufacturing and Management, 48032 Engineering Economics for Manufacturing, 48030 The Industrial Environment; corequisite 24221 Principles of Marketing
subject coordinator Mr R B Ward

The aim is to integrate management activities in the Australian manufacturing environment and prepare the student for management situations.

The over-riding 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); 4 hpw
prerequisite 48031 Computer-aided Drawing and Design
subject coordinator Professor 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

48043 LAW AND CONTRACTS FOR MANUFACTURING

BT

(3cp); 2 hpw
prerequisites 48030 The Industrial Environment, 48040 Management for Manufacturing, 48050 Engineering Documentation
corequisite 48053 Technological Change and Strategic Planning

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

48050 ENGINEERING DOCUMENTATION

BT

(3cp); 3 hpw
subject coordinator Ms H 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); 3 hpw
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); 2 hpw
prerequisite 48040 Management for Manufacturing
subject coordinator Assoc Professor C T Mathews

Focuses the students on their past work experience and require 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); 2 hpw
prerequisite 48040 Management for Manufacturing
subject coordinator Assoc Professor 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); 3 hpw
prerequisite 48051 Metrology and Inspection
subject coordinator Assoc Professor R M Spencer

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); 3 hpw

prerequisite 48041 Computer-aided Manufacturing

subject coordinator Professor F B Swinkels

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

BT

(3cp); 2 hpw

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

51131 COMMUNICATIONS 1

CE/SE/CEE

(3cp); 3 hpw

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: 1 essay 25 per cent, 1 report 25 per cent, oral report 25 per cent, quiz 25 per cent

51161 COMMUNICATIONS 2

CE/SE/CEE

(3cp); 3 hpw

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); 3 hpw

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); 3 hpw
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 re-possession 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); 3 hpw

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 ME/MFG
(6cp); 6 hpw

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); 3 hpw
subject coordinator Mr 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

ME/MFG
(3cp); 3 hpw
prerequisite 65023 Engineering Chemistry; corequisite 67021 Materials Engineering I

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); 3 hpw
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

ME/MFG

(4cp); 4 hpw

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); 3 hpw

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); 3 hpw

prerequisite 68031 Engineering Physics I (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

ME/MFG

(4cp); 4 hpw

prerequisites 67021 Materials Engineering I, 46220 Solid Mechanics I; 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)

ME/MFG

(4cp); 4 hpw

prerequisite 33121 Engineering Mathematics IA

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)

ME/MFG
(4cp); 4 hpw
prerequisites 68011 Engineering Physics (Mechanical), 33122 Engineering Mathematics IB

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; DG 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); 6 hpw
corequisites 33121 Engineering Mathematics IA, 47117 Statics
subject coordinator Assoc Professor 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)

CE/SE
(part-time)
(3cp); 3 hpw
corequisites 33121 Engineering Mathematics IA, 47117 Statics
subject coordinator Assoc Professor 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); 6 hpw

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); 3 hpw
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); 3 hpw

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); 3 hpw

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 COMMUNICATION PHYSICS

EE

(3cp); 3 hpw

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 multi-wavelength 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

79371 LEGAL ISSUES IN TELECOMMUNICATIONS

ET

(6cp); 3 hpw

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

ME/MFG

(4cp); 3 hpw

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); 3 hpw

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: 1 seminar or poster presentation 20 per cent, 1 assignment - desk study 30 per cent, final examination 50 per cent

91651 ENVIRONMENTAL MICRO-BIOLOGY FOR ENGINEERS

CEE

(3cp); 3 hpw

prerequisite 91650 Introduction to Environmental Biology

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

T5115 INTRODUCING ABORIGINAL CULTURES AND PHILOSOPHIES

(6cp); 3 hpw

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

SUBJECT NAMES IN ALPHABETICAL ORDER

Concrete Design 3	47160
Concrete Design 4	47270
Concrete Technology	47154
Construction	47149
Construction Contracts	47179
Construction Management	47307
Construction Materials	47134
Contextual Studies	45154
Continuous and Discrete Systems	45141
Control Engineering 1	46531
Control Engineering 2	46541
Corrosion Technology for Engineers	65071
Data Acquisition and Distribution Systems	45562
Data Communications	45665
Database Structures and Management	31141
Design 1	46320
Design 2	46332
Design 3	46333
Design for Manufacture	48061
Design Project	47285
Digital Systems	45364
Digital Systems Design	45561
Digital Techniques	45113
Digital Transmission	45663
Discrete Mathematics	33100
Domestic Building Design and Construction	47237
Dynamics of Electrical Machines	45481
Dynamics of Mechanical Systems	46130
Dynamics of Structures	47268
Einstein's Universe	46143
Electrical Engineering 1 (Mechanical)	68012
Electrical Engineering 1	45116
Electrical Engineering 2 (Mechanical)	45931
Electrical Engineering 2	45124
Electrical Power Generation	68034
Electrical Variable Speed Drives	45484
Electromagnetics	45242
Electromechanical Systems	45342
Electronic Devices and Circuits	45144
Engineering and Society	46630
Engineering Chemistry	65023
Engineering Communication	45135
Engineering Communication	46620
Engineering Discovery	45125
Engineering Documentation	48050
Engineering Economics (ME/MFG)	46642
Engineering Graphics	46311
Engineering Management	46631
Engineering Mathematics 1	33110
Engineering Mathematics 1A	33121
Engineering Mathematics 1B	33122
Engineering Mathematics 2 (Electrical)	33210
Engineering Mathematics 2A	33221
Engineering Mathematics 2B	33222
Engineering Mathematics 3 (Electrical)	33310
Engineering Physics (Civil)	68021
Engineering Physics (Civil)	68022
Engineering Physics (Mechanical)	68011
Engineering Physics 1 (Electrical)	68031
Engineering Physics 2 (Electrical)	68032
Engineering Physics 3 (Electrical)	68033
Engineering Practice	45115
Engineering Speculation	46344
Engineering Statistics	45145
Engineering Statistics	46820
Environmental Engineering	47142
Environmental Hydraulics	47465
Environmental Microbiology for Engineers	91651
Environmental Science for Engineers	91379
Ergonomics	46040
Fields and Waves	45264
Financial Management for Manufacturing Engineering	25310
Finite Element Analysis	47265
Finite Element Applications	46241
Flexible Manufacturing	46741
Fluid Machines	46445
Fluid Mechanics	46420
Fluid Mechanics	47135
Geology for Engineers	66032
Geomechanics	47306
Geotechnical Engineering	47166
Graphics	47120
Ground Modification	47176
Heat Transfer	46431
High-rise Buildings	47288
History of Ideas	52001
Hydraulics	47145
Hydrology	47155
Industrial Design	46345
Industrial Environment, The	48030
Industrial Experience (Part-time)	45999
Industrial Experience (Sandwich)	45997

Robotics and Flexible Manufacturing	46701
Science Technology and Human Values	59325
Signal Processing	45662
Signal Theory 1	45151
Signal Theory 2	45152
Software Development 1	45123
Software Development 2	45133
Software Engineering	45363
Soil Engineering	47156
Soil Mechanics	47146
Solid Mechanics 1	46220
Solid Mechanics 2	46230
Solid Mechanics 3	46240
Statics	47117
Steel Design 1	47161
Steel Structures and Concept Design	47171
Steel Structures and Concept Design 2	47281
Stormwater Drainage (Elective)	47318
Structural Analysis 1	47141
Structural Analysis 2	47151
Structural Mechanics	47131
Structural Stability	47278
Structural Testing	47287
Structures	46340
Surveying 1A	47118
Surveying 1B	47128
Surveying 2	47168
Systems Engineering	45176
Technological Change and Strategic Planning	48053
Teletraffic Engineering	45668
Terotechnology	46640
Terotechnology	48062
Thermodynamics	46421
Thermofluids	46430
Thesis 1	45182
Thesis 2	45183
Timber Design	47144
Transportation Engineering	47177
Unitised Load Handling	46342
Stormwater Drainage	47318
Waste Minimisation	47482
Water Engineering	47175
Water Supply and Sewerage	47312
Welding (Elective)	47302
Work Study	46743

POSTGRADUATE COURSES

INTRODUCTION

With effect from 1 January 1994, all graduate studies in the Faculty of Engineering are conducted through its Graduate School, located within the Faculty at the City campus, Broadway. It provides a first point of contact for enquiries from both current and prospective students, together with a range of other services relating to program administration. Its offices are located on Level 4 (street level) of Building 2.

All enquiries relating to graduate studies should be directed initially to the Graduate Studies Officer (Ms Beate Buckenmaier), between 10 am-1 pm, and 2 pm-5 pm, Monday to Friday, or at other advertised times during enrolment periods. Telephone 330 2606, fax 330 2611.

COURSES OFFERED

The Faculty of Engineering offers the degrees of Doctor of Philosophy (PhD) and Master of Engineering (ME) (by thesis) in areas of current research, through each of itsSchools.

Several courses are also offered at Master's level (by coursework). These include separate Master's degrees in Engineering Management and in Engineering Practice[1], each of which is available on a part-time attendance pattern; a Master of Local Government Management degree, which is a joint course of the Faculties of Engineering and Business; and a Master of Engineering (Telecommunications) degree, which is offered on a full-time or part-time attendance pattern.

The PhD and ME (Groundwater Management) and the Graduate Diploma (Groundwater Management) are offered through the National Centre for Groundwater Management, which operates jointly with the Faculty of Science.

The Faculty offers a Graduate Diploma in Engineering, abbreviated as Grad Dip Eng, 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. abbreviated as Grad Dip Local Govt Eng. available on a two-year block release pattern of attendance.

[1] In respect of the Master of Engineering Practice only, subject to final approval by Academic Board at the time of printing.

Various programs leading to the award of Graduate Certificates are offered.

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, which are being introduced progressively from September 1993, can be obtained from the Graduate School of Engineering at UTS or directly from AGSEI (telephone 299 5699, fax 299 5334). Details of course credits for AGSEI programs are available through the Graduate School at UTS.

GENERAL INFORMATION

The following information is only an outline. Additional information is provided to all students upon enrolment when they receive the Faculty's booklet *Postgraduate Program Enrolment and Information Guide* and the *Student Information Guide 1994*.

SEMESTER PATTERNS

The Academic Year of the University is divided into two semesters: Autumn, March - June, and Spring, August - December.

All courses except the Graduate Certificate in Environmental Engineering and Management[2] have their intake in March at the beginning of the academic year, although some places may be available in the second semester beginning in August. Potential applicants should contact the Graduate Studies Officer, Ms Beate Buckenmaier, on 330 2606, in April for initial advice.

ATTENDANCE AND ACADEMIC CREDIT

Class attendance requirements vary with the courses. The actual weekly contact hours for a subject unit are denoted by Semester Hours - the hours of attendance per week for one semester.

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.

[2] The intake for the Graduate Certificate in Environmental Engineering and Management for 1994 is at the beginning of the second semester, beginning in August.

RULES GOVERNING THE COURSES

Students will be subject to the Rules prescribed in the *Student Information Guide 1994* 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 Graduate Programs Committee of the Faculty Board in Engineering.

DURATION OF COURSES

Graduate Diploma courses are of two years' duration on a part-time basis and one year's duration on a full-time basis. Available attendance patterns in any year may vary; normally, either is able to be taken. Classes in most subjects are available in the evening as well as during the day, in one of the two semesters. In some cases, however, it is necessary for part-time students to attend the University one afternoon a week.

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 three semesters' duration on a full-time basis or five or six semesters part-time.

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, or four years part-time, and three years full-time for candidates with a Bachelor's degree.

The Faculty also offers a number of short Continuing Professional Education courses, which do not lead to formal awards. Information on these is available separately.

APPLICATIONS FOR ADMISSION

Coursework degree applications

Application forms may be obtained from the Faculty of Engineering in Building 2 at City campus; from 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 Form. 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:
The UTS Information Service
University of Technology, Sydney
Level 4, Tower Building, Broadway
Telephone 330 1990

Postal address:
Post Office Box 123
Broadway, NSW 2007

Courses commence: early March 1994.

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 at 9 Broadway 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) 264 1111

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 29 October 1993 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.

Doctor of Philosophy and Master's (by thesis)

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 following detailed information on these courses.

Late applications after 29 October 1993

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 1993. 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 1993 - January 1993.

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 outlines of the subjects or courses previously undertaken, on the basis of which exemption or credit by substitution is sought. A photocopy from the relevant 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 are as follows:

Master of Engineering Management and Graduate Diploma in Local Government Engineering

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 Director of the course on the question of expertise, and to agree with the Director a suitable subject in lieu.

Other programs

Exemptions or credit by substitution are not normally available.

ENROLMENT

Enrolment for postgraduate programs involving coursework takes place in early February for the Autumn semester, and in late July for the Spring semester. Enrolment must be in person. Complete enrolment details are forwarded to successful applicants.

Block Release students in the Graduate Certificate of Environmental Engineering and Management, Graduate Diploma of Local Government Engineering and Master of Local Government Management usually complete formal enrolment procedures during their first period of Block Release at UTS.

Enrolment for Doctoral and Master's programs (by thesis) 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)	$A170.00
UTS Union (entrance fee) (non-refundable)	$A 20.00
Student Accommodation Levy	$A 50.00
Student identification card charge (non-refundable)	$A 6.00
TOTAL	$A289.00

Students will be exempt from Union fees if they are able to 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 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.

In 1993 Graduate Diploma in Engineering students were liable for HECS charges of approximately $250 per subject. Master of Engineering Management, Master of Engineering (Telecommunications) and Graduate Diploma in Local Government Engineering students paid a postgraduate course fee of $475 per subject. Master of Local Government Management students paid a postgraduate course fee of $550 and Graduate Diploma in Environmental Engineering and Management paid a postgraduate fee of $700 per subject. These were in lieu of the HECS charge. The corresponding figures for 1994 have not yet been determined.

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 1994 will range from $A12,000 to $A16,500 per annum, depending on the course.

For further information on fee arrangements for overseas students, contact UTS International Programs on 330 1531.

SCHOLARSHIPS

Students undertaking Graduate Diploma and 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 Research Award (Industry)

University Doctoral Research Scholarship

R L Werner Postgraduate Research Scholarship

Scholarships for research and coursework programs

Australian Postgraduate Award

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 at 9 Broadway.

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 a separate publication dealing exclusively with scholarships. Interested students should contact the Postgraduate Studies and Scholarships Office, Level 5, Tower Building on 330 1521.

AUSTRALIAN GRADUATE SCHOOL OF ENGINEERING INNOVATION (AGSEI)

The Australian Graduate School of Engineering Innovation (AGSEI) was formed jointly by the University of Technology, Sydney, The University of Sydney and a number of industry members during 1992. AGSEI's establishment has been funded in part by the Commonwealth'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 technological 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, its 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 and business ethics, manufacturing, project financing, risk management, integrated marketing, contract management, engineering economics, and legal and government interfaces.

Participants may aggregate course modules into professional development programs leading to the award of the UTS Master's degree in Engineering Practice.

AGSEI programs are taken on a full-fee basis, with the course component of most modules presented at AGSEI premises within the Eveleigh Advanced Technology Park. Modules are being offered progressively from September 1993.

Details of AGSEI programs, together with advice on crediting them towards a UTS award, may be obtained from the Graduate School of Engineering, UTS, by contacting the Graduate Studies Officer, telephone 330 2606.

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 University *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. With the establishment of the Graduate School and other initiatives, it is intended that the Faculty's distinctive research culture should continue to develop rapidly. 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.

ENTRY 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 *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.[1]

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.

[1] In these respects, Faculty of Engineering requirements are more stringent than those specified in the University Rules.

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 phone 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 should not be lodged until 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 based in the major subdisciplines of Engineering are accommodated within one or more of the Faculty's long-established Schools:

Civil Engineering (incorporating Structural and Environmental Engineering),

Electrical Engineering (incorporating Computer Systems Engineering),

Mechanical Engineering (incorporating Manufacturing Engineering),

and the National Centre for Groundwater Management.

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.

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.

In addition, the Faculty has established a **Graduate School of Engineering.** In 1993 the School has operated in planning mode only, while the scope of its programs and its substantive mode of operation are determined. It may be anticipated that a major emphasis will be on research topics that are generic to engineering as a discipline (rather than to the fields of sub-discipline 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. As one example, candidates who wish to pursue research in engineering management will probably be accommodated through the Graduate School. Further details will be published as they become available.

A brief summary follows of research interests and opportunities in the three long-established 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 multi-variable control, data encryption, speech and image coding, multi-media distributed databases, biomedical engineering.

School of Mechanical Engineering: advanced design, air-conditioning, 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.

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 S Parsanejad
Director of Research Programs in Civil Engineering
Room 2/504, Telephone 330 2620,
Fax 330 2633

Electrical Engineering:
Dr T J Stevenson
Director of Research Programs in Electrical Engineering
Room 1/2545, Telephone 330 2460,
Fax 330 2435

Mechanical Engineering:
A/Prof S F Johnston
Head of School
Room 2/612B, Telephone 330 2668,
Fax 330 1985

Graduate School of Engineering:
Professor W R Belcher
Head of School
Room 1/2419C, Telephone 330 2423,
Fax 330 2695

ASSOCIATED CENTRES

The Faculty of Engineering is also 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 rehabili-

tation; groundwater quality management strategies for industrial, agricultural and urban use; contaminant transport and water resource modelling; optimisation; groundwater 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 electro-physiology and technology, medical imaging, biomathematical 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:
Professor J Unsworth
Director, Centre for Materials Technology
Room 4-427A, Building 4, City campus
Telephone 330 1788, Fax 330 1755

Institute for Coastal Resource Management: enquiries should be made directly to the Faculty of Science.

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.

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 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 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 1994*.

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).

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 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. The cost in 1993 was A$12,000 per annum or A$6,000 per semester.

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, phone numbers and addresses of two professional referees and a statement indicating the level of their employer's support for the application.

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.

MEM COURSE STRUCTURE

		CP	HPW
Semester 1			
43811	Economics for Engineers	6	3
21718	Organisation Analysis and Design	6	3
Semester 2			
42812	Technological Change	6	3
44802	Management Decisions	6	3
Semester 3			
22726	Accounting and Financial Administration	6	3
43833	Project Management	6	3
Semester 4			
21719	Organisational Behaviour	6	3
41823	Systems Engineering and Decision Modelling	6	3
Semester 5/6			

Electives: 4 subjects chosen from the following:

79737	Engineering 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

(one other graduate subject may be substituted for one of the above electives by agreement)

or

44144 Major Project (24 credit points) over 12 months

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 3 years part-time or 1.5 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 Master's candidature.

AVAILABILITY OF PLACES

Generally, places in the course are available on a fee-paying basis. From time to time, places may be offered on a HECS basis, but this is not guaranteed.

Fees for subjects undertaken through the Australian Graduate School of Engineering Innovation Ltd (AGSEI) – *see page 100*– are payable to AGSEI, at levels determined by AGSEI.

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. They 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*. Inquiries 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 Engi-

neering 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.

Master of Local Government Management

This course is designed for individuals employed in local government in a range of occupational groups (eg, 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:

(i) possession of other relevant post-secondary qualifications;

(ii) a minimum of five years' work experience at a senior level in local government; and

(iii) adequate preparation and capacity to pursue successfully postgraduate studies.

MLGM COURSE STRUCTURE

		CP
Semester 1		
43451	Environment of Professions in Local Government	6
21728	Public Sector Management	6
Semester 2		
43452	Environmental Management	6
21731	Resources Management (Public)	6
Semester 3		
43453	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		
43454	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

Course fees for 1993 were $550 per subject (equivalent to 6 credit points). Students will also pay the Student Service Charge of $252 per year.

Master of Engineering in Telecommunications Engineering

This course is offered jointly by UTS and the University of Wollongong. The combined resources of the telecommunications research laboratories of both institutions are considerable, and students consequently have a greater range of areas from which to select their research speciality. 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 both universities.

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, phone 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 48 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

The course consists of up to six subjects and a research thesis. The research thesis has a 50 per cent weighting when six coursework subjects are undertaken and 100 per cent weighting when no coursework is undertaken. 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.

Communication Protocols
Teletraffic Engineering
Transmission Systems
Integrated Services Networks
Telecommunications Signal Processing
Elective

The elective may be chosen from any graduate level subject in Telecommunications Engineering, Computer Systems Engineering, Statistics or Computer Science or Business offered by either university.

ATTENDANCE ARRANGEMENTS

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 independently computer assignments and reading programs between modules. Subjects will be examined by means of a formal examination at the end of each semester. Students will undertake a research project at the university of their Principal Supervisor. Excellent facilities for computer-aided design, hardware development and system simulation are available at each 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 UTS Continuing Professional Education Unit on 330 1620/1624/1626.

DURATION

The minimum time for completion of the degree is three semesters for full-time candidates and five semesters for part-time candidates.

FEES

In 1993 the fee for fee-paying overseas students was $16,500 per annum for the Graduate Diploma and the Master's degree.

The course fee for 'local' students was approximately $425 per subject, to be paid soon after the student is enrolled. This course fee is in lieu of the Commonwealth Government HECS charge.

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, phone 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.

ENQUIRIES

Associate Professor Michael Knight
Director
National Centre for Groundwater Management
Room 1/1715
Telephone 330 1984
Fax 330 1985

MEGM COURSE STRUCTURE

		CP	HPW
Autumn semester			
66014	Hydrogeology	5	3
44150	Computing for Groundwater Specialists[1]	0	3
44155	Groundwater Modelling	5	3
66105	Hydrogeochemistry	5	3
44151	Surface Hydrology and Groundwater	5	3
	Elective 1	5	3
	Elective 2	5	3
Spring semester			
4415x	Project	30	

ELECTIVES

66025	Contaminated Site Management	5	3
66017	Geopollution Management	5	3
66018	Groundwater Geophysics	5	3
44154	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.

Graduate Diploma in Local Government Engineering

This course has been designed for professional engineers practising in the field of local government. The course gives an opportunity for study in depth, and at a professional level, of the special factors necessary for the proper function of local government engineering.

The completion of this course will provide senior personnel with the necessary technical and administrative skills appropriate to the duties of the local government engineer.

DURATION AND ATTENDANCE PATTERNS

The course is offered on a block-release pattern of study. The block-release pattern is designed to accommodate the special problems of students who live in the country enrolling in the course.

The normal attendance pattern is based on two subjects per semester requiring a minimum of four semesters to complete the course.

The block-release pattern of study currently consists of three sessions per semester in Sydney at the University. Each session involves three days of full-time attendance, covering two subjects per semester.

ADMISSION REQUIREMENTS

Engineers wishing to enter the course must either possess a Bachelor's degree in Civil Engineering or Structural Engineering or hold an equivalent qualification acceptable to The Institution of Engineers, Australia.

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, a description of their work experience, and evidence of eligibility for graduate membership of The Institution of Engineers, Australia.

In special circumstances engineers who do not possess a degree (or equivalent) will be admitted to the program if they can submit evidence of general and professional qualifications and experience which will satisfy the Faculty that they possess the educational preparation and capacity to pursue graduate studies.

Enquiries: Further information may be obtained by telephoning the Graduate Studies Officer, Ms Beate Buckenmaier, on 330 2606.

GDLGE COURSE STRUCTURE

		CP	HPW
43401	Environmental Planning	6	3
43402	Traffic and Transportation	6	3
43403	Management and Industrial Relations	6	3
43404	Asset Maintenance Management	6	3
43405	Water and Sewerage Systems Operations	6	3
43406	Roads and Streets	6	3
43407	Water Engineering	6	3
43408	Local Government Law	6	3

Graduate Diploma in Engineering and Graduate Certificate in Engineering

The objective of these courses, offered on a Faculty 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 bring their engineering and associated skills in line with state-of-the-art technology, and business practice. The emphasis of the courses is directed towards engineering practitioners who have found that their previous education and professional experience have not provided adequately for current or future career prospects. 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 48 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 day-time. For part-time attendance it will usually be possible to design suitable programs from subjects available predominantly in the evenings.

COURSE STRUCTURE

Each student designs their own program, structured to suit their individual needs. Program details are determined **prior** to enrolment, in consultation with, and with the approval of, an academic adviser appointed by the Dean. There is opportunity to choose from the broad range of undergraduate and graduate subjects offered by the University's nine faculties, class size quotas permitting.

At least 60 per cent of the content of any individual program should consist of subjects offered by the Faculty of Engineering. Normally this will be interpreted as 30 credit points in a program leading to the Graduate Diploma, and 15 credit points in a program leading to the Graduate Certificate.

Subject selection should be related clearly 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.

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 S Parsanejad
Room 2/504C
Telephone 330 2620, Fax 330 2633

Electrical Engineering:
Dr Terry Stevenson
Room 1/2545
Telephone 330 2460, Fax: 330 2435

Mechanical Engineering:
Dr Y Bhasin
Room 2/605
Telephone: 330 2659, fax: 330 2655

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.

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

GDE(GM) COURSE STRUCTURE

		CP	HPW
Autumn semester			
66014	Hydrogeology	5	3
44150	Computing for Groundwater Specialists[1]	0	3
44155	Groundwater Modelling	5	3
66105	Hydrogeochemistry	5	3
44151	Surface Hydrology and Groundwater	5	3
	Elective 1	5	3
	Elective 2	5	3
Spring semester			
4415X	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.

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 engineers, 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 OF COURSE 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: A multidisciplinary Master's degree program for environmental professionals is under active consideration. It is likely that completion of the Graduate Certificate will provide 'advanced standing' in such Master's programs at UTS.

GCEEM COURSE STRUCTURE

		CP
Semester 1		
47381	Introduction to Environmental Engineering and Management	6
47380	Environmental Assessment and Planning	6
Semester 2		
47382	Waste Minimisation and Advances in Pollution Control	6
47383	Urban Water Quality Management	6

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 WB3, telephone 330 2986

School of Biological and Biomedical Sciences
A/Prof K Brown
Rm GH 1.16, telephone 330 4042

Graduate Certificate in Software Engineering

This is a professional postgraduate course for those who need to lead, manage or influence projects containing a significant software component, but who have no special training in the methods and tools of modern software engineering practice.

It should be of value particularly to software project leaders, software engineers, analysts and programmers who need to bring projects in reliably and effectively, on time and on budget.

The course consist of two modules, Software Development and Software Project Management, which run in the Spring and Autumn semesters respectively. Either may be taken singly, or successful completion of both will result in the award of the Graduate Certificate.

Entry is open to those who have tertiary qualifications or equivalent, and several years' experience in industry with some involvement in projects where software is a significant component. Typically the attendee will be involved in hardware/software projects and/or real-time software.

The course concentrates on building the professional skills and knowledge required to manage the development of quality software to a firm schedule and budget.

Theory and case studies are backed up with extensive guided 'hands-on' laboratory exercises. Laboratories will be made available to participants outside of normal class time to extend their knowledge and implement their own case studies.

The equipment for the course consists of the latest engineering workstations, project management tools and software life cycle

case tools based on Yourdon-DeMarco Hatley methodology, with object-oriented support.

The course particularly addresses the issues of industrial and telecommunications software engineering. It is limited to 24 persons and structured so that at least one staff member is available per session per ten participants.

This is a full-fee course, and meets the requirements of the Commonwealth Training Levy. Fees in 1993 are $4,200 for either module, or $7,000 for both.

ENQUIRIES

Initial enquiries should be made to the Graduate Studies Officer, Ms Beate Buckenmaier, on 330 2606. Academic enquiries should be directed to Mr John Leaney, School of Electrical Engineering, on 330 2389.

POSTGRADUATE SUBJECT DESCRIPTIONS

Subject descriptions are listed in numerical order for all the subjects offered in the Master of Engineering Management (MEM), the Graduate Diploma in Local Government Engineering (GDLGE), the Master of Local Government Management (MLGM), the Master of Engineering in Telecommunications Engineering [ME (Tel)], the Master of Engineering and Graduate Diploma in Groundwater Management (GWM) and the Graduate Certificate in Environmental Engineering and Management (GCEEM).

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 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)
92 =	Faculty of Nursing
E/TE =	Faculty of Education

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 postgraduate subjects begin with '43'

Electrical Engineering postgraduate subjects begin with '41'

Mechanical Engineering postgraduate subjects begin with '42'

Key to abbreviated course names used in descriptions

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

MEM	Master of Engineering in Management
ME(Tel)	Master of Engineering in Telecommunications
MLGM	Master of Local Government Management
GDLGE	Graduate Diploma in Local Government Engineering
GWM	Master of Engineering in Groundwater Management and Graduate Diploma in Groundwater Management
GCEEM	Graduate Certificate in Environmental Engineering and Management

Credit points: Groundwater Management subjects carry 5 credit points. All other subjects carry 6 credit points unless otherwise stated.

21718 ORGANISATION ANALYSIS AND DESIGN

MEM

(6cp); 3 hpw

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 organisational design. The method of presentation is a weekly class of three hours which will involve a combination of lectures, discussion of readings, analysis of case studies and simulation exercises. Students are expected to have read the assigned material in advance so that there can be more informal discussion of key issues.

21719 ORGANISATIONAL BEHAVIOUR

MEM

(6cp); 3 hpw

This subject uses theory and research from the social sciences to explore human behaviour at work. Students are introduced to the basics of individual psychology which are then critically applied to the fields of motivation and job design. Social psychology's work 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 are 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.

21720 EMPLOYMENT RELATIONS

MEM

(6cp); 3 hpw

This subject provides an introduction to the areas of industrial relations and personnel management. The historical steps in the development of the personnel function and the forces which have shaped the development of the personnel function are examined. The major functions of personnel and industrial relations managers are explored, as well as the relationship between the personnel and 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.

21728 PUBLIC SECTOR MANAGEMENT

MEM/MLGM

(6cp); 3 hpw

This subject provides a broad conceptual framework for studying approaches to management within the political environment of the public sector. An evaluation is undertaken of the utility of contemporary business management concepts in public sector organisations. Topics: organisations and management; perceptions of management in the public sector; managerial roles and skills; catalysts for reform; performance management; politics and management; strategic management; decision making and implementation; program and project management; resources acquisition and management; dealing with the public; ethics and values; accountability; the future.

21729 HUMAN RESOURCE MANAGEMENT (PUBLIC)

MLGM

(6cp); 3 hpw

Human Resource Management (Public) adopts a strategic perspective to the management of human resources in public

sector organisations with particular emphasis on local government, analysing strategies and processes to meet the needs of both organisations and individuals. An analysis is conducted of the balance of responsibilities between achieving broad governmental objectives and agency goals; and agency performance and a just concern for employees.

21731 RESOURCE MANAGEMENT

MLGM

(6cp); 3 hpw

This subject provides an overview for managers for the management of material resources in Local Government and aims to develop broad competencies in related areas. Topics include impacts of current legislation; accrual accounting; budget preparation and presentation; financial management; contracting out; managing capital assets; working with auditors.

21741 OPERATIONS MANAGEMENT

MEM

(6cp); 3 hpw

The aim is to develop an understanding of the workings of business operations and systems as a base for discussion of various techniques for effectively managing operations functions. Topics include comparison of production and service processes; product-process matrix; service operations; planning, scheduling and controlling production; materials management (including Just in Time, Materials Requirement Planning); human resources and labour relations in operations; quality planning and control; interface with marketing and accounting/finance functions; strategic planning.

21758 STRATEGIC MANAGEMENT (PUBLIC)

MLGM

(6cp); 3 hpw

prerequisite completion of stages I-5

Strategic management (Public) provides an integrative approach to the development and implementation of strategies appropriate to the peculiar political, legal and financial environments of public sector organisations. Alternative strategy models are examined for their relevance in particular situations.

21779 MANAGEMENT SKILLS

MEM

(6cp); 3 hpw

The objective is to develop student insight into the interpersonal skills requirements of managers and to establish a basis for future skill development on the part of the student.

This subject deals 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 non-verbal 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. There is some treatment of interpersonal communication theory.

22726 ACCOUNTING AND FINANCIAL ADMINISTRATION

MEM

(6cp); 3 hpw

The aim of the subject is to introduce accounting to persons 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, budgeting.

24734 MANAGERIAL MARKETING

MEM

(6cp); 3 hpw

This subject views marketing as a key managerial decision-making area, necessarily at the locus of interface between the firm 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.

25742 FINANCIAL MANAGEMENT

MEM

(6cp); 3 hpw

prerequisites 22726 Accounting and Financial Administration, 43811 Economics for Engineers

Topics: analytical techniques applied to financial decision making and the basic structure of the Australian financial system; capital budgeting; capital structure; dividend policy; risk minimisation; current asset management; lease vs borrow analysis; the leveraged lease; the computer as an effective tool of financial management.

41749 MANAGEMENT OF TELECOMMUNICATIONS

MEM & ME (Tel)

(6cp); 3 hpw

This subject introduces the main concepts of the assessment, control and management of telecommunications systems. Its aim is to develop an understanding of the importance of telecommunications policy and strategic planning of communications resources for efficient operation of an organisation, and to provide necessary tools to apply this understanding and underlying concepts techniques to real life case studies.

41823 SYSTEMS ENGINEERING AND DECISION MODELLING

MEM

(6cp); 3 hpw

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.

41864 INTEGRATED SERVICES NETWORKS

ME (Tel)

(6cp); 3 hpw

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).

41865 COMMUNICATION PROTOCOLS

ME (Tel)

(6cp); 3 hpw

Layered architectures, OSI reference model, protocol evaluation criteria, physical layer, data link control, LAN protocols, transport protocols, session protocols, presentation and application layer protocols. Laboratory work will involve C language implementation of protocols and the use of protocol analysers.

41866 TELECOMMUNICATIONS SIGNAL PROCESSING

ME (Tel)

(6cp); 3 hpw

Speech and image coding, multi-rate processing, block processing, adaptive filtering, waveform generation, modulation, linearisation. Laboratory work will involve using TMS320C25 DSP processor.

41867 TELETRAFFIC ENGINEERING

ME (Tel)

(6cp); 3 hpw

Network design issues, statistics review, queuing theory, traffic theory, capacity design, throughput analysis, network control and management.

41868 TRANSMISSION SYSTEMS

ME (Tel)

(6cp); 3 hpw

Satellite, terrestrial microwave, fibre optics, mobile communications, modulation techniques, channel models, link budgets, error correction coding, synchronisation, multiple access. Laboratory work will involve computer simulation of digital communications systems.

42812 TECHNOLOGICAL CHANGE

MEM

(6cp); 3 hpw

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.

43401 ENVIRONMENTAL PLANNING

GDLGE

(6cp); 3 hpw

The objective of this subject is to ensure that the local government engineer has a sound knowledge and understanding of the principles and procedures of urban and regional planning. Topics to be covered include evolution of town and country planning; New South Wales environmental planning legislation; environmental planning process; neighbourhood planning; development control process and the civil engineer; national, state and regional planning; noise analysis; traffic environmental impact assessment.

43402 TRAFFIC AND TRANSPORTATION

GDLGE

(6cp); 3 hpw

This subject provides the basic principles in transportation planning and traffic engineering. The influence of environmental and political aspects will be analysed as well as technical aspects. Emphasis will be directed towards the application of traffic engineering in the planning and reorganisation of traffic problems in local government situations.

43403 MANAGEMENT AND INDUSTRIAL RELATIONS

GDLGE

(6cp); 3 hpw

This subject examines the principles of management and considers the aspect of corporate management as developed by the Local Government Association of New South Wales. The following topics will be covered: elements of management and industrial relations; concepts of corporate management; the Council; financial management; works management; policies, codes and delegated authority and the review process.

43404 ASSET MAINTENANCE MANAGEMENT

GDLGE

(6cp); 3 hpw

This subject examines the combination of management, financial, engineering and other practices applied to physical assets in the pursuit of economic lifestyle costs. It aims to enable the local government engineer to develop a proper maintenance strategy. Topics to be included are terotechnology, logistics and benefit-cost analysis.

43405 WATER AND SEWERAGE SYSTEMS OPERATIONS

GDLGE

(6cp); 3 hpw

This subject concentrates on the operation and maintenance of municipal waste water treatment plants, sewerage systems and water supply systems. Topics to be covered include statutory requirements, constituents and quality of waste waters, description, operation and control of treatment processes, performance monitoring, description and operation of sewerage and water supply systems, trouble shooting and problem solving.

43406 ROADS AND STREETS

GDLGE

(6cp); 3 hpw

The aim of this subject is to equip students with the knowledge of good practice in the design, construction and maintenance of roads, as well as the basic principles involved in pavement design and construction. Particular attention is drawn to the design, construction and maintenance of streets in residential areas. Students will also become conversant with: design standards of road and street alignment as practised by the appropriate authorities in New South Wales; road elements; road features; and road structures.

43407 WATER ENGINEERING

GDLGE

(6cp); 3 hpw

This subject focuses on urban drainage and methods of control and protection as well as aspects of coastal engineering. Topics to be covered include urban drainage design; design flood estimation techniques; culvert design; erosion and scour protection; flood mitigation practice and coastal engineering.

43408 LOCAL GOVERNMENT LAW

GDLGE

(6cp); 3 hpw

This subject aims to establish the legislative requirements within which the local government engineer operates. The Local Government Act and other related legisla-

tion (including Environmental and Road) are examined. Topics to be covered include roads, drainage, water and sewer services.

43451 ENVIRONMENT OF PROFESSIONS OF LOCAL GOVERNMENT

MLGM

(6cp); 3 hpw

This subject establishes an understanding of cross-disciplinary competences available in the professions working in local government. This provides a foundation for exploring management applications in later stages.

43452 ENVIRONMENTAL MANAGEMENT

MLGM

(6cp); 3 hpw

This subject examines current environment issues and their implications at the local level. Global, national and local policy approaches are evaluated as a basis for developing local government multidisciplinary management approaches.

43453 INFRASTRUCTURE MANAGEMENT

MLGM

(6cp); 3 hpw

This subject 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.

43454 MANAGING LOCAL ENTERPRISES

MLGM

(6cp); 3 hpw

This subject together with 21758 Strategic Management (Public), forms the capstone of the course. Students prepare a management plan, of publishable standard, for a selected local development issue (such as unemployment or environmental degradation). The emphasis is on issues in a council's external environment.

43811 ECONOMICS FOR ENGINEERS

MEM

(6cp); 3 hpw

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.

43833 PROJECT MANAGEMENT

MEM

(6cp); 3 hpw

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.

44144 MAJOR PROJECT

MEM

(24 cp); 3 hpw

This subject is taken over 12 months and provides an opportunity for the practical application and integration of the professional background and skills presented in the MEM. The subject is industry based and requires employer co-supervision.

44150 COMPUTING FOR GROUNDWATER SPECIALISTS

GWM

3 hpw; note: this subject does not carry academic credit

This subject 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.

44151 SURFACE HYDROLOGY AND GROUNDWATER

GWM

(5cp); 3 hpw

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.

44152,
44153 GROUNDWATER PROJECTS

GWM

(5cp); 3 hpw

These subjects will provide candidates with the opportunity to research specific engineering groundwater resource or contamination problems. The depth and extent of research will vary with credit points required. Topics include investigation consisting of one or more of: modelling, laboratory experiments, fieldwork related to hydrogeology and groundwater management, contaminant transport and processes, waste disposal and groundwater impact.

44154 GROUNDWATER COMPUTING

GWM

(5cp); 3 hpw

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.

44155 GROUNDWATER MODELLING

GWM

(5cp); 3 hpw

The subject provides the computer modelling tools required for groundwater resource management. Topics include groundwater modelling of porous media, fractured rock and low permeability materials. Analogue, numerical analytical models. Matrix structure and inverse methods, stochastic modelling and characterisation of variability. Modelling multiphase fluids and regional groundwater flow. Applications to borefield management, salt water intrusion, mine dewatering, geotechnical problems.

44802 MANAGEMENT DECISIONS

MEM

(6cp); 3 hpw

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.

47380 ENVIRONMENTAL ASSESSMENT AND PLANNING

GCEEM

(6cp)

Conserving resources and meeting essential needs; industry, urban, energy futures: the need to reorientate technology; ecology and economics; environmental law: principles; federal, state and local government responsibilities; environmental impact assessment. the concept of licensing requirements, approval procedures; environmental economics: social benefit-cost analysis for environmental services, resource pricing, risk assessment; land-use planning; project planning: environmental aspects.

47381 INTRODUCTION TO ENVIRONMENTAL ENGINEERING AND MANAGEMENT

GCEEM

(6cp)

Ecological systems and processes; basic ecological principles, biogeochemical cycles, development of ecosystems, interaction between physical ecosystems, global environment issues such as greenhouse effect, ozone depletion, acid rain etc; human impact on ecosystems: population growth, terrestrial ecosystem (forest and agricultural land), aquatic ecosystem (lake, river and ocean), biodiversity; 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.

47382 WASTE MINIMISATION AND ADVANCES IN POLLUTION CONTROL

GCEEM

(6cp)

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.

47383 URBAN WATER QUALITY MANAGEMENT

GCEEM

(6cp)

Characteristics of Australian urban water systems: natural features and human infrastructure; benefits and uses of water systems; the sources and nature of major categories of pollutants generated from agricultural, urban and industrial sources; groundwater pollution; beach and coastal pollution; the ecological and public health impacts of pollutants causing siltation; criteria and designs of monitoring programs, sampling procedures, methods of data analysis, description and modelling of pollution processes; remedies: regulation of point sources, storm water and sewer flow controls, ground water controls, etc; standards, pollution laws, regulatory bodies and responsible organisations (with particular emphasis on New South Wales); water and wastewater treatment processes.

66014 HYDROGEOLOGY

GWM

(5cp); 3 hpw

This subject provides a knowledge of geological occurrence and hydraulics of groundwater flow, exploration techniques, extraction engineering and field management.

66015 HYDROGEOCHEMISTRY

GWM

(5cp); 3 hpw

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 OF GROUNDWATER RESOURCES

GWM

(5cp); 3 hpw

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

GWM

(5cp); 3 hpw

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

GWM

(5cp); 3 hpw

This subject presents an advanced application of geophysical techniques for groundwater research, resource management and includes contamination assessment and monitoring.

66025 CONTAMINATED SITE MANAGEMENT

GWM

(5cp)

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.

79737 ENGINEERING LAW

MEM

(6cp); 3 hpw

The objective of this course is to introduce engineers to an overview of the Australian legal system and to the areas of law in which they may be involved.

Special emphasis will be laid on the law of contract to reflect many recent developments in this area as well as an evaluation of current trends, including the social and commercial policy issues which underlie the law, illustrating the way in which lawyers give effect to these policy considerations through the development of legal concepts.

SUBJECT NAMES IN ALPHABETICAL ORDER

Roads and Streets	43406
Strategic Management (Public)	21758
Surface Hydrology and Groundwater	44151
Systems Engineering and Decision Modelling	41823
Technological Change	42812
Telecommunications Signal Processing	41866
Teletraffic Engineering	41867
Traffic and Transportation	43402
Transmission Systems	41868
Urban Water Quality Management	47383
Waste Minimisation and Advances in Pollution Control	47382
Water and Sewerage Systems Operations	43405
Water Engineering	43407

POSTGRADUATE TEACHING STAFF

SCHOOL OF CIVIL ENGINEERING

Building 2, Level 5

	Rm	Ext
Head of School		
Assoc Professor G G O'Loughlin Water Engineering	511C	2630
Deputy Head of School		
Mr E A Brady Surveying	511A	2627
Professors of Civil Engineering		
Professor K A Faulkes Concrete Structures	—	—
Professor S L Bakoss Structural Mechanics	528	2646
Associate Professors		
A/Prof T A Anderson Construction and Management	521	2639
A/Prof M R Hausmann Soil Engineering	527	2645
Assoc Professor B Samali Structural Dynamics and Structural Mechanics	513	2632
Other 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 508 2624
Civil Engineering Design

Dr S Parsanejad 504 2620
Structural Analysis and Design

Dr M Patarapanich 524 2642
Water Engineering

Mr W G Peters 518 2636
Civil Engineering Design

Dr G L Ring 506 2622
Soil Engineering

Dr A Saleh 517 2635
Structural Mechanics and Analysis

Mr K Shafiuddin 501 2617
Water Engineering

Dr R Sri Ravindrarajah 509 2625
Concrete Technology

Dr S Vigneswaran 523 2641
Environmental Engineering

Mr C Wilkinson 537 2648
Structural Analysis and Design

SCHOOL OF ELECTRICAL ENGINEERING

Building 1, Levels 22 to 25

	Rm	Ext

Professor of Electrical Engineering and Head of School

Professor K W Yates 2427 2433
Signal Processing, Communication System Theory, Antennas and Propagation, Electromagnetic Compatibility, Filter Design

Professors of Electrical Engineering

Professor W R Belcher 2419C 2423
Antenna and Microwave Systems, Communication Systems, Systems Engineering

Professor C R Drane 2221A 2390
Satellite Positioning Systems, Multimedia Telecommunications, Software Engineering

Professor V S Ramsden 2417C 2420
Electrical Machines, Electrical Variable Speed Drives, Rehabilitation Engineering (Aids for Disabled People), Electromagnetics

Associate Professors

A/Prof G E Beard 2419B 2413
Satellite Communication Systems, UHF, VHF and Microwave Electronics, Electrical Instrumentation, Analog Electronics

A/Prof P Bryce 2420A 2425
Microhydroelectricity, Appropriate Technology, Fibre Optic Communications, Electromagnetic Theory

A/Prof T Buczkowska 2542 2458
Microcomputer System Design, Software Engineering, Computer Networks, Data Communications, Network Management

A/Prof A Ginige 2224 2393
Digital Systems, Systems Engineering, Image Processing, Real-Time Systems, Rehabilitation Engineering, Computer Networks

A/Prof H T Nguyen 2517 2451
Power Electronics, Machine Control, Real-Time Signal Processing, Computer Simulation, Control Theory, Instrumentation, Computer Systems, Production Processes

A/Prof C E Peterson 2222 2392
Computer Integrated Manufacturing, Image Analysis, Artificial Intelligence, Process Control, Robotics

A/Prof S Reisenfeld 2512B 2448
Communication Systems, Satellite Communication, Information Theory, Modulation, Channel Coding, Synchronisation

Other academic staff

Dr J D Carmo 1920 2339
Electromagnetics, Numerical Methods and Optimisation, Reliability Theory

Mr N J Carmody 2221B 2391
Microcomputer System Design, Operating Systems, Computer Architecture, Digital Control Systems, VLSI

Mr K K Fung 2225 2394
Parallel Processing, Software Engineering

Mr G I Gedgovd 2420E 2429
Power Systems, Computer Applications, Operations Research, Numerical Methods and Optimisation, Educational Research

Ms T Ginige 2323B 1911
Telecommunications

Mr W G Hooper 2428 2438
Power Systems, Electromagnetic Theory, Educational Psychology, Electrical Plant Design

Mr J R M Leaney 2220 2389
System Engineering, Computer Systems Design, Real-Time Computing, Microprocessor-based Instrumentation, Industrial Control, Software Engineering

Mr Peter Lewis 2420C 2431
Engineering Education, Engineering Management, Project Management

Ms V McKain 2433 2443
Instrumentation and Control

Mr P McLean 1921 2339
Power and Machines

Dr R Meegoda 2227 2396
Computer Systems Engineering

Ms S Murray 2222 1553
Computer Systems Engineering

Dr J G Nicol 2119A 2370
Control Theory, Optimal Control, Multivariable Control

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

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

Dr S Ananda Mohan Sanagavarpu 2512A 2447
Electromagnetics, Antennas and Propagation, Electromagnetic Compatibility, Microwave Engineering

Dr A Seneviratne 2431 2441
Protocol Design, Software Engineering, Computer Networks, Data Communications

Dr D Sharma 2419A 2422
Energy Economics, Planning and Policy, Energy Management, Decision Modelling, Systems Engineering, Project Planning and Performance

Dr T J Stevenson 2547 2460
Signal Processing, Communication Systems, Electromagnetics

Ms E A Taylor 2432 2442
Professional Development

Dr P J White 2315 2401
Antennas and Propagation, Microwave and RF Circuit Design, Analog Electronics

Adjunct Professors

Professor E W Aslaksen 2426 2433
Systems Engineering, Professional Development

A/Prof R Stere 2520E 2456
Instrumentation and Control

SCHOOL OF MECHANICAL ENGINEERING

Building 2, Level 6

	Rm	Ext
Head of School		
A/Prof S F Johnston Design, Ergonomics, Social Context of Technology, Engineering Education	612B	2668
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 Engineering	416	2588
Associate Professors		
A/Prof S-L Hall Combustion, Acoustics, Instrumentation, Aero/Thermodynamics, Technology/Education Policy	608	2662
A/Prof C T Mathews Control Engineering, Industrial Instrumentation, Energy Resources, Technical Change, Engineering Management, Manufacturing, Engineering Education	628	2686
A/Prof 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 630 2689
Design, Stress Analysis, Photoelasticity Analysis

Dr K S Chan 604 2658
Applied Mechanics, Design, Materials Handling, Airconditioning and Refrigeration

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 McGregor 620 2678
Human Communication, Engineering and Social Issues, Engineering Documentation Education and Professional Development

Mr S Spain 629 2688
Design and Innovation, Robotics, Instrumentation, Programmable Control and Automation, Computer-aided Manufacture

Mr L E Reece 613 2673
Turbomachinery, Thermofluids, Ergonomics, Philosophy of Technology

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

Mr K A Stillman 624 2682
Control Engineering, Chemical Engineering, Real-Time Computing, Simulation, Optimisation

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

Mr H G R Wiedemann 614 2674
Materials, Hydraulic and Pneumatic Transport of Solids, Machine Design, CADD/CAM

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

GRADUATE SCHOOL OF ENGINEERING

Head of School
Professor W R Belcher 1/2419C 2423

Director of Management Studies in Engineering
Associate Professor
J V Parkin 2/520 2638

NATIONAL CENTRE FOR GROUNDWATER MANAGEMENT

Centre Director
Associate Professor
M J Knight 1/1715 1984
Groundwater contamination–waste-disposal

Senior Lecturers
Dr W A Milne-Home 1/1715 1984
Hydrogeology, pump test analysis, isotope applications

Mr N P Merrick 1/1715 1984
Groundwater modelling and geophysics

Research Fellow
Dr R McLaughlan 1/1715 1984
Groundwater contamination, bore corrosion and performance

SCHEDULE 1.1

EXEMPTIONS/ADVANCED STANDING BASED ON COMPLETED TAFE ASSOCIATE DIPLOMAS

July 1993

TAFE course: 2974 Associate Diploma of Engineering (Civil Engineering)

UTS courses: Bachelor of Engineering (Civil Engineering)
Bachelor of Engineering (Structural Engineering)

Specified credit:

Subject number	Name	CP	Related TAFE subject(s)
47110	Intro Civil Eng	3	6999Z Civil Eng Contextual Studies
47120	Graphics	3	2959A Drawing
47113	Computations 1	4	2973A Computer Graphics &Applns I 2973B Computer Graphics & 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 **A or B level pass**	2959F Building & Engineering Construction
47154	Concrete Technology	3 **A or B level pass**	2959M Concrete Technology II
47146	Soil Mechanics	4 **A level pass**	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	

Comment: Academic and industrial requirements of the BE have to be individually satisfied, and credit towards one does not imply pro rata exemption from the other.

SCHEDULE I.2

EXEMPTIONS/ADVANCED STANDING BASED ON COMPLETED TAFE ASSOCIATE DIPLOMAS

July 1993

TAFE course: 2973 Associate Diploma of Engineering (Structural Engineering)

UTS courses: Bachelor of Engineering (Civil Engineering),
Bachelor of Engineering (Structural Engineering)

Specified credit:

Subject Number	Name	CP	Related TAFE subject(s)
47110	Intro Civil Eng	3	6999Z Civil Eng Contextual Studies
47120	Graphics	3	2959A Drawing
47113	Computations 1	4	2973A Computer Graphics & Applns I 2973B Computer Graphics & Applns II
47118	Surveying 1A	3	2959B Surveying I
51131	Communication 1	3	8979D Communication Studies 8979E Communication Workshop
47149	Construction	3	2959F Building & Engineering Construction **A or B level pass**
47154	Concrete Technology	3	2959M Concrete Technology II **A or B level pass**
47140	Concrete Design 1	3	2959K Reinforced Concrete Drawing & Design **A level pass**
47161	Steel Design 1	3	2959L Structural Steel Drawing & Design **A or B level pass**
47117	Statics	4	2959G Structural Principles & Drawing II **A or B level pass**
47127	Mechanics of Solids 1	4	2959G Structural Drawing II **A or B level pass**

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 Bldg Des & Constr	3	2959F Building & Eng Construction
47128	Surveying 1B	3	2959B Surveying 1
47178	Project Economics	3	2959S Engineering Management

Comment: Academic and industrial requirements of the BE have to be individually satisfied, and credit towards one does not imply pro rata exemption from the other.

SCHEDULE 1.3

EXEMPTIONS/ADVANCED STANDING BASED ON COMPLETED TAFE ASSOCIATE DIPLOMAS

July 1993

TAFE course: 2975 Associate Diploma of Engineering (Survey Drafting)

UTS course: Bachelor of Engineering (Civil Engineering)

Specified credit:

Subject number	Name	CP	Related TAFE subject(s)	
47110	Intro Civil Eng	3	6999Z	Civil Eng Contextual Studies
47120	Graphics	3	2907J	General Survey Drafting
47113	Computations 1	4	2962E	Computing Techniques & Graphics
47118	Surveying 1A	3	2962F	Land and Engineering Surveying
51131	Communication 1	3	8979D *and* 8979E	Communication Studies Communication Workshop

Comment: Academic and industrial requirements of the BE have to be individually satisfied, and credit towards one does not imply pro rata exemption from the other.

SCHEDULE 1.4

EXEMPTIONS/ADVANCED STANDING BASED ON COMPLETED TAFE ASSOCIATE DIPLOMAS

July 1993

TAFE course: 2976 Associate Diploma of Engineering (Surveying)

UTS course: Bachelor of Engineering (Civil Engineering)

Specified credit:

Subject number	Name	CP	Related TAFE subject(s)	
47110	Intro Civil Eng	3	6999Z	Civil Eng Contextual Studies
47120	Graphics	3	2976C	Data Presentation
47113	Computations 1	4	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 8979E	Communication Studies Communication Workshop

Comment: Academic and industrial requirements of the BE have to be individually satisfied, and credit towards one does not imply pro rata exemption from the other.

SCHEDULE 1.5

EXEMPTIONS/ADVANCED STANDING BASED ON COMPLETED TAFE ASSOCIATE DIPLOMAS

July 1993

Tafe course: 2840 Associate Diploma of Electrical Engineering

UTS courses: Bachelor of Engineering (Electrical Engineering)
Bachelor of Engineering (Computer Systems Engineering)

Specified credit:

Subject number	Name	CP	Related TAFE subject(s)
33110	Engineering Maths 1 (Elec)	6	2840W Engineering Mathematics
45113	Digital Techniques	3	2840BG Digital Electronics 2
45116	Electrical Engineering 1	3	Credit or Distinction level Diploma
45123	Fundamentals of Computing	6	2390E Data Entry Techniques 2840AC Engineering Software I 2840CX Engineering Software II 2840AJ Computer Systems **A or B level passes**
63734	Materials Technology	3	1191Q Engineering Materials Electrical **A or B level pass**
45134	Network Theory	6	2840AF Circuit Analysis I 2840BA Circuit Analysis II 2840CD Circuit Analysis III 2840BP Power Circuit Principles **A or B level passes**
45144	Electronic Devices & Ccts	6	2840AG Electronics 1A 2840AK Electronics 1B 2840BM Electronics 2A 2840BN Electronics 2B **A level passes**
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: *Academic and industrial requirements of the BE have to be individually satisfied, and credit towards one does not imply pro rata exemption from the other.*

SCHEDULE 1.6

EXEMPTIONS/ADVANCED STANDING BASED ON COMPLETED TAFE ASSOCIATE DIPLOMAS

July 1993

TAFE course: 7703 Associate Diploma of Engineering (Mechanical Engineering)

UTS courses: Bachelor of Engineering (Mechanical Engineering)
Bachelor of Engineering (Manufacturing Engineering)

Specified credit:

Subject number	Name	CP	Related TAFE subject(s)	
46311	Engineering Graphics	3	7703A	Engineering Drawing
46712	Manufacturing Processes 1A	3	5299K	Workshop A
46713	Manufacturing Processes 1B	2	5299L	Workshop B
46620	Engineering Communication	4	6990S	Industrial Communication
63127	Elect Eng 1 (Mechanical)	4	2890S	Electrical Technology
46320	Design 1	4	7703R	Mechanical Design
46810	Introduction to Computing	3	7703C 7703N	Engineering Computing 1 Engineering 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	Introduction to Engineering	3
65023	Engineering Chemistry	6[1]
67021	Materials Engineering 1	4[1]
68011	Engineering Physics (Mech)	4[2]

[1] With achievement of at least 70 per cent in 2-unit HSC Chemistry

[2] With achievement of at least 70 per cent in 2-unit HSC Physics

Comments

(a) Academic and industrial requirements of the BE have to be individually satisfied, and credit towards one does not imply pro rata exemption from the other.

(b) Credit grade Associate Diploma with A or B level passes in individual subjects. Holders of Distinction level Diplomas entitled to additional credit as noted.

(c) Students without a credit grade Associate Diploma may apply for admission, but EXEMPTIONS may not be granted.

SCHEDULE I.7

EXEMPTIONS/ADVANCED STANDING BASED ON COMPLETED TAFE ASSOCIATE DIPLOMAS

July 1993

TAFE course: 7705 Associate Diploma of Engineering (Industrial Engineering)

UTS courses: Bachelor of Engineering (Manufacturing Engineering)

Specified credit:

Subject number	Name	CP	Related TAFE subject(s)
46742	Production & Cost Control	4	7705F Process Planning 7705G Cost Control
46743	Work Study (Prof.Elect)	4	7705EH Work Study
46712	Manufacturing Processes 1A	3	5299K Workshop A
46713	Manufacturing Processes 1B	2	5299L Workshop B
46741	Flexible Manufacturing	4	7705J Application of JIT 7705EV Flexible Manufacturing Systems
46311	Engineering Graphics	3	7703A Engineering Drawing 1
46810	Intro to Computing	3	7703C Engineering Computing 1 7703N Engineering Computing 2
33121	Engineering Maths 1A	3	6992L Mathematics D
	Professional Elective	4	7705EL Plastics Technology

Comments

(a) Academic and industrial requirements of the BE have to be individually satisfied, and credit towards one does not imply pro rata exemption from the other.

(b) Credit grade Associate Diploma with A or B level passes in individual subjects.

(c) Holders of Distinction level Diplomas may be entitled to additional credit on application.

(d) Students without a credit grade Associate Diploma may apply for admission, but EXEMPTIONS may not be granted.

FACULTY BOARD IN ENGINEERING

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

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Director, Industrial Liaison
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Professors:
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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

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Nominee of the Director, Centre for Learning and Teaching:
Associate Professor E Hazel

Nominee of the Dean from the Faculty Board in Business:
vacant

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:
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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
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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

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.

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Observer

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as at July 1993

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Observer

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(University Centre with links to several other Faculties as well as Engineering)

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National Centre for Groundwater Management

(Jointly with the Faculty of Science)

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Research Fellow
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