The University of Newcastle Calendar consists of the following volumes:

Volume 1 — Legislation
Volume 2 — University Bodies and Staff
Volume 3 — Faculty of Architecture Handbook
Volume 4 — Faculty of Arts Handbook
Volume 5 — Faculty of Economics and Commerce Handbook
Volume 6 — Faculty of Education Handbook
Volume 7 — Faculty of Engineering Handbook
Volume 8 — Faculty of Medicine Handbook
Volume 9 — Faculty of Science and Mathematics Handbook
Volume 11 — Faculty of Music Handbook

Also available are the Undergraduate Guides

This Volume is intended as a reference handbook for students enrolling in courses conducted by the Faculty of Engineering.

The colour band, Lapis Lazuli BCC 150, on the cover is the lining colour of the hood of Bachelors of Engineering of this University.

The information in this Handbook is correct as at 13 September 1990.

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THE DEAN'S FOREWORD

On behalf of the staff of the Faculty of Engineering, I wish to extend a welcome to all students, those who are entering the University and the Faculty for the first time and those who are returning to commence another year of studies.

Having chosen to study in one of the fields of Engineering, Computer Science or Surveying, you are embarking on a professional career which is both challenging and stimulating. We are living in an age which is witnessing a tremendous growth in scientific and technological development and which is having a marked effect on the modes and characteristics of our society. The future of our society is very much dependent on the solution of a number of very complex technological problems. While these problems will be many and varied, none will be more important than those associated with food production, the development of alternative forms of energy and the preservation of our living environment. Graduates in the various disciplines of Engineering and of Computer Science and Surveying, will, in their own way, contribute to the solution of these and other important problems.

The role of universities in modern society has broadened. Not only is it necessary to preserve the ideals of learning and associated fundamental research, it has become of equal importance for universities to become directly involved in the application of research to the solution of problems associated with industry and the community. For this reason, the role of a university engineering faculty in applied and industrially orientated research is an important one. In this respect it is noteworthy that this Faculty of Engineering, through its research and associated projects undertaken on behalf of Australian industry, is making a major contribution and has attained national and international prominence. The interaction between the research and teaching functions is invaluable to the maintenance of standards and the professional relevance of course curricula.

The opportunity to obtain a well-rounded tertiary educational experience is embodied in the very concept of the university system. The University environment, with its excellent campus and facilities, together with the many extra-curricula activities, creates an opportunity for obtaining a broad experience, indeed a unique experience in one's lifetime. For this reason I would encourage you to take full advantage of the opportunities available to you and, where time permits, take an active interest in the various facets of University life. I would also encourage you to take part in the decision-making processes of the Faculty, either through membership of the Faculty and Departmental Boards, or by supporting the students elected to those positions.

The staff of the Faculty will do everything possible to make your work both interesting and enjoyable; they are anxious to help you with any problems you may have. We would be most grateful for any feedback of a constructive nature that you may wish to offer.

In conclusion, I wish you well in your studies at this University. There is no doubt that a course leading to a degree in Engineering, Computer Science or Surveying, requires a great deal of dedication and perseverance, but the task is certainly a rewarding one.

ALAN W. ROBERTS
Dean
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FACULTY INFORMATION

About This Section
This section contains general information about the Faculty of Engineering and the courses which are offered within it. Degree Regulations and Course Programs are given in separate sections of this Handbook.

Advice and Information
Students are assumed to be familiar with the information contained in this Handbook which relates to their own course of study and to general University and Faculty requirements.

Additional information will be posted on Notice Boards throughout the academic year. It is each student's responsibility to ensure that they keep themselves aware of the contents of relevant Notice Boards.

As course and University requirements do not remain static, students are advised to purchase a copy of the Faculty Handbook annually in order to become aware of changes and to retain those Handbooks so as to provide a record of the content studied.

Course Enquiries
Enquiries regarding course requirements and general matters such as University Regulations and procedures, Faculty rules and policies, admission, enrolment, re-enrolment, vacations of program and course transfer may be directed to the Faculty Secretary and Faculty Administrative Assistant at the School Office - enquires at Room EA206.

Academic Advice
Academic advice and general enquiries regarding the content of particular courses may be obtained from the relevant Head of Department or from the following members of academic staff:

- Chemical Engineering: Mr. J. Roberts
- Civil Engineering: Dr. W.G. Field
- Computer Engineering: Professor R.J. Evans
- Computer Science: Associate Professor P.I. Moyles
- Electrical Engineering: Associate Professor J. Rosenbag
- Industrial Engineering: Associate Professor D.J. Hill
- Mechanical Engineering: Mr. I.W. Hayes
- Surveying: Associate Professor J.G. Fryer

Personal Counselling
Students may wish to discuss matters relating to course difficulties or options with the Faculty Secretary, the Faculty Administrative Assistant or the relevant Course Coordinator.

Members of the University Counselling Service are also available for entirely confidential personal consultation on any matter, particularly matters of academic skills and personal growth. The Counselling Service is situated on the courtyard level of the Library Building. An appointment is usually required.

Students with Special Needs
Students with disabilities may wish to consult the Faculty's Advice for Students with Special Needs, Dr. D.H. Wood of the Department of Mechanical Engineering.

THE FACULTY

The Faculty of Engineering is constituted by the Council of the University under By-law 2.4.1 and consists of the Department of Chemical Engineering, the Department of Civil Engineering and Surveying, the Department of Electrical Engineering and Computer Science and the Department of Mechanical Engineering. The Faculty Board, Faculty of Engineering, is charged with conducting the academic affairs of the Faculty. Membership of the Faculty Board includes the Vice-Chancellor (ex officio), the Director of the School of Engineering and Architecture, the Dean of the Faculty, the members of the full-time academic staff of the departments comprising the Faculty, representatives of a number of other Faculties and departments of the University, and four student members. The Dean is Chairman and executive officer of the Faculty Board.

The responsibilities of Faculty Boards are set out in By-law 2.4.4 and other By-laws and Regulations of the University.

Degrees and Diplomas
The awards which may be currently made by the University to persons presented by the Faculty of Engineering are listed below.

Bachelor Degrees
Bachelor of Computer Science (BCompSc)

Bachelor of Computer Science (Honours) (BCompSc(Hons))

Bachelor of Engineering (BE) which is awarded in the specialties of:
- Chemical Engineering
- Civil Engineering
- Computer Engineering
- Electrical Engineering
- Industrial Engineering
- Mechanical Engineering

Bachelor of Surveying (BSurv)

Graduate Diplomas
Diploma in Computer Science (DipCompSc)

Diploma in Computing (DipComp)

Diploma in Surveying (DipSurv)

Higher Degrees
Master of Computer Science (MCompSc)

Master of Computing (MComp)

Master of Engineering (ME)

Master of Engineering Science (MEngSc)

Master of Science (MSc)

Doctor of Engineering (DEng)*

Doctor of Philosophy (PhD)

Doctor of Science (DSc)*

* Normally only conferred as Honorary Degrees

Bachelor Degree Courses
General information regarding the bachelor degree programs offered in the Faculty is provided below. The detailed Course Programs appear in Section 5 of the Handbook.

Computer Science
The Bachelor of Computer Science (BCompSc) degree course has been designed to equip students with an excellent background for a professional career in the computer industry or as a programmier or systems analyst in industry or commerce.

The course program meets the highest academic requirements for membership of the Australian Computer Society (ACS).

The BCompSc program may be completed by three years of full-time study or part-time equivalent. Combined degree programs are also available (see below).

Honours in Computer Science
The Bachelor of Computer Science (Honours) degree is a separate degree program which may be taken full-time over one year or part-time over two years. Candidates for this degree have normally completed the BCompSc program with a creditable performance, however, graduates in other disciplines with a substantial background and a creditable performance in computer science may be considered for admission.

Engineering
Bachelor of Engineering (BE) degree courses are offered in the following specialties:
- Chemical Engineering
- Civil Engineering
- Computer Engineering
- Electrical Engineering
- Industrial Engineering
- Mechanical Engineering

Each engineering degree program may be completed by four years of full-time study or equivalent. Part-time attendance is permitted, however, students intending to undertake part-time study should note that many classes are held during the day.

Students may choose to combine years of full-time study with years of part-time study as their commitments permit. It is also possible to follow a "thick sandwich" pattern of attendance by which full-time study and full-time industrial experience are alternately undertaken on an annual basis. It is recommended that at least the final year of study be taken on a full-time basis.

Engineering courses are highly structured and, although each follows a similar pattern, the content of the courses naturally differs according to the needs of the specialty concerned.

In Year I students study mathematics and the basic sciences as well as commencing studies in the engineering sciences. Year II programs continue studies in mathematics and, where applicable, basic sciences. The scope of engineering studies is also widened. Year III consists of major engineering subjects and is generally regarded as the core of the program. In the final year these studies are extended by the inclusion of more highly specialised topics.
Combined Degree Programs
A number of combined degree programs are available which lead to the award of a Bachelors degree in full of five years of full-time study for programs which include BCompSc/BMath and BCompSc/BSc programs. The programs listed below have been either approved or have been submitted for approval by the relevant Faculty Boards. Other combined programs may be approved to meet the needs of individual cases. Information on the availability of combined programs may be obtained from the Combined Degree Coordinator, Professor N.J. Evans, or from the Faculty Secretary.

BCompSc/BMath
BCompSc/BSc [Physics Major]
BCompSc/BSc [Psychology Major]
BE (Chemical Engineering)/BSc [Chemistry Major]
BE (Chemical Engineering)/BMath
BE (Civil Engineering)/BSurv
BCompSc/BCompSc
BE (Computer Engineering)/BMath
BE (Computer Engineering)/BSc [Physics Major]
BE (Electrical Engineering)/BMath
BE (Electrical Engineering)/BSc [Physics Major]
BE (Industrial Engineering)/BCompSc
BE (Mechanical Engineering)/BCompSc
BE (Mechanical Engineering)/BMath
BE (Mechanical Engineering)/BSc [Physics Major]

Direct admission to most of the above programs may be gained through UAC by persons who achieve highly at the HSC examination.

Combined degree programs may also be entered after completion of the first year of the pre-fiscal engineering or computer science program with an average of credit or weighted average mark (WAM) of 70. In the case of the BE (Civil Engineering)/BSurv program, a WAM of 5.5 after completion of the first year of either of the associated programs is sufficient for admission to the program.

Postgraduate Diploma Courses
Diploma in Computer Science
The Postgraduate Diploma in Computer Science meets the highest academic requirements for membership of the Australian Computer Society (ACS).

Applications for admission to the program must demonstrate a knowledge of Pascal. This knowledge can be demonstrated either by passing the Introduction to Programming Examination or by providing evidence of successful completion of an approved Pascal course. Students who cannot demonstrate that they have such background knowledge must successfully complete the subject COMP102 Introduction to Programming either prior to admission as a non-degree student or enrol in the Diploma program on condition that COMP102 is taken as an extraneous subject for which the appropriate fee is required.

Diploma in Surveying
The Diploma in Surveying is a postgraduate course designed to broaden the education of the practicing surveyor. Recent technological changes have significantly altered the role and operation techniques of surveyors. Many items of equipment and computational methods now in use were unknown ten to fifteen years ago. The course has a twofold objective. Primarily, it has been designed as a bridging course for surveyors with the professional qualification of the Reciprocating Surveyors Boards of Australia and New Zealand. University degree courses in surveying were not available when these surveyors passed the examinations set by those Boards. The Diploma in Surveying is seen as broadening and updating the professional training with a choice of subjects designed to complement the professional experience of candidates. For those surveyors who already have had a comprehensive training in the modern developments in surveying, the course has a second objective. In this case, the aim is to broaden the candidate’s basic training with the offering of study in a wider range of disciplines which have important applications in some fields of surveying.

The Diploma program is normally completed by at least two years of part-time study, although in special cases approved by the Faculty Board, the program may be completed in one year on a full-time basis.

Higher Degree Programs
Master of Computer Science
The MCompSc is a research degree by thesis, requiring an original contribution to knowledge in the area of computer science. Applications for admission are expected to hold a BCompSc(Hons) or an equivalent honours degree at least second class honours. Candidates who enrol initially in the MCompSc may later transfer into the PhD program if their work is of an exceptional quality.

Master of Engineering
The Master of Engineering is a research degree by thesis. Relevant coursework may be undertaken in association with the research project. Numbers of work required in the thesis is substantially higher than that expected of a Bachelor of Engineering honours graduate. Candidates who enrol initially in the ME program may later transfer into the PhD program if their work is of an exceptional quality.

Master of Science
The Master of Science is coursework program with major project. The program is intended to provide graduate engineers with the opportunity to update their knowledge in technical areas of particular interest. However, as a result of resource limitations, no new enrollments were accepted in 1990. The position for 1991 is under review.

Master of Surveying
The Master of Surveying degree has the primary aim of introducing students to research, and bringing it to the point where they will be able to conduct research effectively. Coursework will not normally be included in the program. The quality and standard of work required in the thesis will be at a substantially higher level than that expected of a Bachelor of Surveying honours graduate. Candidates who enrol initially in the MSurv program may later transfer into the PhD program if their work is of an exceptional quality.
Doctor of Philosophy

Doctoral research programs are available within each of the Departments of the Faculty. Initial enquiries regarding these programs and areas of specialized research activity currently undertaken within Departments may be addressed to the Head of the relevant department. Enquiries regarding scholarships, the formal requirements for the degree and admission procedures should be addressed to:

The Academic Registrar,
University of Newcastle,
AUSTRALIA 2308

Centre for Industrial Control Science

The Centre for Industrial Control Science was established in 1988 under the Special Research Centre scheme of the Australian Government and is closely linked to the Department of Electrical Engineering and Computer Science. Additional support is provided by the University and Industry.

The work of the Centre is conducted on two parallel streams. One dealing with theoretical issues in systems science and the other with the design of industrial control and signal processing systems. The aim of the Centre is to establish a true synergism between theoretical work and practical applications of control science, particularly in the areas of process control and automation.

The area of control systems design brings basic theoretical ideas in the understanding of nonlinear systems, estimation and information theory together with the associated technologies of computing, communications and industrial electronics.

In addition to the staff of the Centre, a number of the members of the academic staff of the Department of Electrical Engineering and Computer Science are involved with the work of the Centre, as are some 30 postgraduate students. Visiting academics and postdoctoral fellows also contribute to the work of the Centre.

Further information regarding the work of the Centre may be obtained from:

The Director
Centre for Industrial Control Science
Department of Electrical Engineering and Computer Science
University of Newcastle
AUSTRALIA 2308

BACHELOR DEGREE REGULATIONS

About This Section

This section contains the University Regulations regarding the Bachelor Degrees offered in the Faculty of Engineering.

1. General

These Regulations are made in accordance with the powers vested in the Council under By-law 5.2.1 and prescribe the conditions and requirements relating to the degrees of Bachelor of Computer Science, Bachelor of Computer Science (Honours), Bachelor of Engineering and Bachelor of Surveying.

2. Definitions

(1) In these Regulations, unless the context or subject matter otherwise indicates or requires:

- 'candidate' means a student enrolled in a course;
- 'course' means the total requirements of the program approved by the Faculty Board in accordance with the Schedule to qualify a candidate for the award of the degree;
- 'course program' means the program of subjects approved by the Faculty Board in accordance with the Schedule;
- 'Course Coordinator' means the Head of the designated Department or that Head of Department's nominee;
- 'Dean' means the Dean of the Faculty and, for the purposes of these Regulations, also means any nominee of the Dean;
- 'degree' means the Bachelor Degree referred to in the relevant schedule;
- 'Department' means the department or departments offering a particular subject and includes any other body doing so;
- 'Faculty' means the Faculty of Engineering;
- 'Faculty Board' means the Faculty Board, Faculty of Engineering;
- 'designated Department' means the department identified as such in the Schedule;
- 'Schedule' means the schedule to these Regulations relevant to the course in which a person is enrolled or proposing to enrol;
- 'satisfactory result' means a result considered by the Faculty Board to be sufficient to satisfy pre-requisite requirements;
- 'semester' means that portion of the calendar year so designated by the University; and
- 'subject' means a discrete component of a course for which a result may be recorded.

(2) The credit point value of a subject counting towards completion of the requirements of a course shall:

a) in the case of subjects offered by Departments comprising the Faculty of Engineering or by Departments outside the Faculty of Engineering specifically for inclusion in courses offered in the Faculty of Engineering, be the credit point value determined by the Faculty Board;

b) in the case of subjects offered by Departments outside the Faculty of Engineering for courses offered in other faculties, the credit point value determined for each such subject by the relevant faculty board.
3. Admission
An applicant for admission to candidature shall satisfy the requirements of the Regulations Governing Admission and Enrolment and such other additional requirements as may be specified in the Schedule.

4. Exemptions in courses
(1) The Faculty Board, on the recommendation of the Course Coordinator, may grant exemption from undertaking subjects comprising a course in recognition of work completed in this University or another institution.

(2) Exemptions shall be deemed to meet prerequisite, co-requisite and assumed knowledge requirements but apply only to the particular course in which the candidate is enrolled and are subject to review on any subsequent change of course by the candidate.

(3) Exemptions granted for work completed for which an award shall not be granted in the Bachelor of Computer Science. Exemptions granted for work completed at another institution, whether an award has been made or not, shall not exceed:
   a) in the case of the Bachelor of Computer Science course, 80 credit points; and
   b) in the case of the Bachelor of Engineering and Bachelor of Surveying courses, 160 credit points.

(4) Exemptions will not be granted in the Bachelor of Computer Science (Honours) course.

5. Enrolment: Standard Program
(1) The subjects comprising the course program approved by the Faculty Board in accordance with the requirements of a Schedule shall be grouped by Year. Each Year of a course program shall total 80 credit points and specify the annual program of subjects to be undertaken by a full-time student completing the course in minimum time or the method of selection of those subjects.

(2) A candidate who has fully completed the requirements of the subjects comprising a particular Year of a course program may enrol in any combination of subjects scheduled in the next Year of that course program provided that the prerequisite, co-requisite requirements and assumed knowledge requirements of those subjects are met.

6. Enrolment: Non-Standard Program
(1) For the purposes of this regulation, a non-standard program is defined as a combination of subjects which count in more than one Year of a course program.

(2) A candidate applying for enrolment in a non-standard program shall comply with the rules for non-standard enrolment determined from time to time by the Faculty Board.

7. Prerequisites, Co-requisites and Assumed Knowledge
(1) The Faculty Board on the recommendation of a Head of Department may prescribe prerequisites, co-requisites and/or assumed knowledge requirements for any subject offered by that Department.

(2) Except with the approval of the Dean granted on the written recommendation of the Head of the Department offering the subject concerned, a candidate shall not enrol in a subject unless that candidate has:
   a) attained a satisfactory result in any subject prescribed as its prerequisite;
   b) attained a satisfactory result in any subject prescribed as its co-requisite or concurrently enrolled in any such subject; and
   c) attained a satisfactory result or a level of competence satisfactory to the Faculty Board, in any subject prescribed as assumed knowledge.

(3) A candidate enrolled in a subject in contravention of prerequisite, co-requisite or assumed knowledge requirements may be withdrawn without notice from the subject unless permitted by the Head of Department to remain enrolled.

8. Subject Requirements
(1) A candidate enrolled in a subject shall attend such lectures, tutorials, seminars, laboratory classes and field work and submit written or other work as the Department shall require.

(2) Any material presented by a candidate for assessment must be the work of the candidate and not previously submitted for assessment elsewhere except as otherwise permitted by the Head of Department.

(3) To complete a subject a candidate shall satisfy departmental requirements and gain a satisfactory result in such assessments and examinations as the Faculty Board shall require.

9. Variation of Enrolment - Including Withdrawal
(1) A candidate may apply to withdraw from a subject or course only by informing the Secretary to the University on the prescribed form and the withdrawal, if approved, shall take effect from the date of receipt of such an application.

(2) An application to withdraw from a subject but not from the course, will not be approved unless the application to withdraw is received before the relevant last date for withdrawal, except that the Dean may approve withdrawal without academic penalty in appropriately documented exceptional circumstances.

(3) A candidate who withdraws from the course shall be deemed to have failed in any uncompleted subject in which they are enrolled unless the application to withdraw is received before the last date for withdrawal relevant to such a subject, except that the Dean may approve withdrawal without academic penalty in appropriately documented exceptional circumstances.

(4) The last dates for withdrawal shall be:
   a) in the case of any subject offered in the first semester, the Monday of the ninth week of first semester;
   b) in the case of any subject offered in the second semester, the Monday of the ninth week of second semester; and
   c) in the case of any subject offered over a full year, the Monday of the third week of second semester.

(5) A candidate who applies to withdraw from any subject which is a prerequisite, co-requisite or assumed knowledge requirement for any other subject may be withdrawn without notice from any subject for which the withdrawn subject is co-prescribed unless permitted by the Head of Department to remain enrolled.

(6) Except upon payment of the administration charge prescribed from time to time by the University Secretary and with the approval of the Dean given only on the written recommendation of the Head of the Department, a candidate may not enrol a subject unless application to do so is made:
   a) in the case of any subject offered in the first semester or over a full year, the Monday of the third week of first semester; and
   b) in the case of any subject offered in the second semester, the Monday of the third week of second semester.

10. Re-admission
(1) An applicant for re-admission to candidature shall satisfy the requirements of the Regulations Governing Admission and Enrolment and such other additional requirements as may be specified in the Schedule.

(2) Except as provided below, a candidate who does not re-enrol in a course in each year shall be deemed to have discontinued studies and, if re-admitted to that course at a later date, shall be subject to such conditions as the Faculty Board may prescribe and may be granted such exceptions for work previously completed in that course as are determined under Regulation 4.

(3) Candidates for the degrees of Bachelor of Computer Science, Bachelor of Engineering and Bachelor of Surveying who properly apply for re-admission to a course not more than one year following their last year of enrolment in that course shall be deemed to have been granted leave of absence for that year and shall be re-admitted to that course and permitted to proceed as if they had continuously maintained their enrolment, provided that the candidate:
   a) had completed at least one subject in the year of last enrolment in that course; and
   b) was eligible to re-enrol at the conclusion of the last year of enrolment in that course.

(4) Annual periods of leave permitted under Regulation 10(3) may be taken more than once.

† Applications for re-admission under Regulation 10(3) should be made through the Universities Admission Centre (UAC) by the due date. Application materials may be obtained from the Admissions and Enrolments Office in late August.

11. Award of Degrees
(1) To qualify for admission to the degree a candidate shall satisfy the requirements and conditions prescribed in the Schedule.

(2) A degree with honours shall be conferred in one of the following grades:
   a) Class I;
   b) Class II, Division 1;
   c) Class II, Division 2; and
   d) only in the case of the Bachelor of Computer Science (Honours) degree, Class III.

12. Combined Degree Programs
(1) A candidate may complete the requirements for the degree in conjunction with another Bachelor degree by completing a combined degree program approved by the Faculty Board and, where the other Bachelor degree is offered in another faculty, the Faculty Board of the Faculty offering that other Bachelor degree.

(2) Admission to a combined degree program shall:
   a) be subject to the approval of the Dean of the Faculty and, where the other Bachelor degree is offered in another faculty, the Dean of the Faculty offering that other Bachelor degree;
   b) normally be at the end of the candidate's first year of enrolment in a degree; and
   c) be restricted to candidates who have achieved a standard of performance deemed satisfactory for the purposes of admission to the specific combined degree course offered by the Faculty Board.

(3) The work undertaken by a candidate in a combined degree program shall be no less in quantity and quality than if the two courses were taken separately.

(4) To qualify for admission to the two degrees a candidate shall satisfy the requirements for both degrees.

13. Exceptional Circumstances
In order to provide for exceptional circumstances arising in a particular case, the Senate on the recommendation of the Faculty Board may relax any provision of these Regulations or Schedules.

SCHEDULE 1—BACHELOR OF ENGINEERING
1. The degree may be conferred in the following areas of specialisation:
   a) Chemical Engineering
   b) Civil Engineering
   c) Computer Engineering
   d) Electrical Engineering
   e) Industrial Engineering
   f) Mechanical Engineering

12
13
2. For the purposes of these Regulations the designated Department with respect to each area of specialisation shall be:
   - Department of Chemical Engineering
   - Chemical Engineering
   - Department of Civil Engineering and Surveying
   - Civil Engineering
   - Department of Electrical Engineering and Computer Science
   - Computer Engineering and
   - Electrical Engineering
   - Department of Mechanical Engineering
   - Industrial Engineering and
   - Mechanical Engineering

3. To qualify for admission to the degree in any area of specialisation a candidate shall:
   a) complete to the satisfaction of the Faculty Board a program of subjects approved by the Faculty Board on the recommendation of the Head of the designated Department totalling 320 credit points or such greater number of credit points as may be approved by Faculty Board in individual cases; and
   b) satisfy the industrial experience requirements prescribed by the Faculty Board.

4. The course program of 320 credit points approved by the Faculty Board shall include as a minimum:
   - 80 credit points taken at 100 level
   - 60 credit points taken at 200 level
   - 60 credit points taken at 300 level
   - 40 credit points taken at 400 level

5. A person who has satisfied the requirements for admission to the degree in one area of specialisation may be admitted to candidature in any other area of specialisation on such conditions as the Faculty Board may prescribe. Upon completing the requirements for admission to the degree in that other area of specialisation the candidate shall be eligible to receive a certificate to that effect.

6. The degree shall be conferred as an ordinary degree except that, in cases where a candidate's performance in the course has reached a standard determined by the Faculty Board to be of sufficient merit, the degree may be conferred with honours.

SCHEDULE 4 — BACHELOR OF SCIENCE (ENGINEERING)
(Discontinued)

SCHEDULE 5 — BACHELOR OF SCIENCE (METALLURGY)
(Discontinued)

SCHEDULE 6 — BACHELOR OF COMPUTER SCIENCE
1. The designated Department for the purposes of these regulations shall be the Department of Electrical Engineering and Computer Science.
2. To qualify for admission to the degree a candidate shall complete to the satisfaction of the Faculty Board a program of subjects approved by the Faculty Board on the recommendation of the Head of the designated Department totalling 240 credit points or such greater number of credit points as may be approved by the Faculty Board in individual cases.
3. The course program of 240 credit points approved by the Faculty Board shall include as a minimum:
   - 80 credit points taken at 100 level
   - 60 credit points taken at 200 level
   - 60 credit points taken at 300 level
   - 40 credit points taken at 400 level
4. The degree shall be awarded only as an ordinary degree.

SCHEDULE 7 — BACHELOR OF COMPUTER SCIENCE (HONOURS)
1. The designated Department for the purposes of these regulations shall be the Department of Electrical Engineering and Computer Science.
2. In order to be admitted to candidature for the degree, an applicant shall:
   a) have completed requirements for admission to the ordinary degree of Bachelor of Computer Science in the University of Newcastle or to any other degree approved by the Faculty Board;
   b) have satisfactorily completed any additional work prescribed by the Head of the designated Department; and
   c) have obtained approval to enrol given by the Dean on the recommendation of the Head of the designated Department who, after considering the previous academic performance of the applicant in relevant studies, may decline to recommend an applicant for candidature.

3. Candidature for the degree shall not extend beyond two calendar years, except that in exceptional circumstances acting in a particular case the Faculty Board may grant permission to extend the term of candidature on such conditions as it considers appropriate including requiring additional subjects to be taken towards the degree.

4. To qualify for admission to the degree a candidate shall complete a program of subjects approved by the Faculty Board on the recommendation of the Head of the designated Department totalling 80 credit points or such greater number of credit points as may be approved by the Faculty Board in individual cases.

5. The Faculty Board shall, on the recommendation of the Head of the designated Department, determine the award of honours to be made to a candidate upon completion of the requirements of this Schedule.
FACULTY POLICIES

About This Section
This section contains Faculty Policies which are relevant to all students enrolled in undergraduate programs within the Faculty and are to be read in conjunction with course programs and degree regulations.

Students should note that Faculty Policies do not remain static. Students are expected to consult Faculty and Departmental notice boards regularly in order to make themselves aware of any proposals or decisions which may affect them. Enquiries regarding Faculty Policy may be directed to the Faculty Secretary.

General Course Rules and Information
The information given below should be read in conjunction with the Regulations Governing Bachelor Degrees in the Faculty of Engineering and other University requirements and Faculty policies.

It is the responsibility of students to ensure that they enrol in a program which meets currently applicable course requirements. Where approval of a Head of Department or Course Coordinator is required, this should be gained prior to submitting a Variation of Program Form and attached to that form.

Advice on course requirements and procedures is available from the staff of the School Office - Enquiries to Room EA206, or from the relevant Course Coordinator.

Credit Points
1. The credit point value of a subject is intended to give a general indication of the time required of a student undertaking that subject. The normal annual workload of 80 credit points may be taken to indicate that the total workload of an average student working at pass level is approximately 48 hours per week. Thus a 3 credit point subject offered over one semester may be taken to indicate a minimum average workload requirement of 6 hours per week which includes course contact hours plus time spent by the student on assignments and other set work as well as general study of subject content. The ratio between contact hours and private study will vary between subjects according to the nature of the content studied.

2. The number of hours per week required by individual students will vary according to many factors including: academic background, personal ability, work/study techniques and the level of performance the student wishes to attain in a particular subject. The general indication of 2 hours per week for each credit point in a semester subject is a general understanding of the material in previous years of the course is assumed.

3. Course programs are specified and timetabled by year. Every effort will be made to provide for single day release attendance patterns in the first two part-time stages of each course. Timetable requirements may restrict selection of subjects in non-standard programs.

4. Students are not to enrol in subjects which clash in the timetable.

5. Students must satisfy the relevant pre-requisite, co-requisite and assumed knowledge requirements of each subject unless granted a written waiver of these requirements by the Head of the Department offering the subject. Students wishing to obtain such a waiver should make application at the scheduled Re-enrollment Approval Sessions in February. If requesting a variation of enrollment at another time, the relevant form should be obtained from the School Office before making an appointment to see the Head of Department to discuss the proposed waiver.

6. Only in exceptional circumstances will pre-requisite, co-requisite and assumed knowledge requirements be waived for students who have a WAM of 54 or less.

Adjusting Second Semester Enrolment
9. Enrollment in second semester subjects which require completion of first semester subjects to meet pre-requisite, co-requisite or assumed knowledge requirements is contingent upon successful completion of the relevant first semester subjects.

10. It is the responsibility of students to apply to withdraw from any second semester subject for which they do not meet pre-requisite, co-requisite or assumed knowledge requirements unless a formal waiver of such requirements is received from the Head of Department offering the subject concerned within the first two weeks of second semester.

11. A student who remains officially enrolled in a subject will receive a result in that subject. If a student ceases to attend classes but does not officially withdraw, the result will be Fail (FF).

12. Students wishing to add a second semester subject in place of a withdrawn subject should do so by 5 p.m. on Monday of the third week of second semester otherwise the Head of Department may refuse to permit the addition.

Late Addition or Substitution of Subjects
13. Applications to add subjects after the 5 p.m. on Monday of the third week of the semester in which the subject commence will be approved by the Dean only when submitted with the written permission of the Head of the Department offering the subject. When considering an application for late addition to the subject, the Head of Department will take into account:

• the ability of the student to catch up with work already completed in the subject;

• the effect that a late addition to the class may have on the work of students already enrolled in the subject; and

• where a student has been attending the subject without being enrolled, the reason why the student did not enrol in the subject within the first two weeks of the semester.

A receipt for payment of any preterred administration charge must be presented with any variation of program form requesting late addition of a subject.

15. Note that dates are prescribed after which total semester workload may not be increased. This requirement prevents approval of the addition of a subject after those dates where total semester workload would be increased, even if the permission of the Head of Department is obtained. Students in doubt as to the requirements should consult the staff of the School Office before paying any preterred administration charge or approaching the Head of Department.

16. Addition or substitution of first semester subjects after 31 March and second semester subjects after 31 August will only be permitted by the Dean in exceptional circumstances and where the total semester workload of the student is not increased.

Non-Standard Programs
17. A non-standard program is one which includes subjects from more than one Year of the course program. While progression in each course offered in the Faculty of Engineering is by subject, the following rules apply to students wishing to enrol in a non-standard program.

18. Students are expected to complete subjects in the order given in the course program. A student undertaking a non-standard program should therefore include all uncompleted subjects from the lower year of the course. If a student withdraws from a subject, that subject is expected to be chosen from the higher year. The approval of the Course Coordinator is required for any departure from these expectations.

19. Applications for enrolment in the following non-standard programs will be approved without special permission being required.

• An annual program of subjects prescribed for a combined degree program in which a student is enrolled.

• Inclusion of Industrial Experience subjects by part-time students.

• An annual program which follows prescribed Year by Year transition arrangements.

• An annual program of subjects for which all of the following apply:

  • all pre-requisite, co-requisite and assumed knowledge requirements are met or written relaxation of the relevant requirements is submitted;

  • subjects extend only over two Years of the course;

  • all uncompleted subjects in the lower Year of the course program are included;

  • when undertaken by a student with a WAM of 55 or more, has a total credit point value not exceeding 85 with no more than 50 credit points in a semester; and

  • when undertaken by a student with a WAM of 54 or less, has a total credit point value not exceeding 60 with no more than 40 credit points in a semester.

20. All other applications for enrolment in a non-standard program must be approved by the Course Coordinator responsible for the course in which the student is enrolled.
SECTION FOUR

21. Discussions

Enrolment in Extraneous Subjects

25. Note that the rules may

26. A written appeal regarding any decision made under these

Course Coordinators

Civil Engineering - Mr W.G. Field
Combined Degree Programs - Professor R.J. Evans
Computer Engineering - Associate Professor P.J. Moylan
Computer Science - Associate Professor J. Rosenberg
Electrical Engineering - Associate Professor D.J. Hill
Industrial Engineering - Mr G.D. Butler
Mechanical Engineering - Mr J.W. Haynes
Surveying - Associate Professor J.G. Fryer

- Dr B. Brumfrod-Smith
- Mr P.A. Henskens
- Associate Professor J. Rosenberg
- Associate Professor J.G. Fryer

Undergraduate Performance and Progress

These policies, known as the 'WAM Rules', were amended with effect from 1990 and now apply to students enrolled in the Bachelor of Computer Science, Bachelor of Engineering and Bachelor of Surveying degree programs.

1. General

(1) The following policies are made under the powers vested in the Faculty Board, Faculty of Engineering, by the Regulations Governing Bachelor Degrees offered in the Faculty of Engineering and various By-laws and Regulations of the University including, but not limited to, By-law 2.4 — The Faculty, the Examination Regulations, and the Regulations Governing Unsatisfactory Progress.

(2) These policies, unless the context or subject matter otherwise indicates or requires:

- "annual WAM" means the weighted average mark of the results of subjects taken in a particular calendar year.
- "course" means the total requirements as prescribed in these Policies and the Regulations Governing Bachelor Degrees offered in the Faculty of Engineering which, when completed, qualify a candidate for the award of the degree of Bachelor of Computer Science, Bachelor of Engineering or Bachelor of Surveying.
- "Course Coordinator" means Head of the designated Department or the Head of Department’s nominee.
- "Dean" means the Dean of the Faculty of Engineering;
- "Degree Regulations" means the Regulations Governing Bachelor Degrees in the Faculty of Engineering;
- "Department" means a department of the Faculty of Engineering;
- "Faculty Board" means the Faculty Board, Faculty of Engineering;
- "designated department" means the department identified as such in the relevant Schedule of the Degree Regulations;
- "student" means a person enrolled in an undergraduate course offered in the Faculty of Engineering;
- "Sub-dean" means a Sub-dean of the Faculty of Engineering;
- "WAM" means the cumulative Weighted Average Mark calculated in accordance with these policies.

2. Reservations

Faculty Board reserves its right to consider each case on its merits and to amend its policies without notice as it judges to be proper to maintain appropriate standards of attainment.

3. Assessment

(1) Assessment within each subject offered by a Department may take into account work in assignments, reports, laboratory exercises, tutorials, class tests and formal examinations.

(2) Students will be informed of the method of assessment to be adopted in each subject before the fourth week of lectures in that subject. This information will include an indication of the type of tasks comprising the assessment and the proportion each task will contribute to the final result in the subject concerned.

It should be noted that the final result in a subject is not necessarily determined simply by the addition of marks awarded for assessment tasks although the weightings of each task and class marking will be maintained except where an application for special consideration is granted.

(3) In the case of subjects offered to students enrolled in any undergraduate course in the Faculty by Departments of the Faculty (and any department of another faculty willing to take part in this procedure), the result in each subject will be reported as follows:

Reported as

Marks in the range of

45% to 100% inclusive - Percentage Mark
Marks less than 45% - "F" (Fail)
Other non-passing grades - Grades approved by Senate for specific purposes.

(4) A mark of 50% is considered to be the minimal pass/fail level of performance, however it is recognised that no matter how careful the assessment, an area of doubt may exist within 5% of that mark. Therefore, while a mark below 45% is a clear fail and a mark of 55% is a clear pass, percentage marks in the range of 45 to 54 are regarded as indicating that a student, whilst not performing clearly at a satisfactory level in the subject concerned, had nevertheless demonstrated sufficient understanding of the subject to proceed, provided other progress requirements are met, without repeating the material contained in that subject (see Policy 5 below).

Students should note that while results of 45 to 49 are (barely) acceptable in the context of the full requirements of a particular course in the Faculty of Engineering, they are unlikely to be considered adequate for full standing outside the Faculty of Engineering. For example: a result of 48 awarded to a student enrolled in an engineering course in a first year physics subject may be considered for standing in the Faculty of Science and Mathematics at a Terminating Pass level but would not be acceptable for full standing.

(5) In the case of subjects offered by departments of other faculties, results may be awarded as grades (rather than percentage marks) in accordance with University By-laws and Regulations and the Policies of the Faculty Board.

4. Academic Performance

(1) The academic performance of each student enrolled in an undergraduate course offered in the Faculty shall be measured by a cumulative Weighted Average Mark (WAM).

(2) The WAM is calculated from the results of all subjects taken towards the satisfaction of Degree Requirements, except as provided in Policy 4.5 below, in the following manner:

WAM = \( \frac{\sum (m \times w)}{\sum w} \)

Where:

m = The Mark as defined in Policy 4.3 below.
v = The credit point value of the subject concerned.
w = The Weighting of the subject concerned as determined under Policy 4.4 below.

(3) The Mark ("m") will be calculated as follows:

- Where the result in a subject is given in the range of 45 to 100 inclusive, "m" is equal to the credit point value of the subject concerned.
- Where the result in a subject is a grade of "F", "AF", or "EF", "m" is equal to 44.
- Where the result in a subject is a passing grade (rather than a percentage mark), the Mark ("m") will be deemed to be the relevant number listed below:

<table>
<thead>
<tr>
<th>Grade</th>
<th>m</th>
</tr>
</thead>
<tbody>
<tr>
<td>HD</td>
<td>93</td>
</tr>
<tr>
<td>D</td>
<td>80</td>
</tr>
<tr>
<td>C</td>
<td>70</td>
</tr>
<tr>
<td>P</td>
<td>58</td>
</tr>
<tr>
<td>UP</td>
<td>58</td>
</tr>
<tr>
<td>TP</td>
<td>49</td>
</tr>
</tbody>
</table>

Where grades of "I" are awarded the WAM will not be calculated until a mark or a final grade shall be awarded in that subject.

(4) Each subject shall have a weight of 1, 2, 3 or 4 as set out below.

Level at which the subject is offered

<table>
<thead>
<tr>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
</tr>
<tr>
<td>200</td>
</tr>
<tr>
<td>300</td>
</tr>
<tr>
<td>400 and over</td>
</tr>
</tbody>
</table>

Note: The level at which a subject is offered is indicated by the first number in the subject code; for example, MENG101 is offered at 100 level and MENG1342 is offered at 300 level.
SECTION FOUR

5. Academic Progression

(1) A student who achieves a WAM of 55 or more is considered to be progressing satisfactorily in the course.

(2) A student who has a WAM of 54 or less at the conclusion of any year is considered to be on probation for the next year in the course and in jeopardy of possible exclusion from the Faculty unless performance is improved sufficiently (see "Unsatisfactory Progress" below).

(3) If a student withdraws without penalty from all subjects in which they are enrolled while on probation, the term of their probation shall be deemed to be extended to the following year of enrolment.

(4) Except as otherwise approved by the Course Coordinator, a student who wishes to follow a non-standard program shall not be permitted to enrol in an annual program of study of more than 60 credit points of which not more than 40 credit points may be taken in either semester (also see the General Course Rules and Information above).

6. Unsatisfactory Progress

(1) A student on probation who fails to attain a WAM of 55 or more at the end of their probationary year and failed to achieve an annual WAM of 55 or more in that year, shall be deemed not to have maintained a rate of progress considered satisfactory to the Faculty Board under Regulation 2(1) of the Regulations Governing Unsatisfactory Progress and shall be required to show cause as to why he or she should not be excluded from the Faculty under the terms of those Regulations.

(2) Students required to show cause under Policy 6.1 shall be advised of their rights to make representations either in writing or in person prior to decisions under Regulation 3(1) being taken.

(3) The Dean or Sub-dean shall determine the time and place at which persons required to show cause under Faculty Board on the basis of their unsatisfactory performance in the course as a whole as measured by the WAM according to the following schedule:

<table>
<thead>
<tr>
<th>Minimum WAM</th>
<th>Honours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class I</td>
<td>77</td>
</tr>
<tr>
<td>Class II Division 1</td>
<td>72</td>
</tr>
<tr>
<td>Class II Division 2</td>
<td>67</td>
</tr>
</tbody>
</table>

(4) If a student was granted exemptions at the time of his or her admission or re-admission to the course and the student upon which the exemptions or extensions were based may be considered by Faculty Board in connection with the determination of the award of honours.

(5) A Head of Department may recommend to Faculty Board that a grade of honours be awarded rather than that indicated by the WAM of the student concerned, or that no honours be awarded to a particular student. In such a case Faculty Board may either make an award of honours in accordance with the recommendation of the Head of the Department concerned or in accordance with the regulations for the award of honours. Special Consideration given should not disadvantage other students.

(6) Applications for Special Consideration must be made on the prescribed form. Forms are available from the Faculty Board. It is recommended that the form be submitted within a week of the examination or re-examination, unless for special reasons the Medical Officer has allowed a longer period.

Applications for Special Consideration should be made as soon as possible after the student and the circumstances leading to the request but not more than 5 days after the examination or re-examination in a subject. When considering requests for Special Consideration the Dean may take evidence from any source which he deems to be relevant. The regulations for the award of honours by Special Consideration given should not disadvantage other students.

Enquiries regarding Special Consideration may be directed to the Faculty Secretary.

Further Assessment

A department may grant further assessment where it considers it appropriate to do so after considering a request for Special Consideration.
SECTION FOUR

In are normally undertaken:

- in the case of first semester subjects, before the end of the fifth week of the mid-year exam period;
- in the case of full-year and second semester subjects, before the end of the first week of December.

In view of the provision for further assessment by departments, the Faculty Board does not normally award results of Incomplete (I); however, it may do so if it deems it appropriate to allow a further short period for further assessment. A student in receipt of a result of Incomplete should immediately contact the Head of the Department offering the subject concerned to arrange a time to undertake further assessment. All further assessment for full-year or second semester subjects should be completed by the second week of January.

Failure by a Potential Graduate

Where a student fails a single subject other than the final year project and is thereby prevented from qualifying to graduate, the Faculty Board may award a result of Incomplete (I) in that subject. Such a decision will not be taken until the results of all other subjects required to meet degree requirements are known. Thus, a failure in a single first semester subject will be recorded as an FF unless the student has been enrolled in a program which was potentially sufficient to complete degree requirements in first semester. A result of FF given in a first semester subject may be reviewed at the conclusion of second semester in the light of results obtained in other subjects in that year and may be amended to "I" if it is then the only subject required to meet degree requirements. All such further assessments should be completed by the second week of January.

Review of Results

Students may apply through the University Examinations Office for a review of final results in subjects (see the General Information section of this Handbook for details of the procedure and the fee involved). All requests for review must be made by this procedure. A review of results consists of a check of records to ensure that all work has been marked and all marks were correctly included in the result - it is not a remark of the work submitted. If considered necessary, students may attach a statement to the official request for a review detailing any facts believed to point to an error or omission having been made. Students may also discuss aspects of performance in examinations with the lecturer concerned within a short period after final results have been published in order to gain feedback for educational purposes.

Submission of Final Year Project Reports

Meeting the deadline for submission of final year project reports is considered to be an important element of the subjects concerned. Departments within the Faculty have been advised by the Faculty Board to adopt the following policies regarding the submission of final year project reports:

- The time for submission of final year project report will be set at 5:00 pm on a date (to be specified by the Department concerned) during the November examination period. This date is regarded in the same way as a final formal examination. That is, failure to submit the report at or before the due date is regarded in the same way as failure to attend a formal written examination. The result will be failure, subject to any other decision which may be taken as a result of a request for Special Consideration.
- An extension of time for a submission, by way of an Incomplete grade (I) being awarded in December, may only be granted in response to a formal request for Special Consideration made through the Secretary to the University (see Special Consideration policy above). As students are expected to anticipate some delay or difficulties during the course of their project, Special Consideration will not normally be granted for circumstances involving less than 4 weeks loss of working time for the student.
- Submissions presented by the due date but not up to final presentation standard, or which require an acceptably small amount of additional work, may be granted a result of Incomplete (I). Final submission of the report will then be required on a date (to be specified by the Department concerned) before the second week of January. Project will not be awarded a result higher than 64.

Year/Stage Classification

Full-time students are classified by year. Part-time students are classified by stage. Classification is determined by the number of credit points passed in accordance with the following table:

<table>
<thead>
<tr>
<th>Full-time Credits</th>
<th>Year</th>
<th>Part-time Credits</th>
<th>Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-80</td>
<td>1</td>
<td>0-40</td>
<td>1</td>
</tr>
<tr>
<td>81-160</td>
<td>2</td>
<td>41-80</td>
<td>2</td>
</tr>
<tr>
<td>161-240</td>
<td>3</td>
<td>81-120</td>
<td>3</td>
</tr>
<tr>
<td>240-320</td>
<td>4</td>
<td>121-160</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>161-200</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>201-240</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>241-280</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>281-320</td>
<td></td>
</tr>
</tbody>
</table>

Students enrolled for the final year of any combined course will be classified as Year 5.

SECTION FOUR

Industrial Experience

General

Students enrolled in Bachelor of Engineering programs are required to complete a total of at least 12 weeks of practical work of a nature acceptable to the Faculty Board. This practical experience may be either gained during long vacations or as part of an Industrial Experience elective. The University can accept no responsibility for finding employment for students wishing to enrol for Industrial Experience subjects or to find employment in order to satisfy industrial experience requirements. Students experiencing difficulty in obtaining suitable employment should contact the University's Careers and Student Employment Office.

Full-Time Students

Full-time students will normally gain their practical experience during vacation employment. Students should obtain a statement from their employer certifying the nature and period of the employment undertaken and retain the statement so as to be in a position to provide it when called upon to do so.

Part-Time and Sandwich Pattern Students

Students enrolled in the degree of Bachelor of Engineering on a part-time basis may choose to take Industrial Experience elective subjects as provided in the relevant course program. To be eligible for enrolment in an Industrial Experience subject, the student must be in approved employment on the 1 November preceding the year in which the subject is to be taken. This approved employment must continue for one calendar year, that is, until the 31 October of the year in which the subject is taken.

Students enrolled in Industrial Experience subjects are expected to attend such lectures and seminars, and submit such reports, as the relevant Head of Department may require. Normally enrolment in an Industrial Experience subject will not be allowed in the first year of employment. Students attending on a "thick" sandwich pattern should consult with the Course Coordinator before enrolling in an Industrial Experience subject. The successful completion of one Industrial Experience subject satisfies the requirement that students complete 12 weeks practical experience.

Exemptions in Courses

Students entering courses who believe that they may be eligible for exemptions on the basis of previous tertiary study should consult the relevant Course Coordinator or the Faculty Secretary. Evidence in the form of original academic transcripts and handbook descriptions of the content of the subjects studied should be provided.

Exemptions for TAFE Certificates

Facility Board has approved the granting of exemptions to students enrolling in courses who hold certain TAFE certificates. The exemptions to be granted will naturally vary according to the TAFE qualification obtained, the course program in which the candidate is enrolled and the current requirements of the program. Details are available from the Faculty Secretary. Exemptions have previously been granted to holders of the following qualifications:

- Cartography Certificate
- Civil Engineering Certificate
- Computer Services Technology Certificate
- Electrical Engineering Certificate
- Electronics Engineering Certificate
- Electronics and Communications Certificate
- Engineering Survey Certificate
- Land and Engineering Survey Drafting Certificate
SECTION FIVE

BACHELOR DEGREE COURSE PROGRAMS

About This Section
This section contains the detailed bachelor degree course programs which have been approved by Faculty Board in accordance with the Regulations Governing Bachelor Degrees in the Faculty of Engineering.

A guide is also provided to the various patterns of attendance by which courses may be completed:

Students are expected to be aware of all aspects of the Course Program and associated requirements of the course in which they are enrolled. Attention is particularly drawn to the General Course Rules and other policies of the Faculty Board set out in the Faculty of Engineering.

Enquiries regarding course requirements may be directed to the Faculty Secretary or the Course Coordinator indicated in the course entry concerned.

Guide to Course Attendance Patterns
Course Programs are given in this Section for all bachelor degree courses. All students must complete the requirements of the relevant Course Program regardless of their attendance pattern.

The Faculty of Engineering offers a flexible array of attendance patterns which are designed to suit the individual needs of students. Each student may choose a pattern of attendance each year which suits them provided that academic progress is satisfactory and other course rules and requirements are met. The attendance patterns available are summarised below. Further enquiries may be directed to the Faculty Secretary.

Full-time Attendance
The great majority of students enrolled in the Faculty of Engineering attend as full-time students. Full-time attendance allows full concentration on course requirements during the academic year and is therefore the recommended pattern of attendance. Each course may be completed in a minimum of 4 years of full-time study. The criterion for classification as a full-time student is enrolment in three-quarters or more of the normal full-time program. Thus a student enrolled in 60 credit points or more is regarded as a full-time student.

Part-time Attendance
All or part of each Approved Program may be completed by part-time attendance. Part-time students will normally take two years for each equivalent full-time year. Although a 6 year pattern of attendance, of which the last year is full-time, is possible in the Chemical Engineering program.

The first two part-time stages of all courses are timetabled to permit a single day work release attendance pattern with some evening lectures. In the latter years of each course, attendance will be required at various times during the day depending upon the subjects in which the student is enrolled and the requirements of the timetable. Full-time study is recommended after Stage 2.

While each student enrolled in less than 60 credit points is regarded as a part-time student, there is no minimum number of subjects in which part-time students must enrol in each year. Part-time students may also choose to enrol in Industrial Experience subjects and count these units as Elective units as permitted by the Effective Requirements of the relevant course.

Section Five

BACHELOR DEGREE COURSE PROGRAMS

Sandwich Programs
Each course may be undertaken on a 'stick' sandwich attendance pattern in which full-time attendance at University is alternated with full-time employment on an annual basis. This allows work experience to be undertaken in 15 month periods between Years I and II, Years II and III and Years III and IV. Such a pattern would require a minimum of 7 years to complete degree requirements. The number of years of work experience undertaken may vary according to the needs of the student. A sandwich attendance pattern does not require attendance at University when gaining work experience, employment may be undertaken in areas remote from the University thereby adding to the diversity of the experience which may be gained and increasing the opportunities to obtain work experience employment.

Students following this pattern MUST apply for re-admission to their course through the Universities Admission Centre (UAC) in September of each year in which they are not enrolled at the University. Re-admission will be automatically approved provided only one year of absence is taken at a time and an application for re-admission is made through UAC.

The Traineeship Pattern
Some traineeships may continue to be offered on the basis of a part-time attendance pattern, however the following program is recommended as the most suitable method of combining academic course requirements with work experience.

Year 1 Stage 1 Part-time attendance at University plus vacation work
Year 2 Stage 2 Part-time attendance at University plus vacation work
Year 3 Year II Full-time attendance at University plus vacation work
Year 4 Year III Full-time attendance at University Year 5 — Full-time work experience — 15 months (approx.)
Year 6 Year IV Full-time attendance at University completion of studies.

A further 15 month period of work experience could be included between Years II and III resulting in a 7 year minimum program.

This attendance pattern allows both the employer and employee a period of assessment in Stages 1 and 2. After completing first year studies, trainees are in a position to give their full attention to their academic studies in Years II, III and IV of their course and to gain valuable practical experience during the 15 month period(s) of work experience. The length of the major work experience period(s) makes it possible for the trainee to experience a full annual cycle of the operation his or her employer's organisation and to give full attention to participating in the work of that organisation. The length of the major period(s) of work experience also enables trainees to gain practical experience in locations outside Newcastle.

Finding Employment
While the Careers and Student Employment Office of the University will assist students to find employment to complement their chosen attendance pattern, the University cannot accept any responsibility for finding appropriate positions for students.

Credit Point Transition
In the 1990 Faculty Handbook, courses were expressed in terms of credit points where 48 credit points was considered to be the normal annual workload. During 1990 this policy was amended to provide for an 80 credit point annual workload for all courses in the consolidated university. This decision was implemented with effect in 1990 with the result that subjects indicated to have a credit point value of 3 in the 1990 handbook were deemed to have a credit point value of 5 and subjects indicated as 6cp were deemed to have a value of 10cp, and so on. The course programs given in this Handbook are expressed in the new format.
SECTION FIVE

CHIMICAL ENGINEERING COURSE PROGRAM

Chemical Engineering

Degree: Bachelor of Engineering (BE) awarded in the specialisation of Chemical Engineering

Designated Department: Department of Chemical Engineering

Course Coordinator: Mr. J. Roberts

Course Program

Subjects | Credit Points
---|---

YEAR I

Semester 1

CHEE111 Industrial Process Principles | 5
CHEM101 Chemistry 101 | 10
MATH111 Mathematics 111* | 10
MECH102 Programming | 5
PHYS101 Physics 101* | 10

Semester 2

CHEE112 Introduction to Chemical Engineering | 10
CHEE113 Chemical and Manufacturing Processes | 10
CHEM102 Chemistry 102 | 10
MATH112 Mathematics 112* | 10

* Approved Options

1. MATH102 and MATH103 may replace MATH111 and MATH112.
2. PHYS102 may replace PHYS101.

YEAR II

Semester 1

CHEE241 Design Principles | 5
CHEE242 Chemical Engineering Computations | 10
CHEE263 Transfer Principles 1 | 10
CHEE281 Laboratory 1 | 5
MATH201 Multivariable Calculus | 5

Semester 2

CHEE264 Transfer Principles 2 | 10
CHEE282 Laboratory 2 | 10
CHEM241 Physical Chemistry | 10
MATH202 Partial Differential Equations | 5
MATH203 Ordinary Differential Equations | 5

YEAR III

Semester 1

CHEE321 Modelling of Processes | 5
CHEE332 Thermodynamics | 10
CHEE341 Project Engineering | 10
CHEE382 Laboratory 3 | 5
Technical Electives | 10

Semester 2

CHEE42 Safety and Environment | 10
CHEE372 Separation Processes | 10
CHEE381 Engineering Applications Laboratory | 5
CHEE383 Laboratory 4 | 5
Technical Electives | 10

YEAR IV

Semester 1

CHEE421 Process Control and Instrumentation | 10
CHEE432 Kinetics and Reaction Engineering | 10

Semester 2

General Electives | 15

Both Semesters

CHEE491 Seminar | 5
CHEE495 Design Project | 20
CHEE497 Research Project | 20

YEAR IV

General Course Rules

The attention of students is drawn to the General Course Rules of the Faculty published in the Faculty Policy Section of this Handbook. These rules are particularly important for students intending to enrol in a non-standard program.

Technical Electives

Technical Elective subjects must be selected from the list below. Not all Technical Elective subjects may be offered in any one year. The subjects to be offered will be displayed on the Department Notice Board in September of the previous year.

Technical Elective Subjects | Credit Points
---|---

CHEE351 Electrochemistry and Corrosion | 5
CHEE352 Transport Phenomena | 5
CHEE353 Surface Chemistry 1 | 10
CHEE354 Biotechnology | 5
CHEE355 Process Synthesis | 5
CHEE365 Introduction to Mineral Processing | 5
CHEE381 Fuel Technology 1 | 5
CHEE382 Fuel Technology 2 | 5
CHEE385 Process Metallurgy 1 | 5

General Electives

General Electives may be chosen from any subjects offered within the University at 100, 200, 300, or 400 level provided that prerequisites are met (or written permission obtained from the Head of the Department offering the subject). Recommended electives are listed below. Not all elective subjects may be offered in any one year. Students will be advised in September of the preceding year of the particular CHEE400 level elective subjects which are intended to be offered.

Recommended General Elective Subjects | Credit Points
---|---

CHEE191 Industrial Experience | 5
CHEE192 Industrial Experience | 5
CHEE193 Industrial Experience | 5
CHEE194 Industrial Experience | 5
CHEE451 Surface Chemistry 2 | 5
CHEE452 Mineral Processing 2 | 5
CHEE453 Process Optimization | 5
CHEE454 Fuel Technology 2 | 5
CHEE455 Heat Transfer | 5
CHEE456 Process Metallurgy | 5
CHEE496 Advanced Design Project | 10
CHEE498 Advanced Research Project | 10
PHIL391 Technology and Human Values | 10
STAT205 Engineering Statistics | 5

*May be taken by part-time students after Stage 1.

The following equivalence between previous subjects and new subjects will apply.

Previous Subjects | New Subjects
---|---

CHEE261 | CHEE264
CHEE262 | CHEE263
CHEE331 and Sop Technical Elective | CHEE332
CHEE431 and Sop General Elective | CHEE432
CHEM204 | CHEM241
MATH101 | MATH111
MATH101 and MATH102 | MATH111 and MATH112

Students who completed MATH102 in 1990 but did not complete MATH101 may choose to take either MATH111 in Semester 1 or MATH112 in Semester 2 to complete the mathematics requirements of Year 1.

In order to provide for exceptional cases in transition, the Dean may determine the transition program to be followed.

Combined Degree Programs

Combined degree programs are available which allow completion of the requirements for the Bachelor of Engineering (BE) degree in the specialisation of Chemical Engineering together with the requirements for a degree of Bachelor of Mathematics (BMath) and Bachelor of Science (BS) (Chemistry Major). The subjects undertaken in the first year of study of each program are identical to those required in the Chemical Engineering program. Combined degree programs each require a minimum of 5 years full-time study.

Note that students undertaking a combined degree program are attempting two distinct programs concurrently and therefore the annual enrolment required by such a program may exceed the normal annual load of 80 credit points. Also note that HICs will be calculated on the basis of the proportion with each individual subject counts in the program of the separate degree of which it forms part and not on the proportion it contributes to any combined degree program. Timetabling constraints may limit the choice of optional subjects.

Direct entry to combined programs may be gained via LAC by students who attain an aggregate of marks in the top 70% of the NSW HSC (or equivalent). Current students may enter combined degree programs at the conclusion of Year 1 if they have achieved a WAM of 70. Applications should be submitted in accordance with the instructions in the Re-enrolment Kit. The Faculty Secretary may be consulted regarding application details and course requirements.

Transition Arrangements

The Course Program has been amended with effect from the commencement of the 1991 academic year. All students enrolled in the course or any combined degree of which it forms part, are required to meet the requirements of the new Course Program.
**Civil Engineering**

**Degree:** Bachelor of Engineering (BE) awarded in the specialisation of Civil Engineering

**Designated Department:** Department of Civil Engineering and Surveying

**Course Coordinator:** Dr. W. G. Field

**Course Program Subjects Credit Points**

<table>
<thead>
<tr>
<th>SEMESTER 1</th>
<th>CIVL111 Mechanics and Structures 5</th>
<th>CIVL221 Mechanics of Solids 5</th>
<th>CIVL222 Materials 5</th>
<th>CIVL224 Geotechnical Investigation 10</th>
<th>LAW2291 Legal Process 5</th>
<th>CIVL201 Multivariable Calculus 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEMESTER 3</td>
<td>CIVL314 Theory of Structures 5</td>
<td>CIVL313 Structural Design 5</td>
<td>CIVL315 Stress Analysis 5</td>
<td>CIVL321 Material Science 10</td>
<td>CIVL322 Soil Mechanics 5</td>
<td>CIVL324 Open Channel Hydraulics 5</td>
</tr>
<tr>
<td>SEMESTER 4</td>
<td>CIVL414 Theory of Structures 15</td>
<td>CIVL413 Structural Design 15</td>
<td>CIVL415 Stress Analysis 15</td>
<td>CIVL421 Material Science 15</td>
<td>CIVL422 Soil Mechanics 15</td>
<td>CIVL424 Open Channel Hydraulics 15</td>
</tr>
</tbody>
</table>

**Recommended Elective Subjects Credit Points**

| CIVL203 Multivariable Calculus 5 | CIVL212 Mechanics of Solids 5 | CIVL222 Materials 5 | CIVL224 Geotechnical Investigation 10 | LAW2291 Legal Process 5 |

**YEAR I**

<table>
<thead>
<tr>
<th>SEMESTER 1</th>
<th>CIVL111 Mechanics and Structures 5</th>
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<td>CIVL422 Soil Mechanics 15</td>
<td>CIVL424 Open Channel Hydraulics 15</td>
</tr>
</tbody>
</table>

| CIVL222 Materials 5 | CIVL224 Geotechnical Investigation 10 | CIVL224 Geotechnical Investigation 10 | CIVL215 Systems 5 | CIVL203 Ordinary Differential Equations 8 |

| CIVL224 Geotechnical Investigation 10 | CIVL224 Geotechnical Investigation 10 | CIVL215 Systems 5 | CIVL203 Ordinary Differential Equations 8 |

**YEAR IV**

<table>
<thead>
<tr>
<th>SEMESTER 1</th>
<th>CIVL111 Mechanics and Structures 5</th>
<th>CIVL221 Mechanics of Solids 5</th>
<th>CIVL222 Materials 5</th>
<th>CIVL224 Geotechnical Investigation 10</th>
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<td>CIVL321 Material Science 10</td>
<td>CIVL322 Soil Mechanics 5</td>
<td>CIVL324 Open Channel Hydraulics 5</td>
</tr>
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<td>CIVL414 Theory of Structures 15</td>
<td>CIVL413 Structural Design 15</td>
<td>CIVL415 Stress Analysis 15</td>
<td>CIVL421 Material Science 15</td>
<td>CIVL422 Soil Mechanics 15</td>
<td>CIVL424 Open Channel Hydraulics 15</td>
</tr>
</tbody>
</table>

| CIVL222 Materials 5 | CIVL224 Geotechnical Investigation 10 | CIVL224 Geotechnical Investigation 10 | CIVL215 Systems 5 | CIVL203 Ordinary Differential Equations 8 |

| CIVL224 Geotechnical Investigation 10 | CIVL224 Geotechnical Investigation 10 | CIVL215 Systems 5 | CIVL203 Ordinary Differential Equations 8 |

**YEAR V**

<table>
<thead>
<tr>
<th>SEMESTER 1</th>
<th>CIVL111 Mechanics and Structures 5</th>
<th>CIVL221 Mechanics of Solids 5</th>
<th>CIVL222 Materials 5</th>
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<th>CIVL201 Multivariable Calculus 5</th>
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<td>CIVL313 Structural Design 5</td>
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<td>SEMESTER 4</td>
<td>CIVL414 Theory of Structures 15</td>
<td>CIVL413 Structural Design 15</td>
<td>CIVL415 Stress Analysis 15</td>
<td>CIVL421 Material Science 15</td>
<td>CIVL422 Soil Mechanics 15</td>
<td>CIVL424 Open Channel Hydraulics 15</td>
</tr>
</tbody>
</table>

| CIVL222 Materials 5 | CIVL224 Geotechnical Investigation 10 | CIVL224 Geotechnical Investigation 10 | CIVL215 Systems 5 | CIVL203 Ordinary Differential Equations 8 |

| CIVL224 Geotechnical Investigation 10 | CIVL224 Geotechnical Investigation 10 | CIVL215 Systems 5 | CIVL203 Ordinary Differential Equations 8 |

**Transition Arrangements**

The Course Program has been amended with effect from the commencement of the 1991 academic year. All students enrolled in this course or any combined degree of which it forms part, are required to meet the requirements of the new Course Program.

The following equivalence between previous subjects and new subjects will apply.

**Previous Subjects**

<table>
<thead>
<tr>
<th>CIVL101</th>
<th>CIVL224</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH101</td>
<td>MATH111</td>
</tr>
</tbody>
</table>

**New Subjects**

<table>
<thead>
<tr>
<th>CIVL101</th>
<th>CIVL224</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH101</td>
<td>MATH111</td>
</tr>
</tbody>
</table>

**Combined Degree Programs**

BE(Civil Engineering)/BSurv

A program which allows completion of the requirements of the BE(Civil Engineering) and BSurv is also available. The subjects undertaken in the first year of study of each program are identical to those required in the Civil Engineering program. The BE/BSurv degree program requires a minimum of 5 years full-time study. Admission to the program will be granted after satisfactory completion of Year 1 of either program (that is a W AM of 55 or more).

Note that students undertaking a combined degree program are attempting two distinct programs concurrently and therefore the annual enrolment required by such a program may exceed the normal annual load of 80 credit points. Also note that HESCs will be calculated on the basis of the proportion which each individual subject counts in the program of the separate degree of which it forms part and not on the proportion it contributes to any combined-degree program. Timetabling constraints may limit the choice of optional subjects.

The detailed BE(Civil Engineering)/BSurv combined degree program is summarised in the Surveying section of this Handbook.

**Application**

Applications should be submitted in accordance with the instructions in the Re-enrolment Kit. The Faculty Secretary may be consulted regarding application details and course requirements.

**Other Combined Degree Programs**

Combined degree programs may also be available which allow completion of the requirements for the Bachelor of Engineering (BE) degree in the specialisation of Civil Engineering together with the requirements for another degree, for example Bachelor of Mathematics (BMath) and Bachelor of Science (BSc). The development of an individual program which meets with the approval of the Deans of both faculties concerned will be required. Students normally apply to enter combined degree programs at the conclusion of Year 1. These combined degree programs require a W AM of 70 for entry.
### Computer Engineering

**Degree:** Bachelor of Engineering (BE) awarded in the specialisation of Computer Engineering

**Designated Department:** Department of Electrical Engineering and Computer Science

**Course Coordinator:** Associate Professor P. J. Mooylan

#### Computer Engineering Course Program

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Subject Code</th>
<th>Subject Title</th>
<th>Credit Points</th>
</tr>
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<tbody>
<tr>
<td>MATH102</td>
<td>Mathematics 102</td>
<td>Mathematics 102</td>
<td>30</td>
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<tr>
<td>PHYS102</td>
<td>Physics 102</td>
<td>Physics 102</td>
<td>10</td>
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<tr>
<td>MECH121</td>
<td>Materials 1</td>
<td>Materials 1</td>
<td>5</td>
</tr>
<tr>
<td>Semester 2</td>
<td>MATH103</td>
<td>Mathematics 103</td>
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<tr>
<td>PHYS103</td>
<td>Physics 103</td>
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<tr>
<td>CIVL111</td>
<td>Mechanics and Structures</td>
<td>Mechanics and Structures</td>
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<td>MECH111</td>
<td>Engineering Drawing</td>
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<tr>
<td>Both Semesters</td>
<td>ELEC130</td>
<td>Electrical Engineering 1</td>
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<tr>
<td>ELEC170</td>
<td>Computer Engineering</td>
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<tr>
<td>Both Semesters</td>
<td>MATH111</td>
<td>Mathematics 111</td>
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<tr>
<td>ELEC165</td>
<td>Computer Engineering Project</td>
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<tr>
<td><strong>General Electives</strong></td>
<td><strong>Credit Points</strong></td>
<td><strong>30</strong></td>
<td><strong>20</strong></td>
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<tr>
<td>Both Semesters</td>
<td>COMP200</td>
<td>Advanced Data Structures</td>
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<tr>
<td>COMP205</td>
<td>Programming in C</td>
<td>Programming in C</td>
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<tr>
<td>MATH212</td>
<td>Discrete Mathematics</td>
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<td>5</td>
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<tr>
<td>Both Semesters</td>
<td>COMP209</td>
<td>Programming Language Semantics</td>
<td>5</td>
</tr>
<tr>
<td>COMP206</td>
<td>Theory of Computation</td>
<td>Theory of Computation</td>
<td>5</td>
</tr>
</tbody>
</table>

#### Year I Mathematics Option

MATH102 assumes attainment of a mark of at least 120/150 in 3 unit Mathematics at the NSW HSC examination. It is expected students wishing to prepare for an honours degree need at least 80 points in the Mathematics Option below.

**Course Coordinator:** Associate Professor P. J. Mooylan

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Subject Code</th>
<th>Subject Title</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH102</td>
<td>Mathematics 102</td>
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<tr>
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<td>Physics 102</td>
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<tr>
<td>MECH121</td>
<td>Materials 1</td>
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<tr>
<td>Semester 2</td>
<td>MATH103</td>
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<tr>
<td>Both Semesters</td>
<td>ELEC130</td>
<td>Electrical Engineering 1</td>
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<tr>
<td>ELEC170</td>
<td>Computer Engineering</td>
<td>Computer Engineering</td>
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<tr>
<td>Both Semesters</td>
<td>MATH111</td>
<td>Mathematics 111</td>
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</tr>
<tr>
<td>ELEC165</td>
<td>Computer Engineering Project</td>
<td>Computer Engineering Project</td>
<td>10</td>
</tr>
<tr>
<td><strong>General Electives</strong></td>
<td><strong>Credit Points</strong></td>
<td><strong>30</strong></td>
<td><strong>20</strong></td>
</tr>
<tr>
<td>Both Semesters</td>
<td>COMP200</td>
<td>Advanced Data Structures</td>
<td>5</td>
</tr>
<tr>
<td>COMP205</td>
<td>Programming in C</td>
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<td>5</td>
</tr>
<tr>
<td>MATH212</td>
<td>Discrete Mathematics</td>
<td>Discrete Mathematics</td>
<td>5</td>
</tr>
<tr>
<td>Both Semesters</td>
<td>COMP209</td>
<td>Programming Language Semantics</td>
<td>5</td>
</tr>
<tr>
<td>COMP206</td>
<td>Theory of Computation</td>
<td>Theory of Computation</td>
<td>5</td>
</tr>
</tbody>
</table>

#### Coordinator:** Associate Professor P. J. Mooylan

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Title</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH111</td>
<td>Mathematics 111</td>
<td>5</td>
</tr>
<tr>
<td>ELEC165</td>
<td>Computer Engineering Project</td>
<td>10</td>
</tr>
</tbody>
</table>

**Coordinator:** Associate Professor P. J. Mooylan

#### Year II Mathematics Option

MATH102 assumes attainment of a mark of at least 120/150 in 3 unit Mathematics at the NSW HSC examination. It is expected students wishing to prepare for an honours degree need at least 80 points in the Mathematics Option below.

**Course Coordinator:** Associate Professor P. J. Mooylan

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Subject Code</th>
<th>Subject Title</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH121</td>
<td>Multivariable Calculus</td>
<td>Multivariable Calculus</td>
<td>5</td>
</tr>
<tr>
<td>MATH206</td>
<td>Complex Analysis</td>
<td>Complex Analysis</td>
<td>5</td>
</tr>
<tr>
<td>MATH218</td>
<td>Linear Algebra 2</td>
<td>Linear Algebra 2</td>
<td>5</td>
</tr>
<tr>
<td>PHYS201</td>
<td>Quantum Mechanics and Electromagnetism</td>
<td>Quantum Mechanics and Electromagnetism</td>
<td>10</td>
</tr>
<tr>
<td>Semester 2</td>
<td>MATH209</td>
<td>Ordinary Differential Equations 1</td>
<td>5</td>
</tr>
<tr>
<td>ELEC220</td>
<td>Electronics 1</td>
<td>Electronics 1</td>
<td>10</td>
</tr>
<tr>
<td>Both Semesters</td>
<td>COMP101</td>
<td>Electrical Science 1</td>
<td>20</td>
</tr>
<tr>
<td>ELEC230</td>
<td>Electrical Engineering 2</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td><strong>General Electives</strong></td>
<td><strong>Credit Points</strong></td>
<td><strong>30</strong></td>
<td><strong>20</strong></td>
</tr>
<tr>
<td>Both Semesters</td>
<td>COMP200</td>
<td>Advanced Data Structures</td>
<td>5</td>
</tr>
<tr>
<td>COMP205</td>
<td>Programming in C</td>
<td>Programming in C</td>
<td>5</td>
</tr>
<tr>
<td>MATH212</td>
<td>Discrete Mathematics</td>
<td>Discrete Mathematics</td>
<td>5</td>
</tr>
<tr>
<td>Both Semesters</td>
<td>COMP209</td>
<td>Programming Language Semantics</td>
<td>5</td>
</tr>
<tr>
<td>COMP206</td>
<td>Theory of Computation</td>
<td>Theory of Computation</td>
<td>5</td>
</tr>
</tbody>
</table>

#### Coordinator:** Associate Professor P. J. Mooylan

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Title</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH112</td>
<td>Mathematics 112</td>
<td>5</td>
</tr>
<tr>
<td>ELEC164</td>
<td>Computer Design</td>
<td>Computer Design</td>
</tr>
<tr>
<td>ELEC450</td>
<td>Advanced Communications</td>
<td>Advanced Communications</td>
</tr>
<tr>
<td>ELEC460</td>
<td>Computer Software</td>
<td>Computer Software</td>
</tr>
<tr>
<td>ELEC470</td>
<td>Computer Systems</td>
<td>Computer Systems</td>
</tr>
<tr>
<td>COMP303</td>
<td>Computer Networks</td>
<td>Computer Networks</td>
</tr>
<tr>
<td>COMP304</td>
<td>Database Design</td>
<td>Database Design</td>
</tr>
</tbody>
</table>

### Combined Degree Programs

Combined degree programs are available which allow completion of the requirements for the Bachelor of Engineering (BE) degree in the specialisation of Computer Engineering together with the requirements for a degree of Bachelor of Computer Science (BCompSc), Bachelor of Mathematics (BMath) and Bachelor of Science (BSc) (Physics Major). The subjects undertaken in the first year of study of each program are identical to those required in the Computer Engineering program. Combined degree programs each require a minimum of 5 years full-time study. Note that students undertaking a combined degree program are attempting two distinct programs concurrently and therefore the annual enrolment required by such a program may exceed the normal annual load of 80 credit points. Also note that HECIS will be calculated on the basis of the proportion which each individual subject counts in the program of the separate degree of which it forms part and not on the proportion it contributes to any
combined degree program. Timetabling constraints may limit the choice of optional subjects.

Direct entry to combined programs may be gained via UAC by students who attain an aggregate of marks in the top 7% of the NSW HSC (or equivalent). Students may also apply to enter combined degree programs at the conclusion of Year I. Most combined degree programs require a WAM of 70 for entry. However, students enrolled in the BE(Computer Engineering) or BCompSc in 1990 may enter the B(Computer Engineering)/BCompSc program after satisfactory completion of Year I of either program (that is, attainment of a WAM of 55 or more) in 1991 only. In future years a WAM of 70 will also be required for admission to that program. Applications should be submitted in accordance with the instructions in the Re-enrolment Kit. The Faculty Secretary may be consulted regarding application details and course requirements.

B.E.(Computer Engineering)/BCompSc

The following program has been approved by the Faculty Board.

Year I

Year I of the Computer Engineering Course Program (Total 80 credit points)

Year II

Year II of the Computer Engineering Course Program (Total 80 credit points)

Year III

Year III of the Computer Engineering Course Program plus MATH116. (Total 80 credit points)

Year IV

Year IV of the Computer Engineering Course Program plus MATH215 and STAT203. (Total 80 credit points)

Year V

Year V of the BCompSc Course Program. (Total 80 credit points)

Computer Science

Degree: Bachelor of Computer Science (BCompSc)

Designated Department: Department of Electrical Engineering and Computer Science

Course Coordinator: Associate Professor J. Rosenberg

Course Program

Subjects Credit Points

YEAR I

Semester 1
MATH111 Mathematics 111 * 10

Semester 2
MATH112 Mathematics 112 * 10

Both Semesters
COMP101 Computer Science 1 20
ELIC170 Computer Engineering 1 10
Year I Electives 20 80

* Approved Option MATH102 and MATH103 may replace MATH111 and MATH112.

YEAR II

Semester 1
COMP201 Advanced Data Structures 5

COMP203 Assembly Language 5

COMP205 Programming in C 5

MATH115 Discrete Mathematics 5

MATH217 Linear Algebra 1 * 5

STAT203 Queues and Simulation 5

Year I Electives 10 40

Semester 2
COMP202 Computer Architecture 5

COMP204 Programming Language Semantics 5

COMP206 Theory of Computation 5

MATH215 Operations research 5

MATH216 Numerical Analysis 5

PHIL242 Basic Symbolic Logic 5

Year II Electives 10 40

* Approved Option Students who take MATH102 and MATH103 in Year I may replace MATH117 with MATH116 Linear Algebra 2.

YEAR III

Semester 1
COMP301 Compiler Design 10

COMP303 Computer Networks 10

COMP305 Design and Analysis of Algorithms 10

Semester 2
COMP302 Artificial Intelligence 10

COMP304 Database Design 10

COMP306 Computer Graphics * 10

COMP308 Operating Systems 10

* Approved Option COMP305 and COMP306 may be offered in 1991 in which case students will be required to undertake the substitute subject COMP301 Special Topic 1 unless permitted by the Course Coordinator to take an alternative subject.

General Course Rules

The attention of students is drawn to the General Course Rules of the Faculty published in the Faculty Policy Section of this Handbook. These rules are particularly important for students intending to enrol in a non-standard program.

Elective Requirements

Electives may be chosen from any subjects offered within the University at 100, 200, 300, or 400 level provided that prerequisites are met (or written permission obtained from the Head of the Department offering the subject). Recommended electives are listed below.

Recommended Elective Subjects Credit Points

For Year I

ELEC130 Electrical Engineering 1 10

INFO101 Introduction to Information Systems 10

INFO102 Information Storage and Management 10

PHIL101 Introduction to Philosophy 20

PHYS101 Physics 101 10

PHYS102 Physics 102 ** 10

PSCI101 Psychology Introduction 10

PSCI102 Psychology Introduction 2 10

* Students intending to take INFO102 Analysis of Information Systems, INFO103 Information Systems Design or INFO104 Commercial Programming as Year II Electives should select INFO101 and INFO102 as Year I Elective subjects.

** Students intending to enter the B(Computer Engineering)/BCompSc combined degree programs should take ELEC130, PHYS101 and PSCI101 as their Year I Elective subjects.

For Year II

COMP241 Cognitive Science 10

ELEC370 Computer Engineering 2 20

INFO202 Analysis of Information Systems 10

INFO204 Information Systems Design 10

INFO204 Commercial Programming 10

PHIL391 Technology and Human Values 10

PSCI201 Foundations for Psychology 10

PSCI202 Basic Proceses 10

PSCI203 Developmental and Social Processes 10

Prerequisites, Corequisites and Assumed Knowledge Requirements

The prerequisite, corequisite and assumed knowledge requirements of individual subjects are listed in the schedule presented in Section 8 of this Handbook. Enrolment in a subject contrary to the provisions of this schedule will not be approved without the written permission of the Head of the Department offering the subject concerned.

Part-time Attendance

All candidates for the degree must complete the requirements of the Course Program given above. All or part of this program may be completed by part-time attendance. Part-time students will normally take two years for each equivalent full-time year. The first two stages of the course are timetabled to permit a single-day work release attendance pattern with some evening lectures. These stages are:
Combined Degree Programs

Combined degree programs are available which allow completion of the requirements for the Bachelor of Computer Science in conjunction with the Bachelor of Engineering (BEng) or Bachelor of Science (BSc) (Physics or Psychology Majors). These programs require a minimum of 4.5 years full-time study. A program which allows completion of the requirements for these combined degrees is also available and requires a minimum of 5 years full-time study.

Note that students undertaking a combined degree program are admitted to the combined BE(Computer Engineering)/BCompSc program at the conclusion of their BCompSc program after satisfactory completion of all course requirements.

The attention of students is drawn to the General Course Rules of the Faculty published in the Faculty Policy Section of this Handbook. These rules are particularly important for students intending to enrol in a non-standard program.

### Computer Science Honours

**Degree:** Bachelor of Computer Science (Honours)  
(BCompSc(Hons))

**Designated Department:** Department of Electrical Engineering and Computer Science

**Course Coordinator:** Dr B. Beresford-Smith

The BCompSc(Hons) program is a postgraduate degree taken over one full-time year or two part-time years. The program is normally undertaken by students with a superior record in the BCompSc program who wish to develop their knowledge in the discipline of Computer Science as further preparation for professional practice or to meet the requirements for admission to a research degree program. Entry to the honours program is possible for graduates of other disciplines. Enquiries regarding admission should be directed to the Course Coordinator.

The BCompSc(Hons) course program approved by the Faculty Board is presented below.

**Course Program**

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP425 Honours Project</td>
<td>20</td>
</tr>
<tr>
<td>Selected COMP400 Level Subjects</td>
<td>60</td>
</tr>
</tbody>
</table>

* In exceptional circumstances, the Head of the Department of Electrical Engineering and Computer Science may approve enrolment in other subjects.

**COMP400 Level Subjects**

All COMP400 Level subjects are listed below. Not all subjects will be offered in any one year. Students will be advised of subjects intended to be offered in Semester of the preceding year. Subjects indicated as available may be withdrawn if enrolment is insufficient.

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP401 Advanced Artificial Intelligence</td>
<td>10</td>
</tr>
<tr>
<td>COMP402 Formal Semantics of Programming Languages</td>
<td>10</td>
</tr>
<tr>
<td>COMP403 Advanced Computer Architecture</td>
<td>10</td>
</tr>
<tr>
<td>COMP404 Parallel Computation and VLSI</td>
<td>10</td>
</tr>
<tr>
<td>COMP405 Digital Image Processing</td>
<td>10</td>
</tr>
<tr>
<td>COMP406 Advanced Operating Systems</td>
<td>10</td>
</tr>
<tr>
<td>COMP408 Natural Language Processing</td>
<td>10</td>
</tr>
<tr>
<td>COMP409 Advanced Compiler Design</td>
<td>10</td>
</tr>
<tr>
<td>COMP410 Advanced Computer Networks</td>
<td>10</td>
</tr>
<tr>
<td>COMP411 Special Topic A</td>
<td>10</td>
</tr>
<tr>
<td>COMP412 Special Topic B</td>
<td>10</td>
</tr>
<tr>
<td>COMP413 Special Topic C</td>
<td>10</td>
</tr>
<tr>
<td>COMP414 Special Topic D</td>
<td>10</td>
</tr>
<tr>
<td>COMP435 Special Topic E</td>
<td>20</td>
</tr>
</tbody>
</table>

### Electrical Engineering

**Degree:** Bachelor of Engineering (BEng) awarded in the specialisation of Electrical Engineering

**Designated Department:** Department of Electrical Engineering and Computer Science

**Course Coordinator:** Associate Professor D.J. Hill

**Course Program**

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>CELE310 Power Engineering</td>
<td>15</td>
</tr>
<tr>
<td>CELE320 Electronics 2</td>
<td>15</td>
</tr>
<tr>
<td>CELE330 Communications</td>
<td>10</td>
</tr>
<tr>
<td>CELE370 Computer Engineering 2</td>
<td>20</td>
</tr>
<tr>
<td>MECH361 Automatic Control</td>
<td>10</td>
</tr>
</tbody>
</table>

**Year IV**

Semester 1 or Semester 2

### General Course Rules

The attention of students is drawn to the General Course Rules of the Faculty published in the Faculty Policy Section of this Handbook. These rules are particularly important for students intending to enrol in a non-standard program.

**Year I Mathematics Option**

MATH102 assumes attainment of a mark of at least 120/200 in the NSW HSC examination. It is expected that students wishing to prepare for an honours degree and/or for entry to any combined degree program, will take MATH102 and MATH103. It is also recommended that students who successfully complete MATH102 and MATH103, undertake MATH218 in Year II.

Students underprepared for entry to MATH102 may take MATH111 and MATH112 in lieu of MATH102 and MATH103. Those students who successfully complete MATH111 and MATH112 must take MATH217 in lieu of MATH218 in Year II, and may then choose to take MATH218 as the 3cp Mathematics Elective in Year III.

**Elective Requirements**

The requirements of each of the three elective categories are given below.

**Mathematics Elective (Year III)**

One 3 credit point subject is to be selected from those subjects offered by the Department of Mathematics at 200 or 300 level. The prerequisite and corequisite requirements of the selected subject must be satisfied or written permission to enrol gained from the Head of the Department of Mathematics.

**Electrical Engineering Electives (Year IV)**

A total of 30 credit points (3 subjects) is to be chosen from the subjects listed below. All subjects listed are offered as full-year subjects.
SECTION FIVE

ELECTRICAL ENGINEERING COURSE PROGRAM

Subjects

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEC410</td>
<td>10</td>
</tr>
<tr>
<td>ELEC430</td>
<td>10</td>
</tr>
<tr>
<td>ELEC440</td>
<td>10</td>
</tr>
<tr>
<td>ELEC441</td>
<td>10</td>
</tr>
<tr>
<td>ELEC450</td>
<td>10</td>
</tr>
<tr>
<td>ELEC470</td>
<td>10</td>
</tr>
</tbody>
</table>

Not all Electrical Engineering Electives may be offered in any one year. Students listed below.

Electives may be chosen from any subjects offered within the University at 100, 200, 300, or 400 level provided that prerequisites are met (or written permission obtained from the Head of the Department offering the subject). Recommended electives are listed below.

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEC494</td>
<td>5</td>
</tr>
<tr>
<td>MATH205</td>
<td>5</td>
</tr>
<tr>
<td>MATH213</td>
<td>5</td>
</tr>
<tr>
<td>MATH215</td>
<td>5</td>
</tr>
<tr>
<td>MATH216</td>
<td>5</td>
</tr>
<tr>
<td>MATH221</td>
<td>5</td>
</tr>
<tr>
<td>MATH231</td>
<td>5</td>
</tr>
</tbody>
</table>

General Electives (Year IV)

Electives may be chosen from any subjects offered within the University at 100, 200, 300, or 400 level that provided that prerequisites are met (or written permission obtained from the Head of the Department offering the subject). Recommended electives are listed below.

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEC410</td>
<td>10</td>
</tr>
<tr>
<td>ELEC430</td>
<td>10</td>
</tr>
<tr>
<td>ELEC440</td>
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</tr>
<tr>
<td>ELEC441</td>
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</tr>
<tr>
<td>ELEC450</td>
<td>10</td>
</tr>
<tr>
<td>ELEC470</td>
<td>10</td>
</tr>
</tbody>
</table>

* Approved Option

Note on Year 1 Mathematics Option above.

STAGE 1

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH102</td>
<td>10</td>
</tr>
<tr>
<td>MATH103</td>
<td>10</td>
</tr>
<tr>
<td>Both Semesters</td>
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</tbody>
</table>

STAGE 2

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH111</td>
<td>5</td>
</tr>
<tr>
<td>PHYS102</td>
<td>10</td>
</tr>
<tr>
<td>PHYS103</td>
<td>10</td>
</tr>
<tr>
<td>MECH101</td>
<td>10</td>
</tr>
</tbody>
</table>

After completion of the above progranm attendance will be required for various times during the day depending upon the subjects in which the candidate is enrolled and the requirements of the program. The full-time study is recommended after Stage 2. Students considering part-time study are advised to consult the Guide to Attendance Patterns at the beginning of this Section of the Handbook.

Transition Arrangements

The Course Program has been amended with effect from the commencement of the 1991 academic year. All students enrolled in this course or any combined degree of which it forms part, are required to meet the requirements of the new Course Program. The following equivalence between previous subjects and new subjects will apply.

<table>
<thead>
<tr>
<th>Previous Subjects</th>
<th>New Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH101</td>
<td>MATH111</td>
</tr>
<tr>
<td>MATH102</td>
<td>MATH111</td>
</tr>
<tr>
<td>MATH102</td>
<td>MATH111</td>
</tr>
<tr>
<td>MATH102</td>
<td>MATH112</td>
</tr>
</tbody>
</table>

Students who completed MATH102 in 1990 but did not complete MATH101 or MATH102 may choose to take either MATH111 in Semester 1 or MATH103 in Semester 2 to complete the mathematics requirements of Year 1. MATH103 is recommended for students intending to work towards the attainment of an honours degree.

In order to provide for exceptional cases in transition, the Dean may determine the transition program to be followed.

SECTION FIVE

ELECTRICAL ENGINEERING COURSE PROGRAM

Combined Degree Programs

Combined degree programs are available which allow completion of the requirements for the Bachelor of Engineering (BE) degree in the specialisation of Electrical Engineering together with the requirements for a degree of Bachelor of Mathematics (BMath) or Bachelor of Science (BSc) (Physics Major) by a minimum of 5 years full-time study. The subjects undertaken in the first year of study of each program are identical to those required in the Electrical Engineering program.

Note that students undertaking a combined degree program are attempting two distinct programs concurrently and therefore the annual enrolment required by such a program may exceed the normal annual load of 80 credit points. Also note that HSCs will be calculated on the basis of the proportion which each individual subject counts in the program of the separate degree of which it forms part and not on the proportion it contributes to any combined degree program. Timetabling constraints may limit the choice of optional subjects.

Direct entry to combined programs may be gained via UAC by students who attain an aggregate of marks in the top 7% of the NSW HSC (or equivalent). Students may also apply to enter combined degree programs at the conclusion of Year 1. Admission to either combined degree program requires a WAM of 70 for entry. Applications should be submitted in accordance with the instructions in the Re-enrolment Kit. The Faculty Secretary may be consulted regarding the course programs and application details.

Industrial Engineering

Degree: Bachelor of Engineering (BE) awarded in the specialisation of Industrial Engineering

Designated Department: Department of Mechanical Engineering

Course Coordinator: Mr G.D. Butler

Course Program

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH111</td>
<td>10</td>
</tr>
<tr>
<td>MECH102</td>
<td>5</td>
</tr>
<tr>
<td>MECH111</td>
<td>5</td>
</tr>
<tr>
<td>PHYS101</td>
<td>10</td>
</tr>
<tr>
<td>PHYS102</td>
<td>10</td>
</tr>
<tr>
<td>MATH112</td>
<td>5</td>
</tr>
<tr>
<td>MATH103</td>
<td>5</td>
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<tr>
<td>MECH105</td>
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<td>MECH205</td>
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<td>MECH206</td>
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<td>MECH207</td>
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<td>MECH208</td>
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<td>MECH209</td>
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<td>MECH212</td>
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</tr>
<tr>
<td>MECH213</td>
<td>5</td>
</tr>
<tr>
<td>MECH214</td>
<td>5</td>
</tr>
</tbody>
</table>

* Approved Options

1. MATH102 and MATH103 may replace MATH111 and MATH112.
2. PHYS102 and PHYS103 may replace PHYS101 and PHYS102.

YEAR II

Semester 1

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH201</td>
<td>5</td>
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<tr>
<td>MECH202</td>
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<td>MECH203</td>
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<tr>
<td>MECH204</td>
<td>5</td>
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<tr>
<td>MECH205</td>
<td>5</td>
</tr>
<tr>
<td>MECH206</td>
<td>5</td>
</tr>
</tbody>
</table>

Semester 2

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH202</td>
<td>5</td>
</tr>
<tr>
<td>MECH203</td>
<td>5</td>
</tr>
<tr>
<td>MECH204</td>
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</tr>
<tr>
<td>MECH205</td>
<td>5</td>
</tr>
<tr>
<td>MECH206</td>
<td>5</td>
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</tbody>
</table>

YEAR III

Semester 1

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>MECH381</td>
<td>5</td>
</tr>
<tr>
<td>MECH384</td>
<td>5</td>
</tr>
<tr>
<td>MECH387</td>
<td>5</td>
</tr>
</tbody>
</table>

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SECTION FIVE

INDUSTRIAL ENGINEERING COURSE PROGRAM

Semester 1
ELEC211 Electrical Energy Conversion 5
MATH202 Partial Differential Equations 1 5
MECH382 Engineering Administration 5
MECH385 Quality Engineering 5
MECH386 Computer Aided Manufacturing 5
MECH388 Operations Research 2 5
Both Semesters
MECH361 Automatic Control 10
PHIL391 Technology and Human Values 1 10
Electives 12
80

YEAR IV
Semester 1
MECH485 Production Scheduling 5
Semester 2
MECH431 Robotics 5
MECH484 Engineering Economics 2 5
Both Semesters
MECH496 Project/Seminar 25
Electives 40
80

General Course Rules
The attention of students is drawn to the General Course Rules of the Faculty published in the Faculty Policy Section of this Handbook. These rules are particularly important for students intending to enrol in a non-standard program.

Elective Requirements
Electives must be chosen from the list of Approved Elective Subjects given below. Not all electives may be offered in any one year and the entry requirements for selected subjects must be met. Students will be advised in September of the preceding year which MECH300 and 400 level elective subjects will be available.

Approved Elective Subjects Credit Points
COMM101 Financial Accounting Fundamentals 10
COMM102 Financial Management Fundamentals 10
COMP102 Introduction to Programming 5
COMP201 Advanced Data Structures 5
COMP203 Assembler Language 5
COMP205 Programming in C 5
COMP2022 Artificial Intelligence 10
COMP506 Computer Graphics 10
ECON101 Economics 1 20
LAW101 Foundations of Law 10
MAT1204 Real Analysis 5
MAT1206 Complex Analysis 1 5
MATH217 Linear Algebra 1 5
MECH191 Industrial Experience 5
MECH192 Industrial Experience 5
MECH193 Industrial Experience 5
MECH304 Experimental Methods 2 10
MECH305 Advanced Numerical Programming 5
MECH309 Noise Pollution & Control 5
MECH314 Mechanical Engineering Design 2 5
MECH315 Computer Aided Design 5
MECH316 Finite Element Methods in Design 5
MECH317 Bulk Materials Handling 1 5
MECH318 Conveying of Bulk Solids 5
MECH323 Materials 3 5
MECH324 Ceramic Science and Technology 5
MECH325 Polymer Science and Technology 5
MECH326 Fabrication of Metals 5
MECH333 Dynamics of Machines 5
MECH342 Mechanics of Solids 2 5
MECH352 Fluid Mechanics 2 10
MECH372 Heat Transfer 1 5
MECH386 Computer Aided Manufacturing 5
MECH407 Environmental Engineering 5
MECH412 Composites in Engineering 5
MECH453 Fluid Mechanics 3 5
MECH473 Introduction to Turbulence 5
MECH474 Heat Transfer 2 5
MECH484 Engineering Economics 2 5
MECH497 Directed Reading ** 5
MECH498 Directed Reading ** 5
MNGT201 Management 201 10
MNGT202 Management 202 10
PHIL392 Technology and Human Values 1 10
General Electives *** 20

* Industrial Experience subjects may be taken by part-time students after Stage 1.
** MECH497 and MECH498 are normally taken as substantial extensions to MECH306. Supervision must be arranged and the written permission of the Head of the Department obtained before enrolment will be permitted in these subjects.
*** General Electives may be any subject(s) offered within the University at 100, 200, 300 or 400 level provided the prerequisites are met (or written permission obtained from the Head of the Department offering the subject).

Prerequisite, Corequisite and Assumed Knowledge Requirements
The prerequisite, corequisite and assumed knowledge requirements of individual subjects are listed in the schedule presented in Section 8 of this Handbook. Enrolment in a subject contrary to the provisions of this schedule will not be approved without the written permission of the Head of the Department offering the subject concerned.

Part-time Attendance
All candidates for the degree must complete the requirements of the Course Program given above. All or part of this program may be completed by part-time attendance. Part-time students will normally take two years for each equivalent full-time year. The first two stages of the course are timed to permit a single-day work release attendance pattern with some evening lectures. These stages are:

SECTION FIVE

INDUSTRIAL ENGINEERING COURSE PROGRAM

Subjects Credit Points
STAGE I
Semester 1
MATH111 Mathematics 111 * 10
MATH112 Engineering Drawing 5
Semester 2
CIVL111 Mechanics & Structures 5
MATH112 Mathematics 112 * 10
MECH103 Engineering Chemistry 5
Both Semesters
MECH101 Introduction to Engineering 5
STAGE 2
Semester 1
MECH102 Programming 5
PHYS101 Physics 101 * 10
Semester 2
MECH121 Materials I 5
PHYS102 Physics 102 * 10
Both Semesters
ELEC170 Computer Engineering 1 10

* Approved Options
1. MATH102 and MATH103 may replace MATH111 and MATH112.
2. PHYS101 and PHYS102 may replace PHYS101 and PHYS102.

All students enrolling in this course or any combined degree of which it forms part, are required to meet the requirements of the new Course Program. The following equivalence between previous subjects and new subjects will apply.

Previous Subjects New Subjects
MATH101 MATH111
MATH101 MATH111 and MATH112
Students who completed MATH102 in 1990 but did not complete MATH101 or MATH102 may choose either to take MATH111 in Semester 1 or MATH103 in Semester 2 to complete the mathematics requirements of Year 1.

In order to provide for exceptional cases in transition, the Dean may determine the transition program to be followed.
Course Program

Subjects | Credit Points
--- | ---
**YEAR I**
Semester 1 | 
MATH111 | Mathematics 1 | 10
MECH110 | Programming | 5
MECH111 | Engineering Drawing | 5
PHYS101 | Physics 1 | 10
**SEMESTER 2**
CIVIL11 | Mechanics and Structures | 5
MATH112 | Mathematics 2 | 10
MECH121 | Materials 1 | 5
MECH103 | Engineering Chemistry | 5
PHYS102 | Physics 2 | 10
**Both Semesters**
ELEC170 | Computer Engineering 1 | 10
MECH101 | Introduction to Engineering | 2

*Approved Options*
1. MATH102 and MATH103 may replace MATH111 and MATH112.
2. PHYS102 and PHYS103 may replace PHYS101 and PHYS102.

**YEAR II**
Semester 1 | 
MATH201 | Multivariable Calculus | 5
MECH204 | Experimental Methods 1 | 5
MECH241 | Mechanics of Solids 1 | 5
MECH271 | Thermodynamics 1 | 5
STAT205 | Engineering Statistics | 5
**Semester 2**
MATH203 | Ordinary Differential Equations 1 | 5
MECH205 | Engineering Computations | 5
MECH222 | Materials 2 | 5
MECH251 | Fluid Mechanics 1 | 5
**Both Semesters**
MECH213 | Mechanical Engineering Design 1 | 15
MECH232 | Dynamics | 10
ELEC130 | Electrical Engineering 1 | 10
**YEAR III**
**Semester 1**
MECH323 | Materials 3 | 5
**Semester 2**
ELEC211 | Electrical Energy Conversion | 5
MATH202 | Partial Differential Equations 1 | 5

**LIST A SUBJECTS**
The following subjects totaling 40 Credit Points must be taken during Years III and IV. Normally, 30 credit points will be taken in Year III but students may, with the approval of the Course Coordinator, include fewer List A subjects in Year III in order to include Elective subjects in their Year IV program. All List A subjects not taken in Year III must be taken in Year IV.

**Semester 1**
MECH333 | Dynamics of Machines | 5
MECH352 | Fluid Mechanics 2 | 10
**Semester 2**
MECH342 | Mechanics of Solids 2 | 5
MECH372 | Heat Transfer 1 | 5
MECH373 | Thermodynamics 2 | 5
**Both Semesters**
MECH361 | Automatic Control | 10

**General Course Rules**
The attention of students is drawn to the General Course Rules of the Faculty published in the Faculty Policy Section of this Handbook. These rules are particularly important for students intending to enrol in a non-standard program.

**Elective Requirements**
Electives must be chosen from the list of Approved Elective Subjects given below. A minimum of 10 credit points must be selected from the MECH 400 level subjects listed. Not all electives may be offered in any one year. Students will be advised in September of the preceding year which MECH 300 and 400 level elective subjects will be available.

**Approved Elective Subjects**

**Part-time Attendance**
All candidates for the degree must complete the requirements of the Course Program given above. All or part of this program may be completed by part-time attendance. Part-time students will normally take two years for each equivalent full-time year. The first two stages of the course are timetabled to permit a single-day work release attendance pattern with some evening lectures.

These stages are:
1. **STAGE 1**
   **Semester 1**
   MATH111 | Mathematics 1 | 10
   MECH110 | Engineering Drawing | 5
   **Semester 2**
   CIVIL11 | Mechanics and Structures | 5
   MATH112 | Mathematics 2 | 10
   MECH103 | Engineering Chemistry | 5
   **Both Semesters**
   ELEC170 | Computer Engineering 1 | 10

   *Approved Options*
   1. MATH102 and MATH103 may replace MATH111 and MATH112.
   2. PHYS102 and PHYS103 may replace PHYS101 and PHYS102.
   
   After completion of the above program attendance will be required at various times during the day depending upon the subjects in which the candidate is enrolled and the requirements of the timetable. Full-time study is recommended after Stage 2.

   **Transition Arrangements**
The Course Program has been amended with effect from the commencement of the 1991 academic year. All students enrolled in this course or any combined degree of which it forms part, are required to meet the requirements of the new Course Program. The following equivalence between previous subjects and new subjects will apply.

   **Previous Subjects**
   MATH101 | MAT1101 | Mathematics 1 | 10
   MATH102 | MAT1102 | Mathematics 2 | 10
   **New Subjects**
   MATH111 | MECH11 | Mathematics 1 | 10
   MATH112 | MECH102 | Mathematics 2 | 10
# Mechanical Engineering Course Program

## YEAR I

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH111</td>
<td>Mathematics 111</td>
<td>10</td>
</tr>
<tr>
<td>MECH102</td>
<td>Programming</td>
<td>5</td>
</tr>
<tr>
<td>MECH111</td>
<td>Engineering Drawing</td>
<td>5</td>
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<tr>
<td>PHYS101</td>
<td>Physics 101</td>
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**Semester 2**

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>CIVL111</td>
<td>Mechanics and Structures</td>
<td>5</td>
</tr>
<tr>
<td>MATH112</td>
<td>Mathematics 112</td>
<td>10</td>
</tr>
<tr>
<td>MECH121</td>
<td>Materials 1</td>
<td>10</td>
</tr>
<tr>
<td>MECH103</td>
<td>Engineering Chemistry</td>
<td>5</td>
</tr>
<tr>
<td>PHYS102</td>
<td>Physics 102</td>
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<tr>
<td>Both Semesters</td>
<td>Computer Engineering 1</td>
<td>10</td>
</tr>
<tr>
<td>MECH101</td>
<td>Introduction to Engineering</td>
<td>5</td>
</tr>
</tbody>
</table>

### Approved Options

1. MATH102 and MATH103 may replace MATH111 and MATH112.
2. PHYS102 and PHYS103 may replace PHYS101 and PHYS102.

## YEAR II

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit Points</th>
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<tbody>
<tr>
<td>MATH210</td>
<td>Multivariable Calculus</td>
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</tr>
<tr>
<td>MECH204</td>
<td>Experimental Methods 1</td>
<td>5</td>
</tr>
<tr>
<td>MECH241</td>
<td>Mechanics of Solids 1</td>
<td>5</td>
</tr>
<tr>
<td>MECH271</td>
<td>Thermodynamics 1</td>
<td>5</td>
</tr>
<tr>
<td>STA205</td>
<td>Engineering Statistics</td>
<td>5</td>
</tr>
<tr>
<td>MATH230</td>
<td>Ordinary Differential Equations</td>
<td>5</td>
</tr>
<tr>
<td>MECH205</td>
<td>Engineering Compositions</td>
<td>5</td>
</tr>
<tr>
<td>MECH222</td>
<td>Materials 2</td>
<td>5</td>
</tr>
<tr>
<td>MECH251</td>
<td>Fluid Mechanics 1</td>
<td>5</td>
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</tbody>
</table>

**Semester 1**

<table>
<thead>
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<th>Course Name</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
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<td>MECH333</td>
<td>Dynamics of Machines</td>
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<tr>
<td>MECH352</td>
<td>Fluid Mechanics 2</td>
<td>10</td>
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<tr>
<td>Semester 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH342</td>
<td>Mechanics of Solids 2</td>
<td>5</td>
</tr>
<tr>
<td>MECH372</td>
<td>Heat Transfer 1</td>
<td>5</td>
</tr>
<tr>
<td>MECH373</td>
<td>Thermodynamics 2</td>
<td>5</td>
</tr>
<tr>
<td>Both Semesters</td>
<td>Computer Engineering 2</td>
<td>10</td>
</tr>
</tbody>
</table>

### Approved Options

1. MATH204 and MATH205 may replace MATH111 and MATH112.
2. PHYS202 and PHYS203 may replace PHYS101 and PHYS102.

## List A Subjects

- Mechanical Engineering Design 3
- Mechanics of Solids 2
- Heat Transfer 1
- Thermodynamics 2
- Automatic Control

### General Course Rules

- The attention of students is drawn to the General Course Rules of the Faculty published in the Faculty Policy Section of this Handbook. These rules are particularly important for students intending to enrol in a non-standard program.

- Elective Requirements

  Electives must be chosen from the list of Approved Elective Subjects given below. A minimum of 10 credit points must be selected from the MECH 400 level subjects listed.

## Approved Elective Subjects

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>MECH301</td>
<td>Experimental Methods 2</td>
<td>10</td>
</tr>
<tr>
<td>MECH314</td>
<td>Mechanical Engineering Design 2</td>
<td>15</td>
</tr>
<tr>
<td>PHIL391</td>
<td>Technology and Human Values 1</td>
<td>10</td>
</tr>
<tr>
<td>MATH103</td>
<td>Linear Algebra 1</td>
<td>5</td>
</tr>
<tr>
<td>MATH119</td>
<td>Industrial Experience</td>
<td>5</td>
</tr>
<tr>
<td>MATH120</td>
<td>Industrial Experience</td>
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<tr>
<td>MATH121</td>
<td>Industrial Experience</td>
<td>5</td>
</tr>
<tr>
<td>MATH305</td>
<td>Advanced Numerical Programming</td>
<td>5</td>
</tr>
<tr>
<td>MATH309</td>
<td>Noise Pollution and Control</td>
<td>10</td>
</tr>
<tr>
<td>MECH315</td>
<td>Computer Aided Design</td>
<td>5</td>
</tr>
<tr>
<td>MECH316</td>
<td>Finite Element Methods in Design</td>
<td>5</td>
</tr>
<tr>
<td>MECH317</td>
<td>Bulk Materials Handling 2</td>
<td>10</td>
</tr>
<tr>
<td>MECH318</td>
<td>Conveying of Bulk Solids</td>
<td>10</td>
</tr>
<tr>
<td>MECH324</td>
<td>Ceramic Science and Technology</td>
<td>5</td>
</tr>
<tr>
<td>MECH325</td>
<td>Polymer Science and Technology</td>
<td>5</td>
</tr>
<tr>
<td>MECH326</td>
<td>Fabrication of Metals</td>
<td>5</td>
</tr>
<tr>
<td>MECH381</td>
<td>Methods Engineering</td>
<td>5</td>
</tr>
<tr>
<td>MECH382</td>
<td>Engineering Administration</td>
<td>5</td>
</tr>
<tr>
<td>MECH383</td>
<td>Quality Engineering</td>
<td>5</td>
</tr>
<tr>
<td>MECH384</td>
<td>Engineering Economics 1</td>
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<td>MECH386</td>
<td>Computer Aided Manufacturing</td>
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<td>MECH387</td>
<td>Operations Research 1</td>
<td>5</td>
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<tr>
<td>MECH388</td>
<td>Operations Research 2</td>
<td>5</td>
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<td>MECH407</td>
<td>Environmental Engineering</td>
<td>5</td>
</tr>
<tr>
<td>MECH408</td>
<td>Vibration and Noise Problems</td>
<td>5</td>
</tr>
<tr>
<td>MECH412</td>
<td>Bulk Materials Handling 1</td>
<td>5</td>
</tr>
<tr>
<td>MECH419</td>
<td>Maintenance Engineering</td>
<td>5</td>
</tr>
<tr>
<td>MECH421</td>
<td>Composites in Engineering</td>
<td>5</td>
</tr>
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<td>MECH431</td>
<td>Robotics</td>
<td>5</td>
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<td>MECH453</td>
<td>Introduction to Turbulence</td>
<td>5</td>
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<tr>
<td>MECH473</td>
<td>Thermodynamics 3</td>
<td>5</td>
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<td>MECH474</td>
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<td>MECH497</td>
<td>Engineering Economics 2</td>
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<tr>
<td>MECH485</td>
<td>Production Scheduling</td>
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<td>MECH497</td>
<td>Directed Reading 2</td>
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<td>PHIL292</td>
<td>Technology and Human Values 2</td>
<td>10</td>
</tr>
<tr>
<td>General Electives</td>
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<td></td>
</tr>
</tbody>
</table>

**Prerequisite, Corequisite and Assumed Knowledge Requirements**

- The prerequisite, corequisite and assumed knowledge requirements of individual subjects are listed in the schedule presented in Section 8 of this Handbook. Enrolment in a subject contrary to the provisions of this schedule will not be approved without the written permission of the Head of the Department offering the subject.
In Students SECTION MATH101 or MATH103 may choose either to take MATH111 in Semester 1 or MATH103 in Semester 2 to complete the mathematics requirements of Year 1.

In order to provide for exceptional cases in transition, the Dean may determine the transition program to be followed.

**Combined Degree Programs**

Combined degree programs which allow completion of the requirements for the Bachelor of Engineering (BEng) degree in the specialisation of Mechanical Engineering together with the requirements for a degree of Bachelor of Mathematics (BMath) and Bachelor of Science (BSc) (Physics Major) by a minimum of 5 years full-time study have been submitted to the relevant Faculty Boards for approval. The subjects undertaken in the first year of study of each program are identical to those required in the Mechanical Engineering program.

Note that students undertaking a combined degree program are attempting two distinct programs concurrently and therefore the annual enrolment required by each program may exceed the normal annual load of 80 credit points. Also note that HECS will be calculated on the basis of the proportion which each individual subject counts in the program of the separate degree of which it forms part and not on the proportion it contributes to any choice of optional subjects.

Direct entry to combined programs may be gained via UAC by students who attain an aggregate of marks in the top 7% of the NSW HSC (or equivalent). Students may also apply to enter the combined program. Students completing MA TH102 in 1990 but did not complete MA TH103 may replace MA TH111 and MA TH112.

• **Approved Options**
  1. MA TH102 and MA TH103 may replace MA TH111 and MA TH112.
  2. PHYS102 may replace PHYS101.

**Surveying**

**Course Program**

- **Subjects**
- **Credit Points**

**YEAR I**

**Semester 1**
- CIVL111: Mechanics and Structures 5
- MA TH111: Mathematics 10 •
- MECH121: Materials 1 5
- PHYS101: Physics 10 •
- SURV111: Surveying 1 10

**Semester 2**
- CIVL131: Fluid Mechanics 1 5
- MA TH112: Mathematics 110 •
- MECH102: Programming 5
- MECH111: Engineering Drawing 5
- SURV112: Surveying 2 10

**Full Year**
- MECH101: Introduction to Engineering 10

* Approved Options

1. MA TH102 and MA TH103 may replace MA TH111 and MA TH112.
2. PHYS102 may replace PHYS101.

**YEAR II**

**Semester 1**
- CIVL212: Mechanics of Solids 5
- CIVL232: Fluid Mechanics 2 5
- CIVL271: Transportation Engineering 10
- LA W291: Legal Process 5
- MA TH201: Multivariable Calculus 5
- SURV214: Optics and Mining Surveying 5
- SURV215: Electronic Distance Measurement 5

**Semester 2**
- CIVL224: Geotechnical Investigation 10
- CIVL251: Systems 5
- LA W292: Property and Survey Law 5
- MA TH203: Ordinary Differential Equations 1 10
- SURV213: Surveying 3 10
- SURV233: Survey Computations 8

**YEAR III**

**Semester 1**
- CIVL325: Soil Mechanics 5
- CIVL381: Statistical Methods 5
- ECON371: Principles of Economics 10
- SURV316: Hydrographic Surveying 5
- SURV314: Error Theory 5
- SURV361: Photogrammetry 1 10

**Semester 2**
- CIVL341: Environmental Science 5
- CIVL342: Open Channel Hydraulics 5
- MA TH103: Mathematics 10
- MA TH202: Partial Differential Equations 5
- MECH204: Experimental Methods 1 5
- PHIL201: Technology and Human Values 1 10

* May be taken by part-time students after stage 1.

The Course Program has been amended with effect from the commencement of the 1991 academic year. All students enrolled in this course or any combined degree of which it forms part, are required to meet the requirements of the new Course Program.

**Surveying Course Program**

- **Semester 2**
  - CIVL326: Soil Mechanics 2 5
  - CIVL342: Hydrology 5
  - CIVL352: Management 5
  - SURV251: Geodesy 1 10
  - SURV362: Remote Sensing 5
  - SURV393: Land Boundary Definition* 10

* A ten day live-in Survey Camp is a compulsory part of SURV393.

**Semester 4**
- CIVL443: Water Resources Engineering 5
- CIVL471: Industrial and Other Surveying 10
- SURV418: Control Networks 5

**Semester 5**
- SURV441: Astronomy 10
- SURV472: Land Valuation 10

**Full Year**
- SURV473: Town Planning 10
- SURV481: Project 15

**General Course Rules**

The attention of students is drawn to the General Course Rules of the Faculty published in the Faculty Policy Section of this Handbook. These rules are particularly important for students intending to enrol in a non-standard program.

**Elective Requirements**

Electives may be chosen from any subjects offered within the University at 100, 200, 300, or 400 level provided that prerequisites are met (or written permission obtained from the Head of the Department offering the subject). Recommended electives are listed below. Not all electives may be offered in any one year. Students will be advised in Semester of the preceding year in which SURV460 level elective subjects will be available.

**Recommended Elective Subjects**

**Semester 1**
- SURV191: Industrial Experience *
- SURV192: Industrial Experience *
- SURV193: Industrial Experience *
- SURV452: Geodesy 2
- SURV462: Photogrammetry 2
- SURV463: Advanced Cartography
- SURV498: Special Topic
- SURV499: Special Topic
- CIVL222: Materials 2
- CIVL232: Materials 3
- CIVL233: Fluid Mechanics 3
- CIVL241: Environmental Science
- CIVL334: Open Channel Hydraulics
- MA TH103: Mathematics 10
- MA TH202: Partial Differential Equations 5
- MECH204: Experimental Methods 1
- PHIL201: Technology and Human Values 1

* May be taken by part-time students after stage 1.

**Semester 2**
- CIVL326: Soil Mechanics 2 5
- CIVL342: Hydrology 5
- CIVL352: Management 5
- SURV251: Geodesy 1 10
- SURV362: Remote Sensing 5
- SURV393: Land Boundary Definition* 10

* A ten day live-in Survey Camp is a compulsory part of SURV393.

All candidates for the degree must complete the requirements of the Course Program given above. All or part of this program may be completed by part-time attendance. Part-time students will normally take two years for each equivalent full-time year. The first two stages of the course are timetabled to permit a single-day work release attendance pattern with some evening lectures.

These stages are:

**Subjects**

**STAGE 1**
- MA TH111: Mathematics 11 10
- SURV111: Surveying 1 10

**STAGE 2**
- MA TH112: Mathematics 11 10
- SURV112: Surveying 2 10

**STAGE 2**
- CIVL111: Mechanics and Structures 5
- MECH121: Materials 1 5
- PHYS101: Physics 10 10

**STAGE 2**
- CIVL311: Fluid Mechanics 1 5
- MECH102: Programming 5
- MECH111: Engineering Drawing 5

**Full Year**
- MECH101: Introduction to Engineering 5

**Approved Options**

1. MA TH102 and MA TH103 may replace MA TH111 and MA TH112.
2. PHYS102 may replace PHYS101.

After completion of the above program attendance will be required at various times during the day depending upon the subjects in which the candidate is enrolled and the requirements of the timetable. Full-time study is recommended after Stage 2. Students considering part-time study are advised to consult the Guide to Attendance Patterns at the beginning of this Section of the Handbook.

**Transition Arrangements**

The Course Program has been amended with effect from the commencement of the 1991 academic year. All students enrolled in this course or any combined degree of which it forms part, are required to meet the requirements of the new Course Program.
The following equivalence between previous subjects and new subjects will apply.

<table>
<thead>
<tr>
<th>Previous Subjects</th>
<th>New Subjects</th>
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<tr>
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<td>MATH111</td>
</tr>
<tr>
<td>MATH101 and MATH102</td>
<td>MATH111 and MATH112</td>
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</table>

Students who completed MATH102 in 1990 but did not complete MATH101 or MATH103 may choose either to take MATH111 in Semester 1 or MATH103 in Semester 2 to complete the mathematics requirements of Year 1.

In order to provide for exceptional cases in transition, the Dean may determine the transition program to be followed.

**Combined BE/BSc/Surv Degree Program**

The combined degree program allows completion of the requirements for the Bachelor of Engineering (BE) degree in the specialisation of Civil Engineering together with the requirements for a degree of Bachelor of Surveying (BScSurv) degree in a minimum of 5 years full-time study.

Note that students undertaking a combined degree program are attempting two distinct programs concurrently and therefore the annual enrolment required by such a program may exceed the normal annual load of 80 credit points. Also note that HECS will be calculated on the basis of the proportion which each individual subject counts in the program of the separate degree of which it forms part and not on the proportion it contributes to any combined degree program.

Students normally apply to enter combined degree programs at the conclusion of Year I. Students who have completed the first year of either the Surveying or Civil Engineering program and have attained a weighted average mark (WAM) of 55 for entry may be admitted. Applications should be submitted in accordance with the instructions in the Re-enrolment Kit. The Faculty Secretary may be consulted regarding application details. The Course Coordinator may be consulted regarding course requirements.

The detailed requirements are set out below.

**Year I**

Year I of either the Surveying or Civil Engineering program (Total 80 credit points).

**Year II**

CIVL212, CIVL213, CIVL222, CIVL223, CIVL224, CIVL232, CIVL233, CIVL241, CIVL251, CIVL271, MATH201, MATH205, MECH205, SURV213, SURV233 (Total 80 credit points)

**Year III**

CIVL314, CIVL316, CIVL317, CIVL325, CIVL326, CIVL327, LAW 291, LAW 292, SURV334, SURV214, SURV215, SURV399, PHILO391 or ECON371 (Total 85 credit points)

**Year IV**

CIVL355, CIVL334, CIVL342, CIVL352, CIVL381, CIVL382, SURV316, SURV351, SURV361, SURV362, SURV417, SURV418, SURV441 (Total 85 credit points)

### POSTGRADUATE DEGREE AND DIPLOMA REGULATIONS

**About This Section**

This section contains the regulations governing the following degree and postgraduate diplomas:
- Diploma in Computer Science
- Diploma in Computing
- Diploma in Surveying
- Master of Computer Science
- Master of Computing
- Master of Engineering Science
- Master of Surveying
- Doctor of Philosophy

**Regulations Governing Postgraduate Diplomas in the Faculty of Engineering**

1. **General**

   These Regulations are made in accordance with the powers vested in the Council under By-law 5.2.1 and prescribe the conditions and requirements relating to the Postgraduate Diploma in Computer Science, the Postgraduate Diploma in Computing and the Postgraduate Diploma in Surveying.

2. **Definitions**

   In these Regulations and the Schedules thereto, unless the context or subject matter otherwise indicates or requires:
   - "course" means the total requirements prescribed under these Regulations to qualify a candidate for the award of the Diploma;
   - "credit point" means the Head of the designated department or that Head of Department's nominee;
   - "Dean" means the Dean of the Faculty of Engineering;
   - "Department" means the department or departments offering a particular subject and includes any other body doing so;
   - "designated department" means the department indenified as such in the schedule;
   - "Diploma" means the Postgraduate Diploma in Computing, the Postgraduate Diploma in Computer Science or the Postgraduate Diploma in Surveying as the case may be;
   - "Faculty Board" means the Faculty Board, Faculty of Engineering;
   - "Schedule" means the Schedule to these Regulations relevant to the Diploma in which a person is enrolled or proposing to enrol;
   - "subject" means a discrete component of the course for which a result may be recorded.

3. **Admission to Candidature**

   (1) An application for admission to candidature shall be made on the prescribed form and lodged with the University Secretary by the prescribed date.
   (2) To be eligible for admission to candidature for the Diploma, an applicant shall have satisfied the conditions and requirements relating to the Postgraduate Diploma in Computer Science, the Postgraduate Diploma in Computing and the Postgraduate Diploma in Surveying.

   (3) An application for admission to candidature shall be considered by the Dean who, after considering the recommendation of the Course Coordinator, may approve or reject any application.
SECTION SIX: POSTGRADUATE DEGREE AND DIPLOMA REGULATIONS

4. Exemptions
   (1) The Faculty Board, on the recommendation of the Course Coordinator, may grant a candidate exemptions in the
   course in recognition of work completed in this University or elsewhere on such conditions as the Faculty Board may
determine.
   (2) The exemptions granted under this regulation shall not exceed 20 credit points.

5. Prerequisites, Corequisites and Assumed Knowledge
   (1) The Faculty Board, on the recommendation of the Head of Department, may prescribe prerequisites, corequisites and/or
   assumed knowledge for a subject.
   (2) Except with the approval of the Course Coordinator, a candidate may not enrol or continue enrolment in a subject
   unless he or she has attained a satisfactory result in any subject prescribed as its prerequisite, has already attained a
   satisfactory result in or is concurrently enrolled in any subject prescribed as its corequisite and has already fully attempted
   any subject prescribed as assumed knowledge.

6. Enrolment
   (1) In any year a candidate shall enrol only in those subjects which count towards completion of the requirements of the
   Diploma as are approved by the Course Coordinator.
   (2) A candidate will not be permitted to enrol in any subject which is deemed by the Course Coordinator to be
   substantially equivalent to one which the candidate has previously counted towards a degree or diploma. In such a
   case the Course Coordinator may prescribe alternative subjects of equivalent total credit point value.
   (3) A candidate may not enrol in any combination of subjects which is incompatible with the requirements of the timetable.

7. Variation of Enrolment - Including Withdrawal
   A candidate shall comply with the requirements of Regulation 9 of the Regulations Governing Bachelor Degrees in the Faculty of Engineering.

8. Discontinuance and Re-admission
   (1) A candidate who, prior to completing the requirements for the award of the Diploma, does not effectively re-enrol in each
   calendar year shall be deemed to have discontinued studies and, if re-admitted at a later date, and may be granted such
   exemptions for work previously completed in that course as are determined by the Faculty Board on the recommendation
   of the Course Coordinator.
   (2) The provisions of Regulation 3 shall apply to applicants for re-admission.

9. Time Requirement
   Except with the permission of the Faculty Board a candidate shall complete the requirements for the Diploma in not less than one
   and not more than five calendar years from the date of commencement of the course.

10. Award of the Diploma
    (1) To qualify for the award of the Diploma a candidate shall complete the requirements complying with the standards
    prescribed in the Schedule and meeting the computer competence requirement for full graduation.
    (2) The Diploma shall be awarded on conditions specified in the Schedule.

11. Exceptional Circumstances
    In order to provide for exceptional circumstances arising in a particular case, the Senate on the recommendation of the Faculty
    Board may relax any provision of these Regulations.

SCHEDULE 1 — POSTGRADUATE DIPLOMA IN COMPUTER SCIENCE

1. For the purposes of these Regulations the designated department for the Diploma shall be the Department of Electrical Engineering
   and Computer Science.

2. To be eligible for admission to candidature an applicant shall:
   (a) have satisfied the requirements for admission to a degree in the University of Newcastle; or
   (b) have satisfied the requirements for admission to a degree in another university recognised for this purpose by the Faculty
       Board; or
   (c) hold such other qualifications approved by the Faculty Board for the purpose of admission to candidature; and
   (d) have met the level of competence in computer programming required by the Faculty Board.

3. Where an applicant does not meet the computer competence requirements in 2(d) above but is otherwise eligible for admission
   to candidature, the applicant may be admitted on the condition that he or she enrols extramurally to diploma program requirements
   in such subject(s)* as are prescribed by the Course Coordinator as meeting the computer competence requirement for full
   graduation.

* The subject currently prescribed to meet computer competence requirements for full graduation to the diploma program is
  COMP102 Introduction to Programming.

SCHEDULE 2 — POSTGRADUATE DIPLOMA IN COMPUTING

1. For the purposes of these Regulations the designated department for the Diploma shall be the Department of Electrical Engineering
   and Computer Science.

2. To be eligible for admission to candidature an applicant shall:
   (a) have satisfied the requirements for admission to a degree in the University of Newcastle; or
   (b) have satisfied the requirements for admission to a degree in another university recognised for this purpose by the Faculty
       Board; or
   (c) hold such other qualifications approved by the Faculty Board for the purpose of admission to candidature.

3. Where an applicant does not meet the computer competence requirements in 2(d) above but is otherwise eligible for admission
   to candidature, the applicant may be admitted on the condition that he or she enrols extramurally to diploma program requirements
   in such subject(s)* as are prescribed by the Course Coordinator as meeting the computer competence requirement for full
   graduation.

* The subject currently prescribed to meet computer competence requirements for full graduation to the diploma program is
  COMP102 Introduction to Programming.

SECTION SIX: REGULATIONS GOVERNING MASTERS DEGREES

Regulations Governing Masters Degrees

Part I — General

1. (1) These Regulations prescribe the conditions and requirements relating to the degrees of Bachelor of Architecture, Bachelor of
   Arts, Master of Commerce, Master of Computer Science, Master of Computing, Master of Education, Master of Educational
   Studies, Master of Engineering, Master of Engineering Science, Master of Letters, Master of Mathematics, Master of Medical
   Science, Master of Psychology (Clinical), Master of Psychology (Educational), Master of Science, Master of Scientific Studies,
   Master of Special Education and Master of Surveying.

   (2) In these Regulations and the Schedules thereto, unless the context or subject matter otherwise indicates or requires:
       "Faculty Board" means the Faculty Board of the Faculty responsible for the course in which a person is enrolled or is
       proposing to enrol; and
       "program" means the program of research and study as prescribed in the Schedule; and
       "Schedule" means the Schedule of these Regulations relating to the course in which a person is enrolled or is
       proposing to enrol; and
       "thesis" means any thesis or dissertation submitted by a candidate.

2. These Regulations shall not apply to degrees conferred honoris causa.

3. A degree of Master shall be conferred in one grade only.

4. An application for admission to candidature for a degree of Master shall be made on the prescribed form and lodged with the
   Senate on the recommendation of the Faculty Board.

3.1 To be eligible for admission to candidature an applicant shall:
   (a) have satisfied the requirements for admission to a degree in the University of Newcastle as specified in the Schedule; or
   (b) have satisfied the requirements for admission to a degree or equivalent qualification, approved for the
       purpose by the Faculty Board, in another tertiary institution; or
   (c) have other qualifications and experience as may be approved by the Senate on the recommendation of
       the Faculty Board or otherwise as may be specified in the Schedule; and
   (d) have satisfied such other requirements as may be specified in the Schedule.

   Unless otherwise specified in the Schedule, applications for admission to candidature shall be considered by the Faculty Board which
   may approve or reject any application.

3. An applicant shall not be admitted to candidacy unless adequate supervision and facilities are available. Whether these are available
   shall be determined by the Faculty Board unless the Schedule otherwise provides.
CHAPTER VI — MASTER OF ENGINEERING SCIENCE

1. The Faculty of Engineering shall be responsible for the course leading to the degree of Master of Engineering Science.

2. To be eligible for admission to candidature an applicant shall:
   (a) have satisfied the requirements for admission to a four-year full-time or equivalent part-time Bachelor's degree in Engineering or Metallurgy from the University of Newcastle or any other approved university;
   (b) have satisfied the requirements for admission to a three-year full-time or equivalent part-time Bachelor's degree of the University of Newcastle or any other approved university and have completed to the satisfaction of the Faculty Board such work and examinations as determined by the Faculty Board;
   (c) in exceptional cases produce evidence of such academic and professional attainments as may be approved by the Faculty Board on the recommendation of the Head of Department in which the applicant proposes to carry out the program.

SCHEDULE 6 — MASTER OF ENGINEERING

1. The Faculty of Engineering shall be responsible for the course leading to the degree of Master of Engineering.

2. To be eligible for admission to candidature an applicant shall:
   (a) have satisfied the requirements for admission to a degree with honours in the University of Newcastle or other university approved for this purpose, by the Faculty Board in the area in which the applicant proposes to carry out the research; or
   (b) have satisfied the requirements for admission to a degree in the University of Newcastle or other university approved for this purpose, by the Faculty Board and have completed to the satisfaction of the Faculty Board such work and such examinations as determined by the Faculty Board; or
   (c) in exceptional cases produce evidence of possessing such other qualifications as may be approved by the Faculty Board on the recommendation of the Head of Department in which the candidate proposes to carry out the program.

3. To qualify for admission to the degree a candidate shall complete the satisfactory of the Faculty Board a program consisting of:
   (a) work and examinations as may be prescribed by the Faculty Board; and
   (b) a thesis embodying the results of an original investigation or design.

4. The program shall be completed:
   (a) in not less than two academic years except that, in the case of a candidate who has completed the requirements for a degree of Bachelor with honours or a qualification deemed by the Faculty Board to be equivalent or who has had previous research experience, the Faculty Board may reduce this period to not less than one academic year; and
   (b) except with the permission of the Faculty Board, not more than three years.

5. Except with the permission of the Faculty Board a candidate shall take part in research seminars within the Department in which the program is being carried out.

SCHEDULE 7 — MASTER OF ENGINEERING SCIENCE

1. The Faculty of Engineering shall be responsible for the course leading to the degree of Master of Engineering Science.

2. To be eligible for admission to candidature an applicant shall:
   (a) have satisfied the requirements for admission to a four-year full-time or equivalent part-time Bachelor's degree in Engineering or Metallurgy from the University of Newcastle or any other approved university; or
   (b) have satisfied the requirements for admission to a three-year full-time or equivalent part-time Bachelor's degree of the University of Newcastle or any other approved university and have completed to the satisfaction of the Faculty Board such work and examinations as determined by the Faculty Board; or
   (c) in exceptional cases produce evidence of such academic and professional attainments as may be approved by the Faculty Board on the recommendation of the Head of Department in which the applicant proposes to carry out the program.

SCHEDULE 6 — MASTER OF ENGINEERING

1. The Faculty of Engineering shall be responsible for the course leading to the degree of Master of Engineering.

2. To be eligible for admission to candidature an applicant shall:
   (a) have satisfied the requirements for admission to a degree with honours in the University of Newcastle or other university approved for this purpose, by the Faculty Board in the area in which the applicant proposes to carry out the research; or
   (b) have satisfied the requirements for admission to a degree in the University of Newcastle or other university approved for this purpose, by the Faculty Board and have completed to the satisfaction of the Faculty Board such work and such examinations as determined by the Faculty Board; or
   (c) in exceptional cases produce evidence of possessing such other qualifications as may be approved by the Faculty Board on the recommendation of the Head of Department in which the candidate proposes to carry out the program.

3. To qualify for admission to the degree a candidate shall complete the satisfactory of the Faculty Board a program consisting of:
   (a) work and examinations as may be prescribed by the Faculty Board; and
   (b) a thesis embodying the results of an original investigation or design.

4. The program shall be completed:
   (a) in not less than two academic years except that, in the case of a candidate who has completed the requirements for a degree of Bachelor with honours or a qualification deemed by the Faculty Board to be equivalent or who has had previous research experience, the Faculty Board may reduce this period to not less than one academic year; and
   (b) except with the permission of the Faculty Board, not more than three years.

5. Except with the permission of the Faculty Board a candidate shall take part in research seminars within the Department in which the program is being carried out.
SECTION SIX

REGULATIONS GOVERNING MASTERS DEGREES

SCHEDULE 15 — MASTER OF SURVEYING

1. The Faculty of Engineering shall be responsible for the course leading to the degree of Master of Surveying.
2. To be eligible for admission to candidature an applicant shall:
   (a) have satisfied the requirements for admission to a degree in Surveying with honours in the University of Newcastle or other university approved for this purpose by the Faculty Board;
   (b) have satisfied the requirements for admission to a degree in the University of Newcastle or another tertiary institution approved for this purpose by the Faculty Board and have completed to the satisfaction of the Faculty Board such work and such examinations as determined by the Faculty Board;
   (c) in exceptional cases produce evidence of possessing such other qualifications as may be approved by the Faculty Board.
3. To qualify for admission to the degree a candidate shall complete to the satisfaction of the Faculty Board a program consisting of:
   (a) such work and examinations as may be prescribed by the Faculty Board; and
   (b) a thesis embodying the results of an original investigation or design.
4. The program shall be completed:
   (a) in not less than two academic years except that, in the case of a candidate who has completed all the requirements for a degree of Bachelor of Science or a qualification deemed by the Faculty Board to be equivalent or who has had previous research experience, the Faculty Board may reduce this period to not less than one academic year; and
   (b) except with the permission of the Faculty Board, in not more than five years.
5. Except with the permission of the Faculty Board a candidate shall take part in research seminars within the Department of Civil Engineering and Surveying.

SCHEDULE 7 — MASTER OF COMPUTER SCIENCE

1. The Faculty of Engineering shall be responsible for the course leading to the degree of Master of Computer Science.
2. To be eligible for admission to candidature an applicant shall:
   (a) have satisfied all the requirements for admission to the degree of Bachelor of Computer Science with honours class I or class II of the University of Newcastle or to an honours degree approved for this purpose by the Faculty Board, of the University of Newcastle or any other university; or
   (b) have satisfied all the requirements for admission to a degree of the University of Newcastle or to a degree, approved for this purpose by the Faculty Board, of another tertiary institution and have completed such work and passed such examinations as the Faculty Board may have determined.

and have achieved a standard at least equivalent to that required for admission to a degree of bachelor with second class honours; or
(c) in exceptional cases produce evidence of possessing such academic or professional qualifications as may be approved by the Faculty Board on the recommendation of the Head of the Department of Electrical Engineering and Computer Science.
3. To qualify for admission to the degree a candidate shall complete to the satisfaction of the Faculty Board a program consisting of:
   (a) such work and examinations as may be prescribed by the Faculty Board; and
   (b) a thesis embodying the results of an original investigation or design.
4. Except with the permission of the Faculty Board, which shall be given only in special circumstances, a candidate shall conduct the major proportion of the investigation or design work in the University; and
5. Except with the special permission of the Faculty Board:
   (a) a full time candidate shall complete the program in not less than two and not more than three calendar years from its commencement;
   (b) a part time candidate shall complete the program in not less than three and not more than five calendar years from its commencement.

SCHEDULE 18 — MASTER OF COMPUTING

1. The Faculty of Engineering shall be responsible for the course leading to the degree of Master of Computing.
2. To be eligible for admission to candidature an applicant shall:
   (a) (i) have satisfied all the requirements for admission to the degree of Bachelor of Computer Science of the University of Newcastle or to any other degree approved for this purpose by the Faculty Board; or
   (ii) in exceptional cases produce evidence of possessing such academic or professional qualifications as may be approved by the Faculty Board on the recommendation of the Head of the Department of Electrical Engineering and Computer Science; and
   (b) complete such additional work and pass such examinations as the Faculty Board may determine.
3. (1) To qualify for admission to the degree a candidate shall pass a program of subjects approved by the Faculty Board on the recommendation of the Head of the Department of Electrical Engineering and Computer Science totalling not less than 160 credit points.
   (2) The program referred to in sub-section (1) shall contain 60 credit points comprising the examination of and report on a project specified by the candidate's supervisor or supervisors.
SECTION SIX

DOCTORAL DEGREE REGULATIONS

(b) Supervision of Candidates
   (i) appointing a supervisor or supervisors on the recommendation of the Head of the Department in which the candidate is to carry out research;
   (ii) ensuring adequate supervision of candidates;
   (iii) considering reports of candidates and supervisors to ensure that progress is satisfactory;
   (iv) terminating candidature if progress is considered unsatisfactory.

(c) Examination of Candidates
   (i) recommending to the Senate the examiners to be appointed by the Senate;
   (ii) considering, before the acceptance of the thesis for examination, the report of the supervisor certifying the fitness or otherwise of the thesis for examination and determining the course of action should the report be unfavourable;
   (iii) receiving the reports of examiners and of any subsequent reports recommending to the Senate the Committee that the degree be conferred or not conferred.

(d) Reporting to Faculty Board
   (i) informing the Faculty Board from time to time of the policies it has adopted in respect of (a), (b) and (c) above;
   (ii) noting any comments made by the Faculty Board and, where it considers it appropriate, seeking the advice of the Faculty Board on any policies adopted or envisaged.

4. Where the examiners' reports received by the Doctoral Degree Committee contain recommendations which are not unanimous, the Senate may fix the date on which the candidate is advised of the Committee's recommendation and reach a satisfactory conclusion on the continuation of the candidature as it deems fit.

5. The candidate and the supervisor shall submit to the Doctoral Degree Committee an annual report on the candidate's progress. If after considering these reports, the Committee is of the opinion that the candidate is not making satisfactory progress towards the degree then the Committee may terminate the candidature or place such conditions on the continuation of the candidature as it deems fit.

6. Not later than one year after admission to candidature the candidate shall submit a thesis which complies with the following requirements:

   SCHEDULE II — REQUIREMENTS FOR THE
   DEGREE OF DOCTOR OF PHILOSOPHY

1. An applicant for admission to candidature for the degree of Doctor of Philosophy shall
   (a) have satisfied all of the requirements for admission to the degree of Master or the degree of Bachelor with first or second class honours as approved by the Senate; or
   (b) have satisfied all of the requirements for admission to the degree of Bachelor with third class honours or the ordinary degree of Bachelor in the University of Newcastle or a degree from another university approved by the Senate for this purpose by the Doctoral Degree Committee; or
   (c) have satisfied all the requirements for admission to the degree of Bachelor with third class honours or the ordinary degree of Bachelor in the University of Newcastle or a degree from another university approved for this purpose by the Doctoral Degree Committee, and have achieved by subsequent work and study a standard recognised by the Doctoral Degree Committee as equivalent to at least second class honours; or
   (d) in exceptional cases submit such other evidence of general and professional qualifications as may be approved by the Senate.

2. Before approving an admission to candidature the Doctoral Degree Committee shall be satisfied that the candidate can devote sufficient time to advanced study and research; and
   (a) the thesis shall contain an abstract of approximately 300 words describing its content;
   (b) the thesis shall be typed and bound in a manner prescribed by the University;
   (c) four copies of the thesis shall be submitted together with:
      (i) if the candidate so desires, any documents or work published by the candidate whether bearing on the subject of the thesis or not; and
      (ii) a report from the supervisor advising that the candidate has completed the prescribed program and certifying that the thesis is of sufficient academic merit to warrant examination provided that if the supervisor is unwilling to give such a certificate the candidate may nevertheless request that the thesis be accepted for examination.

10. The University shall be entitled to retain the submitted copies of the thesis, accompanying documents and published work. The University shall be free to allow the thesis to be consulted or borrowed. Subject to the provisions of the Copyright Act (1968) the University may issue the thesis in whole or in part in photostat or microfilm or other copying medium.

11. On the recommendation of the Doctoral Degree Committee the Senate shall appoint three examiners of whom at least two shall not be members of the staff of the University.

12. The candidate may be required by the Doctoral Degree Committee to undertake further oral, written or practical examinations concerning the subject of the thesis or work.

13. A candidate permitted by the Doctoral Degree Committee to resubmit a thesis for examination shall do so within one year from the date on which the candidate is advised of the result of the first examination.

14. In exceptional circumstances arising in a particular case the Senate on the recommendation of the Doctoral Degree Committee may relax any requirement of this Schedule.
POSTGRADUATE COURSEWORK PROGRAMS

About This Section
This section contains the course programs which have been approved by Faculty Board in accordance with the Regulations Governing Postgraduate Diplomas in the Faculty of Engineering and the Master of Computing and Master of Engineering Science programs. Enquiries may be directed to the Faculty Secretary or the Course Coordinator indicated in the course entry concerned.

Diploma in Computer Science
Designated Department: Electrical Engineering and Computer Science
Course Coordinator: Mr F.A. Henskens
The postgraduate DipCompSc program assumes a competence in Pascal programming. Completion of Computer Science I or Introduction to Programming (IP) prior to 1990 or completion of COMP101 Computer Science I or COMP102 Introduction to Programming meets this requirement. Other evidence of programming competence will be considered by the Course Coordinator. Students currently enrolled in bachelor degree programs who intend to enrol in the DipCompSc should, if possible, include either COMP101 or COMP102 in their degree program or take COMP102 as an extraneous subject. Graduates who do not meet the assumed level of programming competence may wish to complete COMP102 as a non-degree student prior to applying for admission or, alternatively, applicants may be granted admission to the Diploma program on condition that they complete COMP102 as an extraneous subject.

While 80 credit points is normally considered a full workload for a single year of a course, the requirements of the DipCompSc are usually met by part-time study. Students with a strong background in computing may choose to complete in a single year but in such cases subject selection will be restricted by prerequisite requirements.

Subject prerequisites are, however, prescribed mainly in relation to the BCompSc program. The prescribed prerequisites may therefore be waived for DipCompSc students with an appropriate background. Enquiries regarding waiver of prerequisites should be directed to the Course Coordinator.

While 80 credit points is normally considered a full workload for 1990 but did not complete the Project must include COMP199 in their program as a List A subject.

LIST B SUBJECTS

Subject Credit Points
COMP301 Compiler Design 10
COMP302 Artificial Intelligence 10
COMP303 Computer Networks 10
COMP304 Database Design 10
COMP305 Design and Analysis of Algorithms 10
COMP306 Computer Graphics 10
COMP307 Operating Systems 10
MNST511 Management Information Systems 10

Diploma in Computing
Designated Department: Electrical Engineering and Computer Science
Course Coordinator: Mr F.A. Henskens
The DipComp program assumes a competence in Pascal programming. Previous completion of Computer Science I or Introduction to Programming (IP) prior to 1990 or completion of COMP101 Computer Science I or COMP102 Introduction to Programming meets this requirement. Other evidence of programming competence will be considered by the Course Coordinator. Students currently enrolled in bachelor degree programs who intend to enrol in the DipCompSc should, if possible, include either COMP101 or COMP102 in their degree program or take COMP102 as an extraneous subject. Graduates who do not meet the assumed level of programming competence may wish to complete COMP102 as a non-degree student prior to applying for admission or, alternatively, applicants may be granted admission to the Diploma program on condition that they complete COMP102 as an extraneous subject.

While 80 credit points is normally considered a full workload for a single year of a course, it might not be possible to complete the requirements of the DipComp course program in a single year of attendance because of subject prerequisite requirements.

Subject prerequisites are, however, prescribed mainly in relation to the BCompSc program. The prescribed prerequisites may therefore be waived for DipComp students with an appropriate background. Enquiries regarding waiver of prerequisites should be directed to the Course Coordinator.

LIST A SUBJECTS

Subject Credit Points
MATH211 Linear Algebra 1 5
MATH215 Linear Programming 5
MATH216 Numerical Analysis 5
MNST309 Commercial Programming 10
MNST505 Computing and Information Systems 10
MNST512 Systems Analysis 10
MNST513 Systems Design 10
PHIL242 Basic Symbolic Logic 5
STAT203 Queues and Simulation 5

LIST B SUBJECTS

Subject Credit Points
COMP201 Advanced Data Structures 5
COMP202 Computer Architecture 5
COMP203 Assembly Language 5
COMP204 Programming Language Semantics 5
COMP205 Programming in C 5
COMP206 Theory of Computation 5
COMP299 Project 5
MATH217 Linear Algebra 1 5

Subject Credit Points
COMP301 Compiler Design 10
COMP302 Artificial Intelligence 10
COMP303 Computer Networks 10
COMP304 Database Design 10
COMP305 Design and Analysis of Algorithms 10
COMP306 Computer Graphics 10
COMP307 Operating Systems 10
MNST511 Management Information Systems 10

Approved Diploma in Computing Subjects

Subject Credit Points
COMP201 Advanced Data Structures 5
COMP202 Computer Architecture 5
COMP203 Assembly Language 5
COMP204 Programming Language Semantics 5
COMP205 Programming in C 5
COMP206 Theory of Computation 5
COMP301 Compiler Design 5
COMP302 Artificial Intelligence 5
COMP303 Computer Networks 5
COMP304 Database Design 5
COMP305 Design and Analysis of Algorithms 5
COMP306 Computer Graphics 5
COMP397 Software Engineering Principles 5
COMP398 Operating Systems 5
MATH217 Linear Algebra 1 5
MATH218 Discrete Mathematics 5
MATH219 Linear Programming 5
MATH220 Numerical Analysis 5
MNST299 Commercial Programming 5
MNST393 Computing and Information Systems 5
MNST395 Management Information Systems 5
MNST396 Systems Analysis 5
MNST397 Systems Design 5
STAT203 Queues and Simulation 5
PHIL242 Basic Symbolic Logic 5

Diploma in Surveying
Designated Department: Department of Civil Engineering and Surveying
Course Coordinator: Associate Professor J.G. Fryer
The Postgraduate Diploma in Surveying is designed to broaden and further the education of the practicing surveyor, particularly in the light of recent technological changes which have significantly altered the role and operational techniques of professional surveyors.

While a full workload for a single year of a course is normally considered to be 80 credit points, it might not be possible to complete the requirements of the Diploma course program in a single year of attendance because of subject prerequisite requirements. Subject prerequisites are, however, prescribed mainly in relation to the BSurv program. The prescribed prerequisites may therefore be waived for Diploma students with an appropriate background. Enquiries regarding waiver of prerequisites should be directed to the Course Coordinator.
Approved Diploma in Surveying Subjects

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECNO101 Economics 1</td>
<td>20</td>
</tr>
<tr>
<td>ECNO371 Principles of Economics</td>
<td>10</td>
</tr>
<tr>
<td>GISG101 Introduction to Physical Geography</td>
<td>10</td>
</tr>
<tr>
<td>GISG102 Introduction to Human Geography</td>
<td>10</td>
</tr>
<tr>
<td>LAW 291 Legal Process</td>
<td>5</td>
</tr>
<tr>
<td>LAW 292 Property and Survey Law</td>
<td>5</td>
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<tr>
<td>SURV316 Hydrographic Surveying</td>
<td>5</td>
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<tr>
<td>SURV334 Error Theory</td>
<td>5</td>
</tr>
<tr>
<td>SURV361 Photogrammetry 1</td>
<td>10</td>
</tr>
<tr>
<td>CIVIL352 Management</td>
<td>5</td>
</tr>
<tr>
<td>SURV351 Geodesy 1</td>
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<td>SURV362 Remote Sensing</td>
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<td>SURV393 Land Boundary Definition</td>
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<td>SURV417 Industrial and Other Surveying</td>
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<td>SURV418 Control Networks</td>
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<td>SURV441 Astronomy</td>
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<tr>
<td>SURV452 Geodesy 2</td>
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<tr>
<td>SURV462 Photogrammetry 2</td>
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<td>SURV463 Advanced Cartography</td>
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<tr>
<td>SURV472 Land Valuation</td>
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<td>SURV473 Town Planning</td>
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<tr>
<td>SURV481 Project</td>
<td>15</td>
</tr>
</tbody>
</table>

* A ten day live-in Survey Camp is included as part of SURV393.

Master of Engineering Science

The Master of Engineering Science (MEngSc) program is a postgraduate coursework degree program. The course program requires completion of a total of 80 credit points of which at 30, 35 or 40 credit points must be advanced project work.

Approved Master of Computing Subjects

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Credit Points</th>
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</thead>
<tbody>
<tr>
<td>COMP501 Compiler Design</td>
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<tr>
<td>COMP502 Artificial Intelligence</td>
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<tr>
<td>COMP503 Computer Networks</td>
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<tr>
<td>COMP504 Database Design</td>
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<tr>
<td>COMP505 Design and Analysis of Algorithms</td>
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<tr>
<td>COMP506 Computer Graphics</td>
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<tr>
<td>COMP507 Software Engineering Principles</td>
<td>10</td>
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<td>COMP508 Operating Systems</td>
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<tr>
<td>COMP401 Advanced Artificial Intelligence</td>
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<tr>
<td>COMP402 Formal Semantics of Programming</td>
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<tr>
<td>COMP403 Advanced Computer Architecture</td>
<td>10</td>
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<tr>
<td>COMP404 Parallel Computation and VLSI</td>
<td>10</td>
</tr>
<tr>
<td>COMP405 Digital Image Processing</td>
<td>10</td>
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<tr>
<td>COMP406 Advanced Operating Systems</td>
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<tr>
<td>COMP408 Natural Language Processing</td>
<td>10</td>
</tr>
<tr>
<td>COMP409 Advanced Computer Design</td>
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<tr>
<td>COMP410 Advanced Computer Networks</td>
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<tr>
<td>COMP411 Special Topic A</td>
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<tr>
<td>COMP412 Special Topic B</td>
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<td>COMP413 Special Topic C</td>
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<td>COMP415 Special Topic E</td>
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<td>COMP501 Master of Computing Project Part A *</td>
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<tr>
<td>COMP502 Master of Computing Project Part B *</td>
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<tr>
<td>COMP503 Master of Computing Project *</td>
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</tbody>
</table>

* Either COMP501 or both COMP501 and COMP502 must be completed.

General Information

Principal Dates 1991

(See separate entry for Faculty of Medicine)

January
1 Tuesday Public Holiday — New Year's Day
4 Friday Last day for return of Enrolment Application Forms — Continuing Students
8 Monday New student enrolment and Re-enrolment
12 Tuesday Anti-discrimination Week
14 Thursday February — Labour Day
15 Friday 2nd Semester begins
20 Monday Australia Day
23 Tuesday Mid-semester recess begins
24 Wednesday Extension of blocks
29 Monday Mid-semester recess ends
30 Friday 1st Semester concludes

February
1 Monday Orientation seminar
3 Tuesday Identities and financial loans
7 Monday Viva-voce examinations
11 Friday Early closing
14 Monday Mid-semester recess begins
18 Friday Early closing
21 Monday Mid-semester recess ends
22 Tuesday Examinations begin
25 Friday Examination period
26 Saturday Final examination period
29 Monday Examination period concludes
5 Tuesday Mid-semester recess begins
8 Friday Early closing
12 Monday Mid-semester recess ends
13 Tuesday Examinations begin
16 Friday Mid-semester recess concludes
19 Monday Mid-semester recess ends
26 Saturday Mid-semester recess concludes
27 Sunday Mid-semester recess concludes
30 Tuesday Mid-semester recess concludes
31 Wednesday Mid-semester recess concludes

March
1 Monday Easter Monday
14 Monday ANZAC Day
28 Monday Mid-semester recess begins
31 Wednesday Examinations conclude

April
1 Monday Mid-semester recess ends
3 Wednesday Extension of blocks
7 Monday Mid-semester recess completes
10 Tuesday Mid-semester recess begins
13 Friday Mid-semester recess concludes
15 Monday Mid-semester recess begins
18 Friday Mid-semester recess concludes
21 Monday Mid-semester recess begins
25 Tuesday Mid-semester recess concludes
28 Monday Mid-semester recess begins
30 Tuesday Mid-semester recess concludes
31 Wednesday Mid-semester recess concludes

May
1 Monday Mid-semester recess ends
4 Thursday Extension of blocks
7 Monday Mid-semester recess completes
11 Tuesday Mid-semester recess begins
14 Friday Mid-semester recess concludes
17 Monday Mid-semester recess begins
20 Friday Mid-semester recess concludes
23 Monday Mid-semester recess begins
27 Wednesday Mid-semester recess concludes
28 Thursday Extension of blocks
31 Sunday Mid-semester recess concludes

June
1 Monday Mid-semester recess ends
3 Wednesday Extension of blocks
6 Monday Mid-semester recess completes
9 Tuesday Mid-semester recess begins
12 Friday Mid-semester recess concludes
15 Monday Mid-semester recess begins
18 Friday Mid-semester recess concludes
22 Monday Mid-semester recess begins
25 Friday Mid-semester recess concludes
28 Monday Mid-semester recess begins
30 Wednesday Mid-semester recess concludes
31 Friday Mid-semester recess concludes

July
1 Monday Mid-semester recess ends
4 Thursday Extension of blocks
7 Monday Mid-semester recess completes
10 Tuesday Mid-semester recess begins
13 Friday Mid-semester recess concludes
16 Monday Mid-semester recess begins
19 Friday Mid-semester recess concludes
23 Monday Mid-semester recess begins
26 Friday Mid-semester recess concludes
29 Monday Mid-semester recess begins
31 Wednesday Mid-semester recess concludes

August
1 Monday Mid-semester recess ends
4 Thursday Extension of blocks
7 Monday Mid-semester recess completes
10 Tuesday Mid-semester recess begins
13 Friday Mid-semester recess concludes
16 Monday Mid-semester recess begins
19 Friday Mid-semester recess concludes
23 Monday Mid-semester recess begins
26 Friday Mid-semester recess concludes
29 Monday Mid-semester recess begins
31 Wednesday Mid-semester recess concludes

NOTE: Semester One consists of Block One (10 weeks) and 7 weeks of Block Two. Semester Two consists of the remaining 3 weeks of Block Two and all of Block Three (10 weeks).

* Date yet to be finalized
The Newcastle Conservatorium of Music Library

This library is located on the second floor of the old section of the Newcastle Conservatorium of Music, corner of Gibson and Auckland Streets. Limited on-street parking is available. Off-street parking is available in the King Street Council Car Park, and Conservatorium students may obtain parking concessions from the Information Centre, Shortland Union Building.

**Borrowing Rights**

Students and staff of the Conservatorium of Music can borrow from its Library. This includes full-time and part-time Music Education students. They are entitled to have three books for one week and seven access for a term. Music recordings are not available for loan. However, compact disc, record and cassette players are available for use within the Library. Access to the collection by other categories of users can be arranged by contacting the Librarian on 29 4133.

Limited facilities for disabled persons can be arranged if prior arrangements are made.

**Hours of Opening**

- Monday to Friday: 9.00am to 1.00pm, 2.00pm to 5.00pm
- Closed for four weeks over Christmas/New Year vacation period.

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**SUBJECT DESCRIPTIONS**

**About This Section**

This section contains descriptions of the content of the subjects offered by the departments of the Faculty of Engineering together with subjects offered by departments of other faculties which are included in the course programs set out in Sections 5 and 7.

**Guide to Subject Descriptions**

**Credit Point Value**

The course programs offered within the University from 1990 require full-time students completing course requirements in minimum time to undertake an annual workload of 80 credit points. The credit point value of a subject thus indicates the workload of a subject as a proportion of normal annual full-time program. Similarly, the credit point value of a subject indicates the proportion of the annual HECS liability which arises from enrolment in that subject. Further information on the meaning of credit points is given in the General Course Rules and Information in Section 4.

The credit point value (cp) of each subject is indicated in each subject description.

**Subject Codes**

Each subject has been given a unique code (eg CIVL111). This code identifies the subject within the University's computer system and should be entered on each form dealing with subjects. The alpha section of the code indicates the department responsible for offering the subject. The first number in the code indicates the level at which the subject is offered (ie. 100, 200, 300, 400 etc.) and, in the Faculty of Engineering, also indicates the WAM weighting of the subject. The latter two numbers usually indicate the sequence of a subject in a stream of subjects or within a course.

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**SECTION EIGHT**

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<thead>
<tr>
<th>Code</th>
<th>Department</th>
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<td>CHEM</td>
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<tr>
<td>SURV</td>
<td>Civil Engineering</td>
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</table>

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Chemical Engineering Subjects

CHEE111 INDUSTRIAL PROCESS PRINCIPLES 5cp

Text
Wall, T.F. Industrial Process Principles Notes (Department of Chemical Engineering)

CHEE112 INTRODUCTION TO CHEMICAL 10cp ENGINEERING

Text
Coulson, J.M. & Richardson, J.P. Chemical Engineering Vol. 1 St edn (Pergamon 1977) Introduction to Chemical Engineering Notes (Department of Chemical Engineering)

CHEE113 CHEMICAL AND MANUFACTURING 10cp PROCESSES
An introduction to the structure and organisation of the chemical and process metallurgical industries in Australia, with reference to the world scene. Descriptions of processes used in the manufacture of the major industrial chemicals, including hydrometallurgical and smelting operations. Outline of typical unit operations. Description of various processes used in the fabrication and utilisation of materials. Visits to a number of industrial plants illustrative of the course material, and preparation of process flow diagrams, to Australian Standards requirements.

Text

CHEE191 INDUSTRIAL EXPERIENCE 5cp
CHEE192 INDUSTRIAL EXPERIENCE 5cp
CHEE193 INDUSTRIAL EXPERIENCE 5cp
CHEE194 INDUSTRIAL EXPERIENCE 5cp

These subjects are designed to formalise periods of Industrial Experience gained by part-time students. Only one such subject may be taken in any one year. Students will be required to present a report giving a connected account and critical evaluation of their engineering activities and experience during the year. Industrial Experience subjects may be taken by part-time students.
Heat and Mass Transfer: Section CHEE264 Transfer Principles 2


CHEE281 LABORATORY 1

A set of experiments illustrating the fundamentals of fluid flow, heat and mass transfer. Plant visits and report writing on elements of unit operation encountered.

Text
Holman, J.P.

CHEE282 LABORATORY 2

A set of experiments illustrating the fundamentals of fluid flow, heat and mass transfer. Plant visits and report writing on elements of unit operation encountered.

Text
Holman, J.P.

CHEE301 SELECTED TOPIC IN CHEMICAL ENGINEERING

A topic in Chemical Engineering to be approved by the Head of Department.

CHEE321 MODELLING OF PROCESSES

An introduction to mathematical modelling and the unsteady-state behaviour of chemical plant and processes. Revision of Laplace transformations, transfer function concept, unsteady state material and energy balances as a technique for system modelling. First order systems, second order systems; response to disturbances-modelling of selected processes; response of existing elements. Introduction to the principles of process control.

Text
Stephanopoulos, G.
Chemical Process Control (Prentice-Hall 1984)

CHEE332 THERMODYNAMICS


CHEE334 SAFETY AND ENVIRONMENT

General introduction to the inherent hazards of the materials and processes relevant to the chemical industry. Elements of hazard analysis and optimization. Aspects of industrial toxicology. Sources, types and effects of explosions. Legal, environmental and ecological considerations in the disposal of industrial wastes. Waste disposal and pollution control; treatment and disposal of solid, liquid and gaseous effluents; recycle possibilities; statutory requirements and environmental regulations; E.L.S. assessment.

CHEE335 ELECTROCHEMISTRY AND CORROSION


CHEE332 TRANSPORT PHENOMENA


CHEE341 PROJECT ENGINEERING AND MANAGEMENT

Project Engineering: The technical and administrative aspects leading to the successful commissioning of a chemical plant, including site and process selection, contracting, construction and commissioning. Network analysis. Process and storage vessels, pumps and pipelines. Plant utilities, including compressed air, cooling water, steam and refrigeration. Process energy systems and drives, including fuels, electricity supply and electrical drive systems. Process instrumentation, concepts and hardware. Management Principles: Management structure, industrial relations, legal and sociological considerations. Estimation of capital and operating costs for process plants, break-even analysis, project profitability, discounting techniques, economic evaluation of alternatives, risk analysis. Basic procedures for cost accounting, budgeting, purchasing and inventory control. Site inspections of appropriate industries.

Text
Peters, M.S. & Timmerhaus, K.D.

CHEE357 FUEL TECHNOLOGY

The properties of gaseous, liquid and solid fuels including their analysis. Combustion mechanisms, including air requirements, mixing and ignition in burners. Coal combustion in suspension and in beds.

CHEE358 PROCESS METALLURGY


CHEE365 INTRODUCTION TO MINERAL PROCESSING


CHEE372 SEPARATION PROCESSES

Physical property criteria for separation process selection. Phase equilibria; equilibrium stage and continuous contacting operations; analysis of principal separation processes, including distillation, absorption, extraction, evaporation, humidification, crystallization and drying, hydraulic design of mass transfer equipment; stage efficiency, energy requirements; analysis of multi-component separation processes including azeotropic, extracotive and complex distillation.

Text
McCabe, W.L., and Smith, J.C.
Unit Operations of Chemical Engineering (McGraw-Hill 1985)

CHEE381 ENGINEERING APPLICATION LABORATORY

In addition to formal lecture courses, students undertake relevant practical exercises involving, for example, assembly, installation and operation of equipment. Students will acquire a good level of understanding and experience in the implementation of appropriate safe working practices.

CHEE382 LABORATORY 3

A number of open-ended investigations illustrating Year III lecture topics, including experiments on instrumentation and control of process plant.

CHEE383 LABORATORY 4

A number of open-ended investigations illustrating Year III lecture topics, including experiments on instrumentation and control of process plant.

CHEE401 SPECIAL TOPIC

A topic in Chemical Engineering to be approved by the Head of Department.

CHEE421 PROCESS CONTROL AND INSTRUMENTATION


Text
Stephenopoulos, G.
Chemical Process Control (Prentice-Hall 1984)
CHEE432 KINETICS AND REACTION ENGINEERING 10cp

Text
Levenspiel, O. Chemical Reaction Engineering 2nd edn (Wiley 1972)

CHEE451 SURFACE CHEMISTRY 2 5cp
Selected topics in surface chemistry relevant to chemical engineering and mineral processing.

CHEE452 MINERAL PROCESSES 2 5cp
A treatment of unit operations of mineral processing.

CHEE453 PROCESS OPTIMIZATION 5cp
Introduction to stochastic processes and their simulation. Analytical and numerical techniques for optimization with single and multiple variable problems. Development of simple flow sheets, process synthesis, to emphasize optimization possibilities or alternatives.

Text

CHEE454 FUEL TECHNOLOGY 2 5cp

CHEE455 HEAT TRANSFER 5cp
Analytical solutions and numerical methods in conduction, convection and thermal radiation, with detailed examinations of selected applications.

CHEE456 PROCESS METALLURGY 2 5cp
Chemistry of extraction, metal extractant chemistry, interphase mass transfer, dispersion and coalescence. Computational techniques, industrial extraction equipment and costs, mixer-settlers, columns, bucket, C machines, heap leaching, biological extraction. Industrial processes.

CHEE491 SEMINAR 5cp
Regular seminar sessions will be held during the semester for discussions of literature reviews, chemical engineering practice and research within the department. Each student will present no less than two half hour papers in the course of the semester.

CHEE495 DESIGN PROJECT 20cp
Preparation of a design report for a specified plant for chemical production, including mass and energy balances, preparation of process flow diagrams, and the detailed design of one or more items of equipment, or equivalent. In addition to the reports students are required to take a design paper.

CHEE496 ADVANCED DESIGN PROJECT 10cp
A major extension to CHEE 495 Design Project.

CHEE497 RESEARCH PROJECT 20cp
An experimental or theoretical investigation, or the design, construction and testing of experimental equipment to be reported formally in a project report.

CHEE498 ADVANCED RESEARCH PROJECT 10cp
A major extension to CHEE 497 Research Project.

CHEE511 COAL COMBUSTION 10cp
The course will cover the current understanding of the principles of coal combustion, including some properties and classification, combustion calculations, devolatilization, ignition, burn-out of char. Emphasis will be given to coal mineral reactions in furnaces and the relationship with ash formation, deposition, ash collection, SOx emission, and trace elements; the relationship between nitrogen and NOx emissions; spontaneous combustion. These principles will finally be used to evaluate the present laboratory techniques for characterising coal.

CHEE512 COAL TECHNOLOGY 10cp
The course will cover the existing technologies associated with coal use, particularly those for coal fired plant. Topics covered include: an introduction to coal geology and mining, coal transport, handling and storage; pulverizing mills; boilers and furnaces; slagging, fouling, erosion; corrosion; ash collection, NOx and SOx; ash handling. An outline of developing firing techniques such as studded firing, fluidized beds and clean up for gases and solids will also be given.

CHEE513 FURNACE TECHNOLOGY 10cp
Furnace construction and refractories. Heat balances and efficiency. The importance of convection and radiative transfer. The treatment of radiation in furnaces, emitters in coal fired systems and those in minerals and the thermal conductivity or ash layers. The use of the well-mixed furnace model in quantifying the effects of fuel changes (from oil to gas and coal) and operational changes. An introduction to the zone method of analysis. Flames and jets, entrainment and mixing, swirling jets. The modelling of flame processes and furnace heat transfer.

SECTION EIGHT

CHEMISTRY SUBJECT DESCRIPTIONS

CHEM101 CHEMISTRY 101 10cp
Students who have not studied Chemistry previously are strongly advised to read the first six chapters in the main text (Brown and LeMay) before the commencement of the academic year.

General Chemistry: (approx. 12 lectures) Revision of basic chemical principles. Introduction to atomic and molecular concepts. Simple ionic and covalent bonding models.

Organic Chemistry: (approx. 24 lectures) Historical development. The shapes, structures and names of organic compounds; reactions of common functional groups; synthesis, differentiation and structural elucidation of organic compounds. Applications of organic chemistry.

Note: Laboratory work will count for 15% of the final assessment but a pass in laboratory work is a prerequisite to a pass in the subject. See Faculty of Science and Mathematics Handbook for further information.

Texts

CHEM102 CHEMISTRY 102 10cp
Inorganic Chemistry: (approx. 12 lectures) Inorganic solids and their structures. Simple molecular orbital theory and bonding in metals. Transition metal chemistry, coordination compounds.

Physical Chemistry: (approx. 24 lectures) Chemical equilibria, thermodynamics, electrochemistry, chemical kinetics.

Note: Laboratory work will count for 10% of the final assessment but a pass in laboratory work is a prerequisite to a pass in the subject. See Faculty of Science and Mathematics Handbook for further information.

Texts

CHEM241 PHYSICAL CHEMISTRY 10cp
Chemical Dynamics: Rate laws of chemical kinetics; principles of mechanism; determinations; transition state theory; electrolyte activity; thermodynamics of galvanic cells.

Surface Chemistry: Definition; binding in crystals; condensation coefficient; sticking probability; adsorption isotherms; Langmuir model; types of isotherms; determination of surface area of adsorbents (BET); applications of adsorptions.
CIVIL ENGINEERING SUBJECT DESCRIPTIONS

CIVIL10 DYNAMICS AND STABILITY OF STRUCTURES 5cp

CIVIL18 THEORY OF STRUCTURES 3 5cp
Plastic analysis of frames. Lower bound design, main code requirements, plastic stability. Yield line analysis of slabs, strip method of design, flat slab systems. Retaining walls. Basic design of prestressed concrete structures.

CIVIL19 MASONRY AND TIMBER DESIGN 5cp
The properties and behaviour of masonry and its components. The design of masonry structures including recent developments in high mass construction. The properties and behaviour of timber. The design of timber structures.

CIVIL28 GEOTECHNICAL ENGINEERING 5cp
Site investigation, design of shallow foundations, piled foundations, soil improvement, design of embankments, cuttings, earth dams, buried pipes.

CIVIL29 ROCK MECHANICS 5cp
Index properties and classification, rock strength and failure criteria, deformation of rocks, in situ stresses, planes of weakness, foundations on rock, underground openings, rock slopes.

CIVIL35 RIVER AND COASTAL ENGINEERING 5cp

CIVIL43 WATER RESOURCES ENGINEERING 5cp
This course considers several areas of applied water resources engineering emphasizing synthesis of basic principles and design. Urban drainage: layout and design, runoff routing, retaining basins. Flood management: mitigation schemes. Water supply systems: objectives, economics, stochastic behaviour, design, operation, modelling.

CIVIL45 CIVIL ENGINEERING DESIGN 1 15cp
Examples of Civil Engineering design in steel and concrete structures, geomechanics and water resource systems. Visits to works of interest. Interaction with other professions, regulatory authorities and practising engineers.

CIVIL454 CIVIL ENGINEERING DESIGN 2 15cp
Further examples as per CIVIL453.

CIVIL455 PROJECT 15cp
Literature review, analytical and/or experimental investigation of one or more civil engineering design problems. Presentation of seminar.

CIVIL472 HIGHWAY ENGINEERING 5cp
Structure of road pavements; failure modes; pavement design methods. Material requirements, strength, strain at failure, fatigue, skid resistance. Testing of materials, subgrade, granular and stabilized bases, bituminous materials.

Tests
- Lay, M.G.
- Source Book for Australian Roads (Australian Road Research Board)
- NAASRA Guide to the Structural Design of Road Pavements

CIVIL491 SPECIAL TOPIC 5cp
A contemporary topic in civil engineering approved by the Head of Department.

CIVIL492 SPECIAL TOPIC 5cp
A contemporary topic in civil engineering approved by the Head of Department.

COMM101 FINANCIAL ACCOUNTING FUNDAMENTALS 10cp
Entry to this subject is restricted to students meeting the entry requirements for the BComm degree program.

Analysis of the accounting function within the business environment. The development of a conceptual framework of accounting with respect to the preparation of conventional financial reports. Examination of the predominant forms of business organisation (sole traders, partnerships and companies), the relative advantages and disadvantages of each form of business organisation and the primary conventional accounting methods applied to record the financial consequences of business operations.

COMM102 FINANCIAL MANAGEMENT FUNDAMENTALS 10cp
Development of basic management accounting techniques to provide data primarily for internal financial assessments by management, including: allocation of overheads, product costing, budgeting, cost-volume-profit analysis, differential analysis and various capital investment models. Introduction to the Australian capital market, and analysis and interpretation of financial statements. These are developed in relation to the operating, investment and financing decisions of a business entity.

Additional Commerce subjects are described in the Faculty of Economics and Commerce Handbook.

COMPS101 COMPUTER SCIENCE 1 20cp
Entry to this subject by students other than those enrolled in the BCompSc, BE(Computer Engineering) and BInfSc degree programs is limited by quota. See the Faculty Secretary for details.

Introduction to the following aspects of computer science: The design of algorithms. The theory of algorithms. How algorithms are executed as programs by a computer. The functions of system software (compilers and operating systems). Applications of computers. Social issues raised by computers. An extensive introduction to programming Pascal and a functional programming language.

COMPS102 INTRODUCTION TO PROGRAMMING 5cp
This subject is not available to students enrolled in computer science degree or diploma courses. Completion of this subject meets the programming competence requirement for admission to the postgraduate DipCompSc and DipComp programs.

An introduction to structured programming and the design of algorithms using the high level language Pascal. The formal definition of high level languages and basic data structures will also be introduced.

COMPS201 ADVANCED DATA STRUCTURES 5cp
Basic data structures are investigated. Topics covered will include a review of elementary data structures, an introduction to the concept of an abstract data type and the abstraction and implementation of data types selected from lists, stacks, queues, trees, graphs and sets.

COMPS202 COMPUTER ARCHITECTURE 5cp
Provides basic introduction to the logical internal structure of computers and the implementation of computer arithmetic and number handling systems.

COMPS203 ASSEMBLY LANGUAGE 5cp
The course is divided into two sections. The first section provides an introduction to computer organisation and assembly language programming. Topics covered include data representation, computer structures, registers, addressing modes, instruction sets, subroutines and the use of stacks. The second section of the course is an introduction to operating system principles. Topics covered include process management synchronization and resource allocation.

COMPS204 PROGRAMMING LANGUAGE SEMANTICS 5cp
Examination of the major concepts which underlie modern programming languages. A variety of programming styles will be compared, including imperative, object-oriented, functional, and logic programming. Representative languages will be introduced to illustrate the concepts behind each style. Programming design issues such as data encapsulation, information hiding, and inheritance will also be studied. Languages
COMPG01 ADVANCED COMPUTER DESIGN 10cp
In addition to lectures, students will complete a major 3-phase project. Symbol Table Structures for block structured languages, and special features such as Importing and Exporting. Run-time structures for block structured languages and Abstract Data Types. Code Generation to assembly language, machine independent and machine dependent optimisation.

COMPG02 ADVANCED COMPUTER NETWORKS 10cp
An investigation of the latest developments in computer network design. Topics include: virtual memory, networks, process migration, remote procedure call, memory coherence algorithms, system stability and data security.

COMPG11 SPECIAL TOPIC A 10cp
COMPG12 SPECIAL TOPIC B 10cp
COMPG13 SPECIAL TOPIC C 10cp
COMPG14 SPECIAL TOPIC D 10cp
Each of these subjects consists of a series of lectures and/or practical work in an area of advanced computer science of contemporary interest. The content of a particular subject may vary from year to year according to developments in technology and the presence of academic visitors.

COMPG25 HONOURS PROJECT 20cp
A substantial practical project involving approximately 400 hours of work which normally commences in early February. Project topics are subject to the approval of the Course Coordinator in Computer Science. The results of the project may be embodied in a thesis and submitted by the due date.

COMPG35 SPECIAL TOPIC E 20cp
A series of lectures and/practical work in an area of advanced computer science of contemporary interest. The content may vary from year to year according to developments in technology and the presence of academic visitors.

COMPG51 MASTER OF COMPUTING PROJECT PART A 30cp
This subject is available for students enrolled in the MComp degree program who are permitted by the Course Coordinator in Computer Science to meet the project requirements of that program, normally taken as COMP403 and/or COMP503, over two years. Project topics are subject to the approval of the Course Coordinator in Computer Science. It is expected that 500 hours of work will be completed in COMP501. Satisfactory completion of this work will lead to the award of a result of 'Passed', and enable the student to proceed to complete the subject by undertaking COMP502.

COMPG52 MASTER OF COMPUTING PROJECT PART B 30cp
This subject enables completion of the major project requirement of the MComp program commenced in COMP501. The results of the project must be embodied in a thesis and submitted by the due date. The result in this subject will indicate the overall standard of the project.
Economics Subjects

ECON101 ECONOMICS 1 20cp

The course is designed to introduce the student to the principles of economics. While emphasis through the course is on the theoretical underpinnings of economics the concepts afford significant insights into contemporary problems. The theoretical concepts developed will be used to address contemporary issues and problems. The first semester will examine the principles of Microeconomics and their applications. Microeconomics is concerned with the rules of rationality for decisions made by individuals who wish to maximise their wellbeing, and the impact these decisions have upon the allocation of resources throughout an economy or society. Emphasis will be placed on contrasting theoretical conclusions with real-world grants. The second semester is concerned with Macroeconomics. It will involve a study of the relationship between aggregates such as consumption, investment, employment, exchange rates, inflation and growth. Basic theoretical analysis will be used to explain policy alternatives and some of the problems involved in making appropriate policy decisions. The course will include a discussion of areas of theoretical controversy and provide some explanation as to why economists can sometimes provide “solutions” to the same problem.

Text

ECON371 PRINCIPLES OF ECONOMICS 10cp

An introduction to the fundamental theorems and principles of modern economic thought and their application to the real world problems arising in the context of regional and urban planning. Micro- and macro-economic principles will be introduced as required. Major problems to be examined: backward and underdeveloped regions, unemployment, labour-migration policies for balanced regional growth, urban growth, sprawl, slum development, poverty and crime, traffic congestion, pollution, and declining quality of life.

Additional Economics subjects are described in the Faculty of Economics and Commerce Handbook.

Economics and Commerce Handbook

Electrical and Computer Engineering Subjects

ELEC120 ELECTRICAL ENGINEERING 1 10cp

Enrolment in this subject is limited to students enrolled in the BE program in Computer Engineering, Electrical Engineering, Industrial Engineering and Mechanical Engineering or the BCompSc program.


Lectures are supported by tutorials and extensive laboratory work. The laboratory component includes an introduction to oscilloscopes, function generators, electronic power supplies and other laboratory instruments.

Text
Ahmed, S. and Young, C. Introduction to Electrical Engineering (Prentice-Hall 1990)

ELEC170 COMPUTER ENGINEERING 1 10cp

Enrolment in this subject is limited to students enrolled in the BE program in Computer Engineering, Electrical Engineering, Industrial Engineering and Mechanical Engineering or the BCompSc program.


Text
Kaminski, S. Applied Circuit Analysis (Wiley 1988)


ELEC192 INDUSTRIAL EXPERIENCE 5cp

ELEC193 INDUSTRIAL EXPERIENCE 5cp

ELEC194 INDUSTRIAL EXPERIENCE 5cp

ELEC195 INDUSTRIAL EXPERIENCE 5cp

These subjects are designed to formalise periods of Industrial Experience gained by part-time students only. Each of the Industrial Experience units is equivalent to 3 credit points.

Students will also be required to present a report giving a connected account and critical evaluation of their engineering activities and experience during the year. Such units may be counted towards part-time students as electives. (See Section 4 of this Handbook.

ELEC197 INDUSTRIAL EXPERIENCE 10cp

This 1 credit point elective is available to “sandwich” course students only. The student must be in appropriate full-time employment for one calendar year from 1st July in the year preceding enrolment to 30th June in the year of enrolment. A diary must be kept, a seminar presented, and a detailed report submitted to the student’s adviser. The report must indicate that the student has been engaged in a major engineering project.

ELEC211 ELECTRICAL ENERGY 5cp

This subject is offered as a service subject and is not available to students enrolled in the Electrical Engineering or Computer Engineering program.

Discussion of energy conversion possibilities. Examination of typical electrical supply systems; magnetic circuits; transformers; three phase power; elementary rotating machines; direct current machines; induction machines; demonstration of DC machines; synchronous machines; electronic power conversion and control systems.

ELEC220 ELECTRONICS 1 10cp

An introductory subject on the physics of electronic devices and the design of discrete component electronic circuits. The subject comprises a series of lectures, laboratories and tutorials.

Text
Hoen, M.N. Microelectronic Circuits and Devices (Prentice-Hall 1990)

ELEC230 ELECTRICAL ENGINEERING 2 20cp

The fundamental concepts of electrical engineering are expounded. The subject builds on and expands the first year circuits topics. The student is also introduced to electro-mechanical energy conversion principles which form the basis of future power subjects. A broad outline of the subject content is as follows. Review of AC circuit theory. Nodal and mesh analysis. Fourier series, Fourier transforms. Star and delta transformations.


Electromechanical transducers. Law of conservation of energy and its application to singly-excited and double excited systems.
ELEC310 POWER ENGINEERING

Introduction to electrical power generation systems and power utilisation by electrical machines. Fundamental concepts associated with rotating machines. Machine construction. Machine windings and their parameters. Detailed steady state analysis and performance of d.c. machines and induction machines. Structure of electrical power systems; energy sources; the synchronous machine; transmission lines; surge phenomena; switchgear; watt and VAR flow control; substations and control rooms; distribution systems; reliability. The subject comprises a series of lectures, tutorials and laboratory sessions.

Texts
- Electrical Machines - Course notes
- Weedy, B.M. Electrical Power Systems (John Wiley)

ELEC320 ELECTRONICS 2

15cp

Text
- Horowitz, M.N. Microelectronic Circuits and Devices (Prentice-Hall 1990)

ELEC330 COMMUNICATIONS

10cp
Spectral Analysis; Random Signals and Noise; Fundamentals of Analog Signal Processing; Amplitude modulation, frequency modulation, phase modulation, pulse modulation; Noise in communications systems; Analysis of commercial communication systems: AM and FM radio, colour television. Revision of MacWeigh's equations. Solutions to various media, reflection; polarisation. Propagation power flow theorem. Attenuation; and surface impedance. Free space and guided wave propagation including coaxial, waveguide and strip line configurations. Electromagnetic sources and potential functions, radiation and elementary antenna theory. Techniques for obtaining the surface current distribution on an arbitrary antenna by analytic and computational methods. Solutions of potential equations, near and far field distributions. Characteristics of common antenna configurations including primary source wire antennas, antenna arrays and secondary source antennas. Ground wave and ionospheric propagation. The subject comprises a series of lectures, laboratories and tutorials.

Text
- Stremler, P.G. Introduction to Communications Systems 2nd edn (Addison Wesley 1982)
Information Science Subjects

INFO101 INTRODUCTION TO INFORMATION SYSTEMS 10cp

Computers have made it possible to store and retrieve massive amounts of data, the "information age" is now a reality. This course introduces the skills and concepts needed to fully exploit the power of this new tool. After completion of the subject, students will understand how and why organisations build and use information systems, will be able to document information flow through particular systems, and will be able to use the microcomputer as a personal support tool. The course provides a solid grounding in computers and their use, which today is important for all students, irrespective of the discipline which they are studying.

Topics covered include: The evolution of computer hardware and software. Systems and their characteristics, the components of an Information System (hardware, software, data and people). Examples of computer based Information Systems. Problems which can/cannot be solved using computers. Types of information systems, formal/informal, public/private. Types of problems structured/unstructured. The computer as a personal support tool, word-processing, spreadsheets, data base management. The importance of people in the information network, the social, organisational and personal implications of computer based information systems.

INFO102 INFORMATION STORAGE AND MANAGEMENT 10cp

The design and implementation of the data repository for any computer based information system is a skilled and extremely critical task. Overall performance of the system will be seriously compromised by an inefficient data storage and retrieval strategy. This course introduces the tools needed to design, implement and maintain computer based database systems. It will be of particular interest to students who will need to design and/or access large databases regularly in their chosen profession.

Topics covered include: Storage and representation of data in computer systems. Data types, records, file structures and access mechanisms. Standard file maintenance procedures. Introduction to COBOL, a business/file oriented third generation language. Semantic data modelling, entity/relationship modelling, functional dependency and other constraints on attributes values. Introduction to database management systems, the hierarchic, network and relational models. Data manipulation languages, with particular emphasis on relational techniques using SQL. Physical database design, normalisation.

INFO202 ANALYSIS OF INFORMATION SYSTEMS 10cp

Structured analysis and design methodology will be introduced. Specific topics include: Characteristics of a system. Information systems. The role of the system analyst. The system life cycle. Interview techniques. Report writing. Documentation techniques (data flow diagrams, data dictionary, flowcharts, etc.). Cost benefit analysis. Implementation techniques.
Management Subjects

MNGT203 FOUNDATIONS OF MANAGEMENT 10cp
This subject provides students with an introduction to the theory and practice of modern management. Specific topics covered include: The Firm or Business as an Organisation, The Nature of Managerial Work, Managing People and Designing Jobs, Managing Time, Information Management and Decision Making, Planning and Management of Change, Managing Work Flow and Technology, Designing Organisation Structure, Total Quality Management, Management of Stress, Business and Managerial Excellence - a Review.

MNGT204 PRINCIPLES OF MARKETING 10cp
The course introduces basic concepts/techniques in marketing. A strategic management perspective is developed. Topics include the marketing environment, market segmentation, new product development, promotional mix, pricing strategies and distribution management.

MNGT309 COMMERCIAL PROGRAMMING 10cp
COBOL as a business data processing and file organisation language. Basic concepts of file handling and maintenance. Sequential, relative and indexed sequential file organisation. Structured techniques, as applied to COBOL programming, are emphasised. Structure diagrams, pseudo-code, programming standards, etc. Students are expected to complete assignments using both COBOL 74 and COBOL 85.

MNGT303 COMPUTING AND INFORMATION SYSTEMS 10cp
This course is designed to provide students with an overview of information systems in today's business environment. The course will introduce personal support software available on microcomputers and their applications to management decision making. During compulsory workshop sessions students will gain "hands on" experience using software packages such as electronic spreadsheets, database management systems, and word processing.

MNGT511 MANAGEMENT INFORMATION SYSTEMS 10cp
This course is designed to expose potential managers to the variety of management information systems available today. The aim is to emphasise the role of the computer in the planning function, rather than simply in the day-to-day transaction based operational systems. Specific topics covered will include: data base management systems, distributed versus centralised processing, the role of the microcomputer, decision support systems, expert systems, security and privacy implications.

MATH102 MATHEMATICS 102 10cp
Partial derivatives, Vector operators, Taylor's Theorem, Line integrals, Multiple and surface integrals, Gauss, Green, Stokes' Theorems. See Faculty of Science and Mathematics Handbook for further information.

Text: Mathematics II Tutorial Notes (University of Newcastle, 1991)

MATH203 ORDINARY DIFFERENTIAL EQUATIONS
Linear differential equations with constant coefficients, Linear differential equations - general case, Series solutions - special cases, Laplace transforms, Applications. See Faculty of Science and Mathematics Handbook for further information.

Text: Mathematics 103 Tutorial Notes (University of Newcastle, 1991)

MATH111 MATHEMATICS 111 10cp

Text: Tutorial Notes for Mathematics 111 (University of Newcastle, 1991)

MATH112 MATHEMATICS 112 10cp

Text: Tutorial Notes for Mathematics 112 (University of Newcastle, 1991)

DISCRETE MATHEMATICS
An introduction to various aspects of discrete mathematics of current interest: Graphs, trees, relations, elements of set theory and logic, induction, counting, and recurrence equations; basic combinatorics. See Faculty of Science and Mathematics Handbook for further information.

SECTION EIGHT: MECHANICAL ENGINEERING SUBJECT DESCRIPTIONS

MATH215 OPERATIONS RESEARCH 5cp
Operations research involves the application of quantitative methods and tools to the analysis of problems involving the operation of systems and its aim is to evaluate the consequences of certain decision choices and to improve the effectiveness of the system as a whole. This subject will cover a number of areas of operations research which have proved successful in business, economics and defense. These include such topics as network and transportation problems, project management, stock control and replacement theory.

See Faculty of Science and Mathematics Handbook for further information.

Text
Lecture Notes; Optimisation (University of Newcastle 1990)

MATH 216 NUMERICAL ANALYSIS 5cp

See Faculty of Science and Mathematics Handbook for further information.

Text
Burden, R.L. & Faires, J.D.
Numerical Analysis 3rd edn (Pindle, Weber & Schmidt, 1985)

MATH217 LINEAR ALGEBRA 1 5cp

See Faculty of Science and Mathematics Handbook for further information.

Text

MATH 218 LINEAR ALGEBRA 2 5cp

See Faculty of Science and Mathematics Handbook for further information.

Additional Mathematics subjects are described in the Faculty of Science and Mathematics Handbook.

MECHANICAL ENGINEERING SUBJECT DESCRIPTIONS

Mechanical Engineering Subjects

MECH101 INTRODUCTION TO ENGINEERING 5cp
A course of lectures, seminars and plant visits intended to enhance an understanding of the role of the professional engineer in industry and society.

MECH102 PROGRAMMING 5cp
An introduction to the use of computers and computer programming in Engineering. The programming language is FORTRAN 77 under a Unix operating system. Emphasis is placed on the development of a good programming style and on the logical development of a program. Lectures will cover variable types and their uses, file and data handling, functions, subroutines, arrays, the computer operating system and text editors. Assessment is based partly on programs written by students.

Text
Koffman, E. B. and Friedman, F. L.
Problem Solving and Structured Programming in FORTRAN 77, 4th edn. (Addison Wesley 1987)

MECH103 ENGINEERING CHEMISTRY 5cp

Text
Steedman, W., Snaddon, R.H. et al
Chemistry for the Engineering and Applied Sciences (Pergamon 1980)

MECH111 ENGINEERING DRAWING 5cp
A study in communication methods and visualisation by pictorial means. Review of drafting types. Methods of projection including orthographic, axonometric and perspective in both structured and freehand modes. Sectioning, dimensioning and use of standards and symbolism in engineering pictorial communication. Developments, true shapes and intersection of entities.
MECH251 FLUID MECHANICS 1

Fluid properties and definitions. Fluid statics—forces on surfaces, buoyant forces. Types of flow, continuity equation, Euler and Bernoulli equations, energy equation, linear and angular momentum applications. Introduction to dimensional analysis. Analysis of fluid machinery.

Text
Fox, R.W. and McDonald, A.T.
Introduction to Fluid Mechanics 3rd edn (Wiley 1985)

MECH271 THERMODYNAMICS 1


Text
Black, W.Z. and Hartley, J.G.
Thermodynamics (Harper and Row 1985)

MECH304 EXPERIMENTAL METHODS 2

Selected experimental laboratory designs intended to extend the concepts of experimental procedures and to complement formal subject matter in the course.

MECH305 ADVANCED NUMERICAL PROGRAMMING

Complex algebra, multiple entry and return points for segments, use of disc and magnetic tape files, use of library subroutines, etc. Some advanced computing techniques. For example: Solution of end value differential equations; Finite element techniques; Advanced finite difference techniques; Eigenvalue problems.

MECH306 INTRODUCTION TO NOISE POLLUTION CONTROL


MECH314 MECHANICAL ENGINEERING DESIGN 2


Text
Shigley, J.E.

Burr, A.H.
Mechanical Analysis and Design (Elsevier 1983)

MECH315 COMPUTER AIDED DESIGN


Text
Cook, R.D., Malkus, D.S. et al.
Concepts and Applications of Finite Element Analysis 3rd edn (John Wiley & Sons 1988)

MECH316 FINITE ELEMENT METHODS

Basic concepts of finite element techniques. Introduction to finite element computer packages and their use as tools in mechanical engineering design. Application to problems of stress analysis of complex shapes, thermal stresses and vibrations.

Text
Cook, R.D., Malkus, D.S. et al.
Concepts and Applications of Finite Element Analysis 3rd edn (John Wiley & Sons 1988)

MECH317 BULK MATERIALS HANDLING SYSTEMS 1


Text
Arnold, P.C., McLean, A.G. et al

Selected research papers

MECH318 CONVEYING OF BULK SOLIDS

Comparison based on economic and technical considerations of different modes of continuous and discontinuous transportation of bulk solids. Overview of freight pipelines—pneumatic, hydraulic and capacle. and mechanical conveying—belt, screw and bucket elevators. Technical and economic considerations in the design of conveyors. Examples will be selected from the continuous conveyor systems mentioned above. In the case of bulk conveyors the dynamic characteristics and the influence of these characteristics on design will be studied in some detail. In the case of pneumatic conveyors, the design of both lean and dense phase systems will be discussed.

Texts
Arnold, P.C., McLean, A.G. et al

Roberts, A.W. & Hayes, J.W.
Economic Analysis in the Optimum Design of Conveyors (TUNRA 1981) ISBN 0 7259 0 3010 0

Selected research papers

MECH323 MATERIALS 3

This subject deals with metals, polyesmers, ceramics, composites and biomaterials. In conjunction with the following topics: review of traditional strength tests; fundamentals of fracture mechanics, rate, environment and temperature effect on toughness, toughening mechanisms; fatigue crack propagation; scaling in static fracture and fatigue fracture; classification of materials according to mechanical properties.

Texts
Atkins A.G. & Mai Y.W.
Elastic and Plastic Fracture (Ellis Horwood 1988)

Felbeck P.K. & Atkins A.G.
Strength and Fracture of Engineering Solids (Prentice Hall 1984)

MECH324 CERAMIC SCIENCE and TECHNOLOGY

Discussion of the engineering properties of ceramics and how these properties are dependent on atomic structure, chemical composition, microstructure and processing. Structures of oxides, silicates and glasses. Polycrystalline ceramics, non-stoichiometry and doping. Grain boundaries. Phase transformations and solid state mections. Firing, grain growth, sintering and vitrification. Microstructures, mechanical, magnetic, dielectric properties, semiconduction and piezoelectric.

Text
W.D. Kingery, H.K. Bowen et al
Introduction to Ceramics 2nd edn (Wiley 1976)

MECH325 POLYMER SCIENCE and TECHNOLOGY


MECH326 FABRICATION OF METALS

An introduction to the common metal working techniques and the effects these processes have on the properties of the finished products. Topics presented will be taken from: Rolling, Forging, Deep Drawing, Wire and Tube Drawing, Casting, Extrusion and Powder Metallurgy.

Text
Harris, J.N.
Mechanical Working of Metals (Pergamon, 1983)

Dieter, G.E.
Mechanical Metallurgy (McGraw Hill)

MECH332 DYNAMICS OF MACHINES


Texts
Mathe, H.H. & Reinholts, C.F.
Mechanisms and Dynamics of Machinery 5th edn 4th edn (Wiley 1997)

Rao, S.S.
Mechanical Vibrations (Addison-Wesley 1986)

MECH342 MECHANICS OF SOLIDS 2


MECH352 FLUID MECHANICS 2

Kinematics of fluids. Dynamics of incompressible fluids. Similarity and the application of dimensional analysis. Exact solutions of the Navier-Stokes equations. Hydrodynamic lubrication. Laminar and turbulent flows. The course includes a number of laboratory experiments dealing with the above topics.

Texts
Fox, R.W. & McDonald, A.T.
Introduction to Fluid Mechanics 3rd edn (Wiley 1985)

Antonia, R.A.
Notes for Fluid Mechanics II (Department of Mechanical Engineering, University of Newcastle)
MECH485 PRODUCTION SCHEDULING 5cp
Production Systems. Scheduling techniques for automated production facilities; scheduling theory for simple production systems. Flow shops, job shops. Project planning and management: CPM and PERT. Production planning and control: MRP and MRP II.

MECH490 PROJECT/SEMINAR 25cp
Major undergraduate project usually consisting of literature survey and review, analytical and/or experimental investigation into a mechanical or industrial engineering topic. Presentation of two seminars, briefing sessions and weekly guest seminars are mandatory. Two (2) copies of the Project Report are required.

MECH497 PROJECT/DIRECTED READING 5cp
Private work of laboratory, literature search or theoretical nature requiring preparation of a report. Work will be undertaken at the direction of a supervisor with whom the topic should be negotiated. The work undertaken in this subject may form part of an extended MECH496 project or an independent topic.

MECH498 PROJECT/DIRECTED READING 10cp
Private work of laboratory, literature search or theoretical nature requiring preparation of a report. Work will be undertaken at the direction of a supervisor with whom the topic should be negotiated. The work undertaken in this subject may form part of an extended MECH496 project or an independent topic.

MECH596 PROJECT 30cp
A major project for MEngSc students. Work will be undertaken at the direction of a supervisor with whom the topic should be negotiated. Two (2) copies of the Project Report are required.

MECH597 PROJECT 35cp
A major project for MEngSc students. Work will be undertaken at the direction of a supervisor with whom the topic should be negotiated. Two (2) copies of the Project Report are required.

MECH598 PROJECT 40cp
A major project for MEngSc students. Work will be undertaken at the direction of a supervisor with whom the topic should be negotiated. Two (2) copies of the Project Report are required.

Philosophy Subjects

PHIL101 INTRODUCTION TO PHILOSOPHY 20cp
First Semester: Book 1 of Hobbes’ classic Leviathan will be read; it will be explained and expounded in detail to bring out the Hobbesian world view systematically, the world view of liberalism that underlies western democracies (1 hour per week). A segment on knowledge and reality examines some questions about belief and knowledge, the mind/body relationship, and the existence of God (1 hour per week). A segment on critical reasoning aims to develop skills in analyzing, evaluating and advancing arguments, considerable emphasis being placed on arguments as they naturally occur, and on reasoning as an everyday practice (1 hour per week).

Second Semester: Some of Plato’s dialogues will be read, and the ethical, political and metaphysical questions raised by them will be systematically expounded (1 hour per week). A segment on morality discusses the nature of justice and some views on free will and on the basis of morality (1 hour per week). A segment on the historical development of scientific explanation and an introduction to the theory of scientific method (1 hour per week).

Preliquiry Reading
Nagel, T. What Does It All Mean? (Oxford U.P.)
Tests
Clendinnen, F.J. Perspectives of Scientific Explanation
Hobbes, T. Leviathan (Penguin)
Houper, J. An Introduction to Philosophical Analysis (Routledge)
Plato
Sparkes, A.W. Argument Diagrams and Logical Relations (Pergamon)
Sparkes, A.W. Talking Philosophy (Routledge)

PHIL242 BASIC SYMBOLIC LOGIC 5cp
A basic introduction to sentential and predicate calculi, including notations, interpretation, satisfiability, validity and proof construction. Part of the course will deal with the reduction of logical formulae into clausal form to enable their expression in PROLOG.

Text
Newton-Smith, W.H. Logic: An Introductory Course (Routledge)

PHIL391 TECHNOLOGY AND HUMAN VALUES 1
A course of lectures and discussions focusing on the economic, political, social and ethical issues that arise in technological design decisions. The course is presented in two parallel strands. Strand A is based on an examination of energy policy. This example of design analysis and decision making is used to develop an awareness of (i) systems design and how non-technical factors enter design decisions and (ii) a systematic approach to public policy making. Strand B complements Strand A by introducing a range of additional topics concerned with the philosophy, nature and social assessment of technology.

Tests
Strand A
Commonon, B. The Poverty of Power (Bantam 1977)
Hooker, C.A. et al Energy and the Quality of Life (University of Toronto Press 1981)
Strand B
Tests
Strand B
Brown, L.R. The Twentieth Ninth Day (W.W. Norton 1978)
Schumacher, E.F. Small is Beautiful (Abacus 1974)
Teich, A.H. (ed.) Technology and Man’s Future (St Martin’s Press 1977)

PHIL392 TECHNOLOGY AND HUMAN VALUES 2
A team project on the role of technical and value factors in technological decision making. Students will form small teams under staff leadership for a year-long intensive study of a specific example of technologicai decision making. The aim is to provide a comprehensive and accurate understanding of the interaction between technical and value factors in the decision. Each team will produce a report of a quality aimed at management/ministerial discussion. Evaluation will be by the Team Report plus staff leader’s/teams assessment of individual contributions. Example projects are Nuclear Electric Power for Australia, A Study of Technology Assessment. A wider variety of projects can be undertaken, selection by teams will occur during the first two weeks of semester.

Additional Philosophy subjects are described in the Faculty of Science and Mathematics Handbook.

Physics Subjects

PHYS101 PHYSICS 101 5cp
This is an introductory course in physics concentrating primarily on the core topics of the HSC physics syllabus. The course includes, each of 13 lectures consists of three main strands: mechanics, electromagnetism, waves, optics, and thermal physics. The subject includes 3 hrs/week of laboratory and tutorial work.

See Faculty of Science and Mathematics Handbook for further information.

Tests

PHYS102 PHYSICS 102 10cp
The lecture course consists of three principal strands, each of 13 lectures, being: mechanics; electromagnetism; thermal, nuclear and quantum physics. The subject is a rigorous one, utilizing calculus, and stresses the unifying principles in the development of the physical concepts. The syllabus provides for discussion of modern applications. The subject also includes 3 hours per week associated with laboratory and tutorial work.

See Faculty of Science and Mathematics Handbook for further information.

PHYS103 PHYSICS 103 10cp
The lecture course consists of three principal strands, each of 13 lectures: advanced mechanics and electromagnetism; waves and optics; thermal, atomic, and quantum physics. The strands will be matched to the preceding strands of PHYS102, continuing with the rigorous development of basic physics. The subject also includes 3 hours per week associated with laboratory and tutorial work.

See Faculty of Science and Mathematics Handbook for further information.

PHYS201 QUANTUM MECHANICS AND ELECTROMAGNETISM 10cp
Basic principles of modern quantum mechanics and electromagnetism. Laboratory, computational and tutorial work in these areas.

Additional Physics subjects are described in the Faculty of Science and Mathematics Handbook.
**Surveying Subjects**

**SURV11 SURVEYING 1** 10cp
Elementary surveying principles. Nature, causes and classes of errors; elementary error propagation. Linear measurement with tapes. Ordinary differential levelling. Theodolite; angle measurement; magnetic compass. Field notes, traversing and traverse calculations; simple plan drawing.

**SURV12 SURVEYING 2** 10cp
Plane table; contour surveys by stadia; detail surveys, route surveys, areas and volumes, horizontal curves, transition curves, vertical curves. A brief history of surveying and surveying instruments. A three-day series of field-work exercises form a compulsory component of this subject.

**SURV19 INDUSTRIAL EXPERIENCE** 5cp
These subject units are designed to formalise periods of industrial experience gained by part-time students only. Students will also be required to present a report giving a connected account and critical evaluation of their engineering activities and experience during the year. Such subjects may be counted by part-time students as electives.

**SURV23 SURVEY COMPUTATIONS 2** 5cp

**SURV316 HYDROGRAPHIC SURVEYING** 5cp

**SURV334 ERROR THEORY** 5cp
Revision and extension of error theory. Adjustment by least squares. Error ellipse calculations.

**SURV351 GEODESY**

**SURV362 REMOTE SENSING** 5cp
-mounting electromagnetic distance measurement (2nd edn, 1982)

**SURV393 LAND BOUNDARY DEFINITION** 10cp
Cadastre surveys in N.S.W. Surveying Law, Territorial and common law titles surveys and searches. Identification surveys. Field records and plans. A ten-day survey camp is a compulsory part of this subject.

**SURV417 INDUSTRIAL AND OTHER SURVEYING**
Review of statistics. Mechanical principles of instrument design, optical tooling in industry, pointing accuracy theory. Construction project surveys, establishing control net and monitoring construction, such as dam deformation surveys.

**SURV418 CONTROL NETWORKS** 5cp
Analysis of field procedures and design of surveys. Survey control for subdivision projects, integrated surveys.

**SURV441 ASTRONOMY** 10cp

**Survey Subject Descriptions**

**Statistics Subjects**

**STAT203 QUEUES AND SIMULATION** 5cp
Queues. Random number generation. Simulation, including the use of SIMSCRIPT.

**STAT205 ENGINEERING STATISTICS** 5cp

**Statistics subjects are described in the Faculty of Science and Mathematics Handbook.**

**Psychology Subjects**

**PSYC101 PSYCHOLOGY INTRODUCTION 1** 10cp

**Additional Psychology subjects are described in the Faculty of Science and Mathematics Handbook.**

**Additional Psychology subjects are described in the Faculty of Science and Mathematics Handbook.**

**Psychology**

**Psychology, a First Encounter**

**Additional Psychology subjects are described in the Faculty of Science and Mathematics Handbook.**

**Additional Psychology subjects are described in the Faculty of Science and Mathematics Handbook.**
SURVEYING SUBJECT DESCRIPTIONS

SURV452 GEODESY 2 5cp
Least squares adjustment of control surveys: variance/covariance matrix, variance factor and weight coefficient matrix: elementary statistical testing of observations and adjusted values. Relationship between geoid and ellipsoid, astro-geodetic levelling, ellipsoidal elevations, mean sea level and the geoid-gravity and its use in geodesy, methods for establishing a world geodetic system. Precise levelling.

Texts
Torge, W.
Geodesy (de Gruyter)
Mikhail, E.M.
Observations and Least Squares (IEP)

SURV462 PHOTOGRAMMETRY 2 5cp
Photogrammetric orientation. Design principles and practical application of exact and approximate restitution instruments. Flight and project planning — aerial mapping — aerial triangulation of strips.

Text
Wolf, P.R.
Elements of Photogrammetry (McGraw-Hill 1974)

SURV463 ADVANCED CARTOGRAPHY 5cp

SURV472 LAND VALUATION 10cp
General principles of urban and rural land valuation — unsold and improved capital values — valuation of household and freehold land — subdivisional value of land — valuation of buildings — relevant Acts and Regulations — N.S.W. Land and Valuation Court proceedings and decisions.

Texts
Honby, D.
Appraisal One (Jolyon 1976)
Murphy, J.F.N.
Principles and Practice of Land Valuation (Commonwealth Inst. of Valuers 1974)

SURV473 TOWN PLANNING 10cp
Review of historical planning concepts. Modern approaches to town planning including legal aspects. Practical consideration in subdivision design. Environmental impact considerations.

SURV481 PROJECT 15cp
Either a minor research project involving a literature review and/or analytical and/or experimental investigation; or a land studies project, involving selection of a site suitable for a specified purpose, investigation of title, zoning, site survey, environmental impact study, design for development.

SURV498 SPECIAL TOPIC 5cp
A contemporary topic in surveying approved by the Head of Department.

SURV499 SPECIAL TOPIC 5cp
A contemporary topic in surveying approved by the Head of Department.

SCHEDULE OF SUBJECTS

About This Section
This section contains the details of the subjects offered by the departments of the Faculty of Engineering together with subjects offered by departments of other faculties which are included in the course programs set out in Sections 5 and 7. The content descriptions of the listed subjects are set out in Section 8.

Guide to Subject Detail Schedule
Subject Codes
Each subject has been given a unique code (eg CIVL111). This code identifies the subject within the University's computer system and should be entered on each form dealing with subjects. The alpha section of the code indicates the department responsible for offering the subject. The first number in the code indicates the level at which the subject is offered (ie. 100, 200, 300, 400 etc.) and, in the Faculty of Engineering, also indicates the WAM weighting of the subject. The latter two numbers usually indicate the sequence of a subject in a stream of subjects or within a course.

The departmental indicators included in this Handbook are listed in Section 4.

Credit Point Value
The credit point value of a subject thus indicates the workload of a subject as a proportion of a normal full-time program. Similarly, the credit point value of a subject indicates the proportion of the normal HECS liability which arises from enrolment in that subject. Further information on the meaning of credit points is given in the General Course Rules and Information in Section 4.

In the 1990 Faculty Handbook, courses were expressed in terms of credit points where 48 credit points was considered to be the normal annual workload. During 1990 this policy was amended to provide for an 80 credit point annual workload for all courses in the consolidated university. This decision was implemented with effect in 1990 with the result that subjects indicated to have a credit point value of 3 in the 1990 handbook were deemed to have a credit point value of 5 in the 1990 handbook were deemed to have a credit point value of 5 and subjects indicated as 6cp were deemed to have a value of 10cp; and so on. The course program and subject details given in this handbook are expressed in the 80 credit point annual program format.

Semester Offered
Subjects may be offered in Semester 1, Semester 2, both Semester 1 and Semester 2 (ie. the subject is repeated) or over a full year. The indications given in the Schedule are accurate at the time of publication but students should check final arrangements in the University Timetable.

Prerequisites, Corequisites and Assumed Knowledge
The schedule lists the prerequisite, corequisite or assumed knowledge requirements of the subjects described in this Handbook. The meaning of these terms are defined in the relevant degree regulations.

The head of the department offering a subject (indicated by the subject code) may waive the prerequisite, corequisite or assumed knowledge requirements of that subject. Students should obtain any such waiver in writing on the form available from the School Office and submit the completed form attached to any request for variation of program.
### Schedule of All Subjects Listed by the Department of Chemical Engineering

<table>
<thead>
<tr>
<th>Code</th>
<th>Subject Name</th>
<th>Credit Point Value</th>
<th>Semester Available</th>
<th>Prerequisites</th>
<th>Corequisites (CR)</th>
<th>Assumed Knowledge (AK)</th>
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**SURV393, SURV362, SURV361 Code**

Students enrolled in elective subjects should check with the relevant Departmental Office for the availability of the elective subjects they have chosen will be offered and, if necessary, formally vary their enrolment accordingly.

*Elective subjects.* Not all elective subjects will be available in any one year. A list of the elective subjects planned to be offered will be posted on the Departmental Notice Board in September of the previous year but the ability to offer elective subjects will depend on student demand. Students enrolled in elective subjects should check with the Departmental Office in the first week of first semester to ensure that the elective subjects they have chosen will be offered and, if necessary, formally vary their enrolment accordingly.

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**CIVIL ENGINEERING AND SURVEYING SCHEDULE OF SUBJECTS**

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T.B.D. = To be determined

H.O.D. = Head of Department

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**ELECTRICAL ENGINEERING AND COMPUTER SCIENCE SCHEDULE OF SUBJECTS**

Schedule of All Subjects Listed by the Department of Electrical Engineering and Computer Science

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ELEC420 · ELEC410 · ELEC543

SECfION Code

ELEC450 ·
ELEC54S* Nonlinear Systems Analysis 5 Not in 1991
ELEC441*
ELEC571 Computer and Electronics
ELECS81 Project
ELEC662· Advanced Topics in Computers 5 2
ELEC647· Advanced Topics in
ELEC643· Nonlinear Control 5 Not in 1991
ELEC642* Estimation and
ELEC592*

•• C0MP307

Students enrolled in elective subjects should check with the relevant Departmental
COMP306

on the Departmental Notice Board in

= Head of Department

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### Mechanical Engineering Schedule of Subjects

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<th>Prerequisites</th>
<th>Corequisites (CR)</th>
<th>Assumed Knowledge (AK)</th>
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T.B.D. = To be determined  
H.O.D. = Head of Department

* Elective subjects. Not all elective subjects will be available in any one year. A list of the elective subjects planned to be offered will be posted on the Departmental Notice Board in September of the previous year but the ability to offer elective subjects will depend on student demand. Students enrolled in elective subjects should check with the relevant Departmental Office in the first week of first semester to ensure that the elective subjects they have chosen will be offered and, if necessary, formally vary their enrolment accordingly.

### Schedule of Selected Subjects Listed by Departments Outside the Faculty of Engineering

The list below contains only those subjects which are compulsory or recommended elective choices for courses offered in the Faculty of Engineering. For the details of other subjects which may be chosen as electives, please consult the Handbook of the relevant Faculty. Note that the prerequisite and corequisite requirements of subjects listed in other Handbooks relate to the courses offered in that other Faculty. Students who do not meet the prescribed prerequisites for a particular elective subject but believe that they have a suitable background to attempt that subject, should consult the Head of the Department offering the subject, obtain written permission to enrol and submit it with the Variation of Programmes Form requesting addition of the subject.

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<th>Subject Name</th>
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<td>MATH102 and permission of H.O.D.</td>
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AK: At least 120/150 in 3u HSC Mathematics  
AK: At least 120/150 in 3u ISC Mathematics  
AK: At least 67/100 in 2u ISC Mathematics  

CR: GER111 or demonstrated competence in German Language

For the details of other subjects which may be chosen as electives, please consult the Handbook of the relevant Faculty. Note that the prerequisite and corequisite requirements of subjects listed in other Handbooks relate to the courses offered in that other Faculty. Students who do not meet the prescribed prerequisites for a particular elective subject but believe that they have a suitable background to attempt that subject, should consult the Head of the Department offering the subject, obtain written permission to enrol and submit it with the Variation of Programmes Form requesting addition of the subject.
<table>
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<tr>
<th>Code</th>
<th>Subject Name</th>
<th>Credit Value</th>
<th>Semester Available</th>
<th>Prerequisites</th>
<th>Corequisites (CR)</th>
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<td>Ordinary Differential Equations 1</td>
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* Elective subject - may not be offered.