The University of Newcastle

FACULTY OF ENGINEERING HANDBOOK
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 Mathematics Handbook
Volume 9 — Faculty of Medicine Handbook
Volume 10 — Faculty of Science Handbook

Also available are the Undergraduate Guide and Postgraduate Prospectus.

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 1 November, 1987.

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Recommended Price: Three dollars and fifty cents plus postage.
On behalf of the staff of the Faculty of Engineering, I wish to extend a very warm 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 or in Surveying, we believe you are embarking on a professional career which is both challenging and stimulating. It is clear we are living in a technological age—a time which has seen a tremendous burst of scientific and technological development and which has had a marked effect on the modes and characteristics of our society. It is also clear that the future of our society is very much dependent on the solution of a number of very complex technological problems, such as those associated with the development of alternative forms of energy and the preservation of our living environment. Graduates in the various professions of Engineering and Surveying will, in their own way, be required to contribute to the solution of these problems.

The role of universities in modern society is a changed one. Not only is it necessary to preserve the ideals of learning and associated fundamental research, it has become equally important for universities to become increasingly involved in the advancement of science and technology necessary for modern industrial and economic development. In this respect the role of the University Engineering Faculty in applied and industrially orientated research is an important one. The Faculty of Engineering through its research and associated projects undertaken on behalf of Australian industry, has already made a significant contribution.

The Faculty of Engineering has continued to update course material to meet the current and future standards of the professions and the needs of society. To ensure that this is done effectively, it is essential to maintain a stimulating learning environment, teaching and assessment methods. While the various courses provide the essential depth of study in the principal technical fields, we believe it to be of importance that students gain some breadth in their educational experience. In the various degree programmes the opportunity exists for students to take some subjects in other Faculties. The rationale for this is obvious; while the role of the professional Engineer or Surveyor may be seen as providing technical solutions to technical problems, he or she must also be acutely aware of the social implications of the decisions being made. The inter-relation of the professions and society is one of growing importance.

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 total 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.

The staff of the Faculty will do everything possible to make your work both interesting and enjoyable and will be anxious to help you with any problems you may have. I personally would be most happy to assist you in any way I can, and would be 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 of study leading to an Engineering or Surveying degree requires a great deal of dedication and perseverance, but the task is certainly a rewarding one.

ALLAN W. ROBERTS,
Dean
# CONTENTS

## FACULTY OF ENGINEERING

<table>
<thead>
<tr>
<th>SECTION</th>
<th>FACULTY STAFF</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>SECTION ONE</td>
<td>Department of Chemical and Materials Engineering</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Department of Civil Engineering and Surveying</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Department of Electrical and Computer Engineering</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Department of Mechanical Engineering</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SECTION TWO</th>
<th>FACULTY INFORMATION</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Advice and Information</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>The Faculty</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Undergraduate Degree Courses</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Postgraduate Diploma Courses</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Postgraduate Degree Programmes</td>
<td>7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SECTION THREE</th>
<th>UNDERGRADUATE DEGREE REGULATIONS</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Regulations Governing Bachelor Degrees</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Engineering</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Metallurgy</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Surveying</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Science (Engineering)</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Science (Metallurgy)</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Core Programmes</td>
<td>12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SECTION FOUR</th>
<th>FACULTY POLICIES</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Policies on Undergraduate Performance and Progress</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>General</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Reservation</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Assessment</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Academic Performance</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Academic Progression and Unsatisfactory Progress</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Satisfaction of Degree Requirements</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Awards of Honours and Merit</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Last Dates for Addition or Substitution of Subjects</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Special Consideration</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Special Examinations</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Deferred Examinations</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Review of Results</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Submission of Final Year Project Reports</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Late Withdrawal from Subjects</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Years/Stage Classification</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Standing for TAFE Certificates</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Industrial Experience</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Exemptions</td>
<td>20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SECTION FIVE</th>
<th>BACHELOR DEGREE COURSE PROGRAMMES</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Guide on Course Attendance Patterns</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Chemical Engineering</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Civil Engineering</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Computer Engineering</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Electrical Engineering</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Industrial Engineering</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>Materials Engineering</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>Mechanical Engineering</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>Surveying</td>
<td>43</td>
</tr>
</tbody>
</table>
CONTENTS

SECTION SIX  SUBJECT DESCRIPTIONS  46
  Guide to Subject Descriptions  46
  Chemical Engineering (ChE)  48
  Civil Engineering (CE)  56
  Electrical and Computer Engineering (EE)  60
  General Engineering (GE)  68
  Materials Engineering (Mat)  71
  Mechanical Industrial Engineering (ME)  73
  Surveying (SV)  82
  Core Subjects Offered by Departments in Other Faculties  85
  Chemistry  85
  Economics  86
  Geography  87
  Mathematics  87
  Physics  91
  Approved Elective Subjects  92

SECTION SEVEN  COMBINED DEGREE PROGRAMMES  95

SECTION EIGHT  POSTGRADUATE DEGREE REGULATIONS  102
  Regulations Governing Diplomas  102
  Diploma in Industrial Engineering  102
  Diploma in Surveying  103
  Regulations Governing Master Degrees  104
  Master of Engineering  105
  Master of Engineering Science  106
  Master of Science  106
  Master of Surveying  107
  Approved Master of Engineering Science Subjects  107

SECTION NINE  BACHELOR OF ENGINEERING SUBJECT COMPUTER NUMBERS  109
  Chemical Engineering  109
  Civil Engineering  110
  Electrical and Computer Engineering  110
  Mechanical and Industrial Engineering  111
  Materials Engineering  112
  Metallurgy  113
  Surveying  113
  Master of Engineering Science Subject Computer Numbers  114
  Coal Technology Subjects  114
  Electrical and Computer Engineering Subjects  114
  Mechanical and Industrial Engineering Subjects  115

SECTION TEN  GENERAL INFORMATION located between pages 54 and 55  1
  PRINCIPAL DATES 1988  1
  Term Dates Faculty of Medicine  1
  Advice and Information  1
  Faculty Secretaries  2
  Cashier’s Office  2
  Careers and Student Employment Officer  2
  Counselling Service  2
  Enrolment of New Students  2
  Transfer of Course  2

CONTENTS
  Re-Enrolment by Continuing Students  ii
  Re-Enrolment Kits  ii
  Lodging Application for Re-Enrolment Forms  ii
  Enrolment Approval  ii
  Payment of Charges  iii
  Late Payment  iii
  Student Cards  iii
  Re-Admission after Absence  iii
  Attendance Status  iii
  Change of Address  iii
  Change of Name  iii
  Change of Programme  iii
  Withdrawal  iii
  Confirmation of Enrolment  iv
  Failure to Pay Overdue Debts  iv
  Leave of Absence  iv
  Attendance at Classes  iv
  General Conduct  iv
  Notices  iv
  Student Matters Generally  iv
  EXAMINATIONS  iv
  Examination Periods  iv
  Sitting for Examinations  iv
  Rules for Formal Examinations  v
  Examination Results  v
  Special Consideration  v
  Deferred Examinations  v
  UNSATISFACTORY PROGRESS  v
  Regulations Governing Unsatisfactory Progress  v
  CHARGES  vii
  Higher Education Administration Charge  vii
  Method of Payment  viii
  Scholarship Holders and Sponsored Students  viii
  Loans  viii
  Refund of Charges  viii
  Higher Degree Candidates  viii
  CAMPUS TRAFFIC AND PARKING  viii
SECTION ONE FACULTY OF ENGINEERING STAFF

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SECTION TWO

FACULTY INFORMATION

About This Section
This section contains general information about the Faculty of Engineering and the degree programmes which are offered within it. Degree Regulations and Undergraduate Course Programmes 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 requirements and other aspects of the University do not remain static, students are advised to purchase a copy of the Handbook annually in order to become aware of changes and to retain it so as to provide a record of their course content.

Further advice and information about the Faculty of Engineering can be obtained from a number of people.

GENERAL INFORMATION
Enquiries regarding general matters such as University Regulations and procedures, Faculty rules and policies, admission, enrolment and re-enrolment, and studies within the Faculty generally, may be directed to:
The Faculty Secretary Mr G.D. Gordon
The Sub-Dean of the Faculty Dr W.G. Field
The Dean of the Faculty Professor A.W. Roberts

ACADEMIC ADVICE
Academic advice and general enquiries regarding the content of particular courses may be obtained from the following members of academic staff.

Chemical Engineering Mr J. Roberts or Professor G.J. Jameson
Civil Engineering Dr W.G. Field or Professor R.E. Melchen

Computer Engineering Mr B. Penfold or Associate Professor R.J. Evans

Electrical Engineering Mr B. Penfold or Associate Professor R.J. Evans

Industrial Engineering Mr G.D. Butler or Mr J.W. Hayes

Materials Engineering Dr J.D. Browne or Professor G.J. Jameson

Mechanical Engineering Mr G.D. Butler or Mr J.W. Hayes

Metallurgy Dr J.D. Browne or Professor E.O. Hall

PERSONAL COUNSELLING
Students may wish to discuss matters relating to course difficulties or options with the Faculty Secretary (room EA209) or any of the persons listed above.

Members of the University Counselling Service are also available for entirely confidential consultation on any matter. The Counselling Service is situated on the lower ground floor of the McMillan Building. An appointment is usually required.

THE FACULTY
The Faculty of Engineering is constituted by the Council of the University in accordance with By-law 2.4.1 and is comprised of the Department of Chemical and Materials Engineering, the Department of Civil Engineering and Surveying, the Department of Electrical and Computer Engineering and the Department of Mechanical Engineering.

The Faculty Board, Faculty of Engineering, is charged with conducting the affairs of the Faculty and includes the Vice-Chancellor (ex officio), the Dean of the Faculty, the members of the full-time academic staff of the Faculty, representatives 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 made by the University to persons presented by the Faculty of Engineering are listed below.

Undergraduate Degrees
Bachelor of Engineering (BE) which is awarded in the specialities of:
Chemical Engineering
Civil Engineering
Computer Engineering
Electrical Engineering
Industrial Engineering
Materials Engineering
Mechanical Engineering

Bachelor of Metallurgy (BMet)
Bachelor of Surveying (BSurv)
Bachelor of Science (Engineering)(BSc(Eng))
Bachelor of Science (Metallurgy)(BSc(Met))

Postgraduate Diplomas
Diploma in Industrial Engineering (DipIndEng)
Diploma in Surveying (DipSurv)

Postgraduate Degrees
Master of Engineering Science (MEngSc)
Master of Engineering (ME)
Master of Science (MSc)
Doctor of Engineering (DEng)
Doctor of Philosophy (PhD)
Doctor of Science (DSc)
SECTION TWO

UNDERGRADUATE DEGREE COURSES

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

In addition, a structured process metallurgy option is available within the Chemical Engineering programme.

Each engineering degree programme may be completed by four years of full-time study or equivalent study. A minimum of seven years study is required to complete a course entirely on a part-time basis, however, 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 "quick 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. The attendance patterns available are described in Section Five.

Engineering courses are highly structured and, although each follows a similar pattern, the content of the courses 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 I is the year for programme selection: the requirements for each programme are extended by the inclusion of specialist topics which may enable a student to concentrate on one or more particular subjects areas or to gain a wide range of specialist knowledge. Engineering programmes also make provision for non-engineering elective subjects to be included in the degree programme. The final year project, in which students may undertake extensive studies in an area of special interests, is a particular feature of engineering programmes at Newcastle.

Engineering programmes are regularly reviewed in order to incorporate the latest developments relevant to each specialisation. The Programme for each course is set out in Section 5 of this Handbook.

In addition to the full degree programmes offered in the Faculty, students may commence studies in Mining Engineering and Naval Architecture by completing the first two years of the full time programmes in Civil Engineering or Mechanical Engineering respectively. Students choosing to follow their programme may complete their studies at the University of New South Wales.

Honours
Honours are awarded on the basis of performance during the entire course programme (see Faculty Policies in Section 4).

FACULTY INFORMATION

POSTGRADUATE DIPLOMA COURSES

Diploma in Industrial Engineering
The Department of Mechanical Engineering is responsible for the teaching of subjects which may be taken in the Diploma in Industrial Engineering.

The Diploma in Industrial Engineering is a postgraduate course directed especially towards those Diploma in Surveying and the Schedule of Subjects available is set out in Section 6 of this Handbook.

POSTGRADUATE DEGREE PROGRAMMES

Master of Engineering Science
The Master of Engineering Science degree has the primary aim of introducing the knowledge of the student-engineer in a specific and professional area, and therefore places more emphasis on coursework; nevertheless it includes project work for its own value both in the broadening and the consolidation of knowledge, and as an introduction to research.

The Master of Engineering Science degree course is offered on both a part-time and full-time basis in order to give graduate engineers the opportunity to update themselves in technological areas of interest. This degree course is flexible in that candidates for the degree may select from a large number of subject combinations which may span one or more engineering Departments. At present MEngSc subjects are available in areas of Computer Engineering, Electrical Engineering, Industrial Engineering, Mechanical Engineering and Coal Technology. The EE, GE and MB 500 and 600 level subjects currently approved are listed in Sections 3 of this Handbook. The Regulations for the Master of Engineering Science degree programme shall be completed in not less than two years of full-time study, although in special cases approved by the Faculty Board, the programme may be completed in one year. The Regulations for the Master of Engineering Science degree programme are available is set out in Section 3 of this Handbook.

Diploma in Surveying
The Department of Civil Engineering and Surveying is responsible for the teaching of subjects which form the core of the Diploma in Surveying.

The Diploma in Surveying is a postgraduate course designed to broaden and further the education of the practising surveyor. Recent technological changes have significantly altered the role and operational techniques of surveyors. Many items of equipment and computational methods now in use were unknown ten to fifteen years ago. The course has been designed by professionals to provide a comprehensive bridging course for surveyors with the professional qualification of the Reciprocating Surveyors Boards of Australia and New Zealand. University Degree Course in Surveying were not available when these surveyors passed the examinations set by those Boards. As a consequence, the various coursesstituting the modern curriculum was not available to these people. The Diploma in Surveying is seen as broadening and updating their professional training with a choice of subject combinations designed to complement their current knowledge. For those surveyors who already have, in their undergraduate programme, a comprehensive training in the basic disciplines of surveying and the course has a secondary objective. In this case, the aim is to broaden the person's basic training with the offer of study in a wider range of disciplines which have important applications in the industrial engineering field.

The Diploma programme consists of ten units of formal coursework plus two units of project work. Normally this programme shall be completed in not less than two years of part-time study, although in special cases approved by the Faculty Board, the programme may be completed in one year. The Regulations for the Diploma in Surveying are available is set out in Section 3 of this Handbook.

Master of Engineering
The Master of Engineering degree has the primary aim of introducing the knowledge of the student-engineer in a specific and professional area, and therefore places more emphasis on coursework; nevertheless it includes project work for its own value both in the broadening and the consolidation of knowledge, and as an introduction to research.

The Master of Engineering degree course is offered on both a part-time and full-time basis in order to give graduate engineers the opportunity to update themselves in technological areas of interest. This degree course is flexible in that candidates for the degree may select from a large number of subject combinations which may span one or more engineering Departments. At present MEngSc subjects are available in areas of Computer Engineering, Electrical Engineering, Industrial Engineering, Mechanical Engineering and Coal Technology. The EE, GE and MB 500 and 600 level subjects currently approved are listed in Sections 3 of this Handbook. The Regulations for the Master of Engineering Science degree programme shall be completed in not less than two years of full-time study, although in special cases approved by the Faculty Board, the programme may be completed in one year. The Regulations for the Master of Engineering Science degree programme are available is set out in Section 3 of this Handbook.

Master of Science
This degree is similar to the Master of Engineering degree but is undertaken by students with a non-engineering background or students who are carrying out research in areas related to engineering. The Regulations for the Master of Science degree are set out in Section 3 Handbooks.

Master of Surveying
The Master of Surveying degree has the primary aim of introducing the knowledge of the student-engineer in a specific and professional area, and therefore places more emphasis on coursework; nevertheless it includes project work for its own value both in the broadening and the consolidation of knowledge, and as an introduction to research.

The Master of Surveying degree course is offered on both a part-time and full-time basis in order to give graduate engineers the opportunity to update themselves in technological areas of interest. This degree course is flexible in that candidates for the degree may select from a large number of subject combinations which may span one or more engineering Departments. At present MEngSc subjects are available in areas of Computer Engineering, Electrical Engineering, Industrial Engineering, Mechanical Engineering and Coal Technology. The EE, GE and MB 500 and 600 level subjects currently approved are listed in Sections 3 of this Handbook. The Regulations for the Master of Engineering Science degree programme shall be completed in not less than two years of full-time study, although in special cases approved by the Faculty Board, the programme may be completed in one year. The Regulations for the Master of Engineering Science degree programme are available is set out in Section 3 of this Handbook.
in the programme, and the quality and standard of work required in the thesis will be at a substantially higher level than that expected of an Honours Bachelor of Surveying graduate. The Regulations for the Master of Surveying degree are set out in Section 3 of this Handbook.

Doctor of Philosophy

In addition to the above degrees it is possible to register for candidature for the degree of Doctor of Philosophy in each Department in the Faculty. Persons wishing to obtain information on the requirements for the degree should address enquiries to: The Secretary, University of Newcastle, New South Wales, Australia 2308.

SECTION TWO

FACTORY INFORMATION

About This Section

This section contains the University Regulations regarding the Bachelor Degrees and Postgraduate coursework Degrees and Diplomas offered in the Faculty of Engineering.

REGULATIONS GOVERNING BACHELOR DEGREES

General

1. 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 Engineering, Bachelor of Metallurgy, Bachelor of Surveying, Bachelor of Science (Engineering), and Bachelor of Science (Metallurgy).

2. Definitions

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

"course" means the total requirements as prescribed in the schedule to qualify a candidate for the award of the degree;

"Dean" means the Dean of the Faculty of Engineering;

"degree" means the degree of Bachelor of Engineering, Bachelor of Metallurgy, Bachelor of Surveying, Bachelor of Science (Engineering) or Bachelor of Science (Metallurgy) as the case may be;

"Department" means the department or departments offering a particular subject and includes any other body doing so;

"Faculty Board" means the Faculty Board of the Faculty of Engineering;

"responsible department" means the department designated as such in the schedule;

"Schedule" means the schedule to these Regulations relevant to the degree in which a person is enrolled or proposing to enrol;

"subject" means any part of the course for which a result may be recorded.

(2) The unit value of a subject for the purposes of these Regulations shall:

(a) in the case of subjects offered by Departments of the Faculty of Engineering, be calculated on the basis that approximately 42 hours of lectures, tutorials and laboratory work equals one unit; or

(b) in the case of subjects offered by Departments outside the Faculty of Engineering, be determined by the Faculty Board.

3. Enrolment

(1) In any year a candidate shall enrol only in those subjects approved by the Dean or the Dean’s nominee.

(2) Except with the prior approval of the Dean or the Dean’s nominee, a candidate shall complete all subjects comprising Year I of the relevant course before enrolling in any subject comprising Year II or Year III of that course; and

(3) shall complete all subjects comprising Year II of the relevant course before enrolling in any subject comprising Year IV of that course.

4. Standing

The Faculty Board may grant to a candidate standing in specified and unspecified subjects not exceeding the unit value specified in the Schedule in recognition of work completed in this University or another institution, subject to the following:

(a) Standing in a specified subject shall be granted only on the recommendation of the Head of Department;

(b) Standing in an unspecified subject shall be granted only on the recommendation of the Head of the responsible department;

(c) Where standing has been granted in unspecified subjects the Faculty Board on the recommendation of the Head of the responsible department:

(i) shall prescribe the course (not inconsistent with that specified in the Schedule) in which the candidate is required to undertake; and

(ii) may specify the area of study for which the standing is granted for the purposes of the core programme prescribed by the Senate as required in the Schedule.

5. Prerequisites and Corequisites

(1) The Faculty Board on the recommendation of the Head of Department may prescribe prerequisites and/or corequisites for a subject.

(2) Except with the approval of the Dean, a candidate may not enrol in a subject unless he or she has passed any subjects prescribed as its prerequisites and has already passed or concurrently enrols in or is already enrolled in any subjects prescribed as its corequisites.

6. Withdrawal

(1) A candidate may withdraw from enrolment in a subject or the degree only by informing the Secretary to the University in writing and the withdrawal shall take effect from the date of receipt of such notification.

(2) A candidate who withdraws from any subject after the relevant date shall be deemed to have failed in that subject unless granted permission by the Dean to withdraw without penalty. The relevant date shall be:

1 Approval has been given for part-time students to enrol in Industrial Experience subjects counting as Elective units as indicated in the relevant Recommended Part-Time Programme. Approval in other cases will only be given in exceptional circumstances. Where required, approval must be obtained in writing prior to making application for enrolment and submitted with that application.
To qualify for admission to the degree a candidate shall:

(a) be the holder of a degree which the Faculty Board may, at its discretion, accept as fulfilling the admission requirement;

(b) have satisfied the requirements for admission to the course in conjunction with another Bachelor degree by completing a combined course approved by the Faculty Board for the purpose of such combined course.

4. A candidate may be granted standing in a maximum of 32 units under the provisions of Regulation 4 of these Regulations.

5. The degree may be conferred as a degree with honours.

SCHEDULE 2—BACHELOR OF METALLURGY
1. For the purposes of these Regulations the responsible department for the degree shall be the Department of Chemical and Materials Engineering.

2. (a) To qualify for admission to the degree a candidate shall:

(i) pass a programme of subjects approved by the Faculty Board on the recommendation of the Head of the responsible department totalling not less than 60 units; and

(ii) satisfy the industrial experience requirements prescribed by the Faculty Board.

(b) The programme referred to in section 2(a)(i) of this schedule shall include the core programme prescribed from time to time by the Senate.

3. A candidate may be granted standing in a maximum of 32 units under the provisions of Regulation 4 of these Regulations.

4. The degree may be conferred as a degree with honours.

SCHEDULE 3—BACHELOR OF SCIENCE (METALLURGY)
1. For the purposes of these Regulations the responsible department for the degree shall be the Department of Chemical and Materials Engineering.

2. No candidate shall be permitted to enrol or re-enrol for the degree unless the candidate was enrolled for either the degree of Bachelor of Metallurgy or Bachelor of Science (Metallurgy) after March, 1982.

3. (a) To qualify for admission to the degree a candidate who was enrolled prior to 1983 shall:

(i) pass a programme of subjects approved by the Faculty Board on the recommendation of the Head of the responsible department totalling not less than 48 units; and

(ii) satisfy the industrial experience requirements prescribed by the Faculty Board.

(b) The programme referred to in section 2(a)(i) of this schedule shall include the core programme prescribed from time to time by the Senate.

4. A candidate may be granted standing in a maximum of 25 units under the provisions of Regulation 4 of these Regulations.

5. The degree may be conferred as a degree with honours.

SCHEDULE 4—BACHELOR OF SCIENCE (ENGINEERING)
1. The degree of Bachelor of Science (Engineering) shall be conferred only on a candidate specialising in the area of Chemical Engineering.

2. For the purposes of these Regulations the responsible department for the degree shall be the Department of Chemical and Materials Engineering.

3. No candidate shall be permitted to enrol or re-enrol for the degree unless the candidate was enrolled for the degree prior to 1980.
SECTION THREE
UNDERGRADUATE DEGREE REGULATIONS

CORE PROGRAMMES
The following core programmes have been approved by the Senate.

1. Bachelor of Engineering
   Bachelor of Engineering in Chemical Engineering
   Mathematics 6 units
   Science 4 units
   Engineering 100 level 4 units
   Engineering 200 level 8 units
   Engineering 300 level 8 units
   Engineering 400 level 8 units
   Bachelor of Engineering in Civil Engineering
   Mathematics 6 units
   Science 4 units
   Engineering 100 level 4 units
   Engineering 200 level 8 units
   Engineering 300 level 8 units
   Engineering 400 level 8 units

2. Bachelor of Metallurgy
   Science 4 units
   Engineering 100 level 4 units
   Engineering 200 level 8 units
   Engineering 300 level 8 units
   Engineering 400 level 8 units

3. Bachelor of Surveying
   Mathematics 6 units
   Science 4 units
   Surveying 100 level 4 units
   Surveying 200 level 6 units
   Surveying 300 level 8 units
   Surveying 400 level 8 units

4. Bachelor of Science (Engineering)
   Mathematics 6 units
   Physics 4 units
   Chemistry 8 units
   Engineering 100 level 1 unit
   Chemical Engineering 100 level 1 unit
   Chemical Engineering 200 level 5 units
   Chemical Engineering 300 level 8 units
   Chemical Engineering 400 level 1 unit

5. Bachelor of Science (Metallurgy)
   Mathematics 6 units
   Physics 4 units
   Chemistry 8 units
   Engineering 100 level 1 unit
   Chemical Engineering 100 level 1 unit
   Chemical Engineering 200 level 5 units
   Chemical Engineering 300 level 8 units
   Chemical Engineering 400 level 1 unit
   Bachelor of Engineering in Electrical Engineering
   Mathematics 6 units
   Science 4 units
   Engineering 200 level 4 units
   Engineering 300 level 8 units
   Engineering 400 level 8 units
   Bachelor of Engineering in Industrial Engineering
   Mathematics 6 units
   Science 4 units
   Engineering 200 level 8 units
   Engineering 300 level 8 units
   Engineering 400 level 8 units

Bachelor of Engineering in Materials Engineering
Mathematics 6 units
Science 4 units
Engineering 100 level 4 units
Engineering 200 level 8 units
Engineering 300 level 8 units
Engineering 400 level 8 units

Bachelor of Engineering in Mechanical Engineering
Mathematics 6 units
Science 4 units
Engineering 100 level 4 units
Engineering 200 level 8 units
Engineering 300 level 8 units
Engineering 400 level 8 units

SECTION FOUR
FACULTY POLICIES

About This Section
This section contains Faculty Policies which are relevant to students enrolled in undergraduate programmes within the Faculty. The following matters are included:

Undergraduate Performance and Progress Requirements
Criteria for Honours Awards
Weighted Average Mark (WAM) Calculation Method
Final Dates for Addition of Subjects
Late Withdrawal from Subjects
Year/Stage Classification
Standing for Certificate Holders
Industrial Experience Requirements
Exemptions
Special Consideration
Deferred Examinations
Submission of Final Year Project Reports

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.

POLICIES ON UNDERGRADUATE PERFORMANCE AND PROGRESS
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 Un satisfactory Progress.
(2) In the case of students, unless the context or subject matter otherwise indicates or requires:
   "course" means the total requirements as prescribed in those Policies and the Regulations Governing Bachelor Degrees offered in the Faculty of Engineering which, when completed, qualify a candidate for the award of the relevant degree.
   "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.
   "responsible department" means the department designated 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.

2. Reservation
(1) Faculty Board reserves its rights 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 weighting each task will have in the determination of 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 ranking 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:
   Result Reported as:
   Marks in the range of 45% to 100% inclusive - Percentage Mark
   Marks less than 45% - PF (Fail)
   Other non-passing grades - Grades approved by Senate for specific purposes.

(4) Percentage marks in the range of 45 to 54 inclusive, 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).

(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 Weighted Average Mark (WAM).

"sub-dean" means the Subdean of the Faculty of Engineering.
The WAM is calculated from the results of all subjects taken towards the satisfaction of Degree Requirements, except as provided in Policy 4.3 below, in the following manner:

\[ \text{WAM} = \frac{\text{Sum of (m w u)}}{\text{Sum of (u w) of all subjects}} \]

Where:
- \( m \) = The Mark as defined in Policy 4.3 below.
- \( u \) = The Unit Value of the subject concerned.
- \( w \) = The Weighting of the subject concerned as determined under Policy 4.4 below.

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 that percentage mark.
- Where the result in a subject is a pass grade (rather than a percentage mark), the Mark \( m \) will be deemed to be the relevant number listed below:
  - Grade 'm'
    - HD = 93
    - D = 80
    - C = 70
    - P = 58
    - UP = 50
    - TP = 49
- Where grades of W, X, S or I are awarded the subject concerned shall not be included in the calculation of the students WAM until a mark or a final grade shall be awarded in that subject at which time, the student’s WAM shall be re-calculated to include the newly approved mark or grade.

(4) Each subject shall have a weighting of 1, 2, 3 or 4 as determined by Faculty Board. The weighting so determined will be published in the Faculty Handbook. Weightings will generally be determined according to the level at which a subject is offered as set out below.

### Engineering Non-engineering Weighting

<table>
<thead>
<tr>
<th>Subject Level</th>
<th>Subject Year Level</th>
<th>Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Year I</td>
<td>1</td>
</tr>
<tr>
<td>200</td>
<td>Year II</td>
<td>2</td>
</tr>
<tr>
<td>300</td>
<td>Year III</td>
<td>3</td>
</tr>
<tr>
<td>400, 500 or 600</td>
<td>Year IV</td>
<td>4</td>
</tr>
</tbody>
</table>

The following will be taken into account when calculating the WAM:
- Subjects re-admitted to a course after being granted leave of absence for the previous academic year, will retain their previous WAM as the basis of future calculations.
- Students permitted to transfer from one course offered in the Faculty to another shall, provided standing in all subjects previously passed in the original course is granted in the new course, retain the WAM achieved in the original course as the basis for future WAM calculations in the new course.
- Students re-admitted to a course without having been granted leave of absence for the previous academic year, shall be considered in the same way as if they had completed their previous studies at another institution and re-comence calculation of their WAM from the year of their re-admission: provided that a student who was last enrolled in a course not more than three (3) years prior to the year of their re-admission to that course may request that the WAM applying at the conclusion of the last year of their enrolment in that course be reinstated as the basis of future calculations.
- Where a student has been awarded a grade of TP, or to enrol in a subject which replaced a subject is offered as set out below.
- Students on probation who attain a WAM of 55 or more, may elect to repeat any subject in which they were awarded a Final Assessment of 55 or more, or a passing grade.
- A student on probation is strongly advised to repeat all subjects, other than elective or extraneous subjects, which were taken in the academic year in which list or her WAM became less than 55 and for which she received a result of less than 55, before enrolling in any course.
- Each WAM shall be included in the schedule of recommendations results presented to Faculty Board. On each student's notification of results and placed on the student's academic record; except that should a grade of S, X or I be awarded to a student, the WAM calculated for that student will be regarded as provisional until final marks or grades are awarded.
- Where a student has been awarded a grade of S, X or I, the student's WAM shall, upon the award of other marks or grade for the subject, be re-calculated and included on the student's notification of results and placed upon the student's academic record in place of the provisional WAM. If a student awarded a deferred examination (grade X) may not subsequently be awarded a mark greater than 64 or a grade higher than Pass.
- Students may elect to repeat any subject in which they were awarded a result in the range of 45 to 54 or a grade of TP, or to enrol in a subject which replaced a subject in that category in the Approved Program of the course in which they are enrolled. In such a case:
  - the subject originally taken remains part of the student's academic record and continues to be included in the calculation of the student's WAM as before.
  - the repeated subject is included in the WAM calculations of the year in which it is taken.
- If the student is awarded a failing grade in the repeated subject, the failure is deemed to be extended to the following academic year.
- If a student was granted standing at the time of his or her admission or re-admission to a course offered within the Faculty, the record of that student upon which the standing was based may be considered by Faculty Board in connection with the determination of the grade of honours degree.
- A student who is required to show cause under Policy 5.7 shall be deemed to be subject to the provisions of the Policies of Faculty Board as would a student placed on probation under the provisions of Policy 5.2.

### 6. Satisfaction of Degree Requirements

(1) Students are required to have passed the programme of subjects approved by Faculty Board in accordance with the relevant schedules of the Regulations Governing Bachelor Degrees Offered in the Faculty of Engineering when they have:
- obtained an average of 45 or more (or a passing grade) in each of the subjects comprising the relevant programme of subjects approved by Faculty Board; and
- attained at the completion of that programme a WAM of 55 or more.

(2) If a student completes the relevant programme of subjects but has not achieved a WAM of 55 or more, the student is regarded as not having passed the programme of subjects approved by Faculty Board and is therefore ineligible for the award of a bachelor's degree and is placed on probation under the terms of section 5 of these policies.

(3) A student who is ineligible for the award of a bachelor's degree under the terms of Policy 6.2 may repeat any subject in which they were awarded a result in the range of 45 to 54 (in which case the conditions of Policy 4.8 apply) or enrol in other subjects not previously attempted as the Dean, on the recommendation of the Head of the responsible department, may approve until such time as he or she attains a WAM of 55 or more included under the provisions of section 5 of these policies.

### 7. Awards of Honours and Merit

(1) Honours grades will normally be awarded by Faculty Board on the basis of a graduating student's performance as measured by the WAM according to the following schedule:

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

(2) If a student was granted standing at the time of his or her admission or re-admission to a course offered within the Faculty, the record of that student upon which the standing was based may be considered by Faculty Board in connection with the determination of the grade of honours degree.

(3) A Head of Department may recommend to Faculty Board that a grade of honours be awarded other 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 make an award of
honours in accordance with the recommendation of the Head of the Department concerned or in accordance with the schedule contained in Policy 7.1, as it sees fit. 
(4) Merit grades will normally be awarded by Faculty Board to students enrolled in the Bachelor of Science (Metallurgy) programme who attain, at the conclusion of the programme, a WAM of 72 or more. Policies.

Example WAM Calculation

The following calculation is presented as an example of the method of calculation resulting from the above policies.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Mark or Grade</th>
<th>Unit Value</th>
<th>Weighting Wt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics I</td>
<td>P</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Physics I</td>
<td>STANDING</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>GE111</td>
<td>85</td>
<td>1</td>
<td>86</td>
</tr>
<tr>
<td>GE100</td>
<td>65</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>GE101</td>
<td>90</td>
<td>1</td>
<td>90</td>
</tr>
<tr>
<td>GE151</td>
<td>90</td>
<td>1</td>
<td>90</td>
</tr>
<tr>
<td>ME111</td>
<td>76</td>
<td>1</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>12</td>
<td>194</td>
</tr>
<tr>
<td>WAM = 794/12</td>
<td>12</td>
<td>794</td>
<td></td>
</tr>
<tr>
<td></td>
<td>= 66</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Year 2 (Full-time attendance: normal Year II program) program)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Mark or Grade</th>
<th>Unit Value</th>
<th>Weighting Wt</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM2AS</td>
<td>62</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>EM2CO</td>
<td>FF</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>GE204</td>
<td>FF</td>
<td>1</td>
<td>88</td>
</tr>
<tr>
<td>GE205</td>
<td>WITHDRAWN</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Math</td>
<td>46</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>ME204</td>
<td>58</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>ME214</td>
<td>65</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>ME215</td>
<td>77</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>ME231</td>
<td>65</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>ME251</td>
<td>80</td>
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<tr>
<td>ME271</td>
<td>75</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>28</td>
<td>1720</td>
</tr>
<tr>
<td>WAM = (794 + 1720) / (12 +28)</td>
<td>12</td>
<td>794</td>
<td></td>
</tr>
<tr>
<td></td>
<td>= 251440</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>= 63</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Year 3 (Full-time attendance: reduced load due to failures and pre-requisite requirements)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Mark or Grade</th>
<th>Unit Value</th>
<th>Weighting Wt</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM2CO</td>
<td>60</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>GE204</td>
<td>75</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>GE205</td>
<td>80</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>GE211</td>
<td>85</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>GE301</td>
<td>72</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Math</td>
<td>53</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>ME305</td>
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<td>ME316</td>
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<td>ME343</td>
<td>64</td>
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<td>ME373</td>
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<tr>
<td></td>
<td>13</td>
<td>34</td>
<td>2400</td>
</tr>
<tr>
<td>WAM = (2514 + 2400) / (40 +34)</td>
<td>16</td>
<td>2400</td>
<td></td>
</tr>
<tr>
<td></td>
<td>= 66</td>
<td></td>
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</tr>
</tbody>
</table>
their inability to sit for an examination on that day. In other circumstances all available evidence should be provided together with a Statutory Declaration setting out the circumstances which prevented their attendance. Note that an Application for Special Consideration should be lodged within three (3) days of the examination involved, (see Special Consideration and Special Examinations below).

**SPECIAL CONSIDERATION**

It is recognised that during the course of their studies, students may suffer from illness or other serious circumstances which affect their preparation for or performance at an examination. University Regulations provide for students who believe that their performance in a subject has been adversely affected by such circumstances to apply for Special Consideration (also refer to the General University Information section of this Handbook).

APPLICATIONS FOR SPECIAL CONSIDERATION MUST BE MADE ON THE PRESCRIBED FORM. Forms are available from the Student Administration Office in the McMillin Building.

As decisions can only be made on the basis of the information presented by the student, each application should give FULL PARTICULARS of the circumstances which are relied upon and the way in which it is believed that performance has been adversely affected by those circumstances. Applications MUST be accompanied by medical certificates or other relevant documentary evidence as indicated on the form.

MEDICAL CERTIFICATES OF THE KIND NORMALLY ISSUED TO EXPLAIN ABSENCE FROM EMPLOYMENT DO NOT MEET THE ABOVE CRITERIA AND ARE NOT SuFFICIENT TO EXPLAIN ABSENCE FROM AN EXAMINATION. Where submitted, such reports will normally be taken to indicate a ‘mild’ handicap.

Where a request for Special Consideration is made on the grounds of misadventure, all available supporting evidence should be attached to the application. In some cases the submission of a Statutory Declaration Form will be appropriate. Statutory Declaration Forms are available from most newspapers.

Requests should be made as soon as possible after the occurrence of the circumstances leading to the request. University Regulations provide that requests must be submitted within 7 days in cases where study during the year or preparation for an examination was affected (or by such later time as the Dean may approve). Requests made regarding attendance or performance in a formal written examination must be submitted within 3 days of the date of the examination (or by such later time as the Vice-Chancellor may approve). Where a student is unable to make application personally, another person may take action on the student’s behalf.

When considering requests for Special Consideration it is the intention of the Faculty to take account of circumstances which substantially affect performance such that the performance of the student concerned does not reflect his or her true competence in a subject. In doing so, the Faculty will be conscious that any Special Consideration given should not act to the disadvantage of other students.

Enquiries regarding Special Consideration may be directed to the Faculty Administration Office. (Also see Missing an Examination above and Special Examinations below.)

**SPECIAL EXAMINATIONS**

Special Examinations are NOT awarded automatically. If it is considered to be appropriate, a Special Examination may be awarded following timely lodgement of a properly completed Application for Special Consideration, whether the examination was subject to any special conditions or not. (See Missing an Examination and Special Consideration above.)

Students who are awarded a Special Examination will receive the result of 'S' as the result for the subject concerned. Where a Special Examination is awarded, the student should contact the Department offering the subject in order to ascertain whether the examination will be held in the January Examination Period or at some other convenient time. It is the student’s responsibility to ensure that he or she is aware of the time and place at which the Special Examination will be held.

**DEFERRED EXAMINATIONS**

Deferred examinations in subjects offered by Departments of the Faculty will not normally be awarded to students other than those students enrolled in a programme of subjects sufficient to complete degree requirements in the current year.

Where a student fails a single subject and is thereby prevented from graduating, a deferred examination may be awarded following the submission of a properly completed Application for Special Consideration setting out the circumstances which prevented attendance. (See Submission of Final Year Project Reports below).

Deferred examinations recommended to the Faculty Board by departments of other faculties will normally be approved.

It should be noted that the maximum result which can be awarded on the basis of a deferred examination is that of pass (either a 'P' grade or a mark no higher than 64).

**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. If considered necessary, students may attach a statement to the official request for a review in which any facts believed to point to an error or omission having been made may be brought to the attention of the departments concerned. Note that this request is not a replacement for requests for Special Consideration.

While staff may discuss aspects of performance in examinations with the individual students concerned within a short period after final results have been published in order to provide feedback for educational purposes, the assessment of individual pieces of work will not be discussed.

**STANDING FOR TAFE CERTIFICATES**

Faculty Board has approved the granting of standing to students enrolling in courses who hold certain TAFE Certificates. The standing to be granted will normally vary according to the TAFE qualification obtained, the course programme in which the candidate is enrolled and the current requirements of that programme. For details of the standing available students should contact the Faculty Secretary.

List of Certificates For Which Standing is Granted

<table>
<thead>
<tr>
<th>Certificate Type</th>
<th>List of Certificate Courses For Which Standing is Granted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cartography Certificate</td>
<td>Structural &amp; Surveying Services</td>
</tr>
<tr>
<td>Associate Diploma</td>
<td>Survey</td>
</tr>
<tr>
<td>Bachelor of Engineering</td>
<td>Engineering Certificate</td>
</tr>
<tr>
<td>Bachelor of Metallurgy</td>
<td>Metals Engineering Certificate</td>
</tr>
<tr>
<td>Bachelor of Science</td>
<td>University Technician Certificate</td>
</tr>
<tr>
<td>Bachelor of Technology</td>
<td>Nautical Architecture Certificate</td>
</tr>
<tr>
<td>Bachelor of Technology</td>
<td>Production Publishing Certificate</td>
</tr>
<tr>
<td>Bachelor of Architecture</td>
<td>Structural Engineering Certificate</td>
</tr>
<tr>
<td>Bachelor of Surveying</td>
<td>Surveying Certificate</td>
</tr>
</tbody>
</table>

**INDUSTRIAL EXPERIENCE**

1. General

For the degrees of Bachelor of Engineering and Bachelor of Metallurgy, students will normally be 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 units or to find employment in order to satisfy industrial experience requirements). Students experiencing difficulty in obtaining suitable employment may contact the University's Careers and Student Employment Office.

2. Full-Time Students

Full-time students will normally gain their practical experience through placements. Students should obtain a statement from their employer certifying the nature and period of the employment undertaken and retain the
3. Standing for Work Completed as Part of a Larger Subject
Standing may be granted, where appropriate, for work completed as part of a larger subject ONLY where the larger subject was successfully completed. That is, standing will NOT be granted on the basis of work completed in a part subject or topic which formed part of a larger subject if a failing grade was awarded in the larger subject concerned.

4. Exemptions for a Laboratory Component of a Subject
In some cases, a student who fails a subject but completed the laboratory component of that subject satisfactorily, may be exempted from repeating that laboratory component. Exemption from a laboratory component is not automatic and should not be assumed. Students should apply to the lecturer responsible for the subject concerned for exemption from laboratory work at the commencement of classes in that subject.

SECTION FIVE
BACHELOR DEGREE COURSE PROGRAMMES

About This Section
This section contains the detailed undergraduate course programmes 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.

Each course is outlined as an approved full-time programme taken over 4 years. All students complete the relevant approved programme regardless of their pattern of study.

Attendance

There are also a number of other sections associated with each approved programme. These cover such aspects as:

- Options within the Approved Programme
- Elective Requirements
- Perquisites, Corequisites and Assumed Knowledge requirements of Core Subjects
- The Recommended Pattern of Part-time Attendance
- Transition Arrangements

Students are expected to be aware of all aspects of the Approved Programme and associated requirements of the course in which they are enrolled.

Enquiries may be directed to the Faculty Secretary or the Head of the Department indicated in the course entry concerned.

GUIDE ON COURSE ATTENDANCE PATTERNS

An Approved Programme is given in this Section for all undergraduate courses. All students must complete the requirements of the relevant Approved Programme regardless of their attendance pattern.

The Faculty of Engineering offers a flexible range of attendance patterns which are designed to suit the individual needs of students. There is no restriction on students choosing a pattern of attendance each year which suits them so long as academic progress is satisfactory and other course 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 3 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 programme. Thus a student is treated as a full-time student if his full-time attendance is 12 units or more.

Part-time Attendance

Each course entry includes a recommended part-time attendance pattern which allows the requirements of the Approved Programme to be completed over 7 part-time stages.

A further 15 month period of work experience could be included between Years II and III resulting in a 7 year minimum programme.
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 gaining 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 their employer’s operation and to complement their chosen attendance pattern. The University recognizes the importance of giving their full attention to their academic studies in Years II, III and IV of their course, and this attendance pattern allows both the employer and employee to participate in the work of the organisation without being required to attend classes at irregular intervals. There is also no necessity for the major period of work experience to be gained in the local area.

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.

CHEMICAL ENGINEERING

The Department of Chemical and Materials Engineering is the department responsible, under the Regulations Governing Bachelor’s Degrees Offered in the Faculty of Engineering (see Section 3) and the policies of the Faculty Board (see Section 4), for matters relating to the specialisation of Chemical Engineering.

The programme of subjects set out below has been approved by the Faculty Board and leads to the award of the degree of Bachelor of Engineering (BE) in Chemical and Materials Engineering. Students enrolled prior to 1987 should carefully note the transition requirements.

APPROVED PROGRAMME

<table>
<thead>
<tr>
<th>Year I</th>
<th>Subjects</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHE343 Process Analysis II</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>CHE355 Transfer Processes I</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CHE363 Separation Processes</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>CHE371 Kinetics and Thermodynamics</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>CHE383 Modelling of Processes</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>CHE391 Laboratory</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
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</tbody>
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<table>
<thead>
<tr>
<th>Year II</th>
<th>Subjects</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHE463 Safety and Environment</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>CHE483 Reaction Engineering</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>CHE486 Process Control</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>CHE491 Seminar</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>CHE496 Research Project</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>CHE497 Design Project</td>
<td>4</td>
<td></td>
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<tr>
<td>Electives</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. Physics IB may be taken in lieu of Physics IA.
2. Standing will be granted in Mathematics IA to students who complete both Mathematics IS and Mathematics 102. Students who wish to do so will be permitted to enrol in Mathematics IS and, after successful completion of that subject, permitted to enrol in Mathematics 102. Note that these subjects must be completed over a minimum of two years. Neither Mathematics IS nor Mathematics 102 contribute to WAM calculations.
3. Mathematics IIA (Topics CO, B and D) may be taken in lieu of EM2CO, EM2BD and one unit of Elective.
4. Chemistry IIA (6 units: weight 2) may be taken in lieu of Chemistry IIC and 2 units of Elective. Students are encouraged to consider taking this option. Students wishing to enrol in Chemistry IIA as part of a full Year II programme should take EM2CO in Year III.

ELECTIVE REQUIREMENTS

(a) The number of Elective units to be taken are: BE (Chemical Engineering) — 6 units

(b) Elective units must consist of any subjects offered within the Faculty of Engineering or other Faculties, subject to the approval of the Head of the Department of Chemical and Materials Engineering and of the Department responsible for the subject.

Notes:
1. Elective subjects taken outside the Faculty of Engineering may only be selected from those subjects approved by Faculty Board. The list of approved subjects is presented at the end of Section 6.

(c) Part-time students may count up to four units of Industrial Experience Subjects (CHE002 to CHE005) as Elective units.

APPROVED PROGRAMME

<table>
<thead>
<tr>
<th>PROCESS METALLURGY OPTION</th>
<th>Subjects</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year I</td>
<td>Chemistry I</td>
<td>4</td>
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<tr>
<td>CHE141 Industrial Process Principles</td>
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<tr>
<td>CHE153 Chemical and Manufacturing Processes</td>
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<tr>
<td>GE151 Introduction to Materials Science</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
<td></td>
</tr>
</tbody>
</table>

| Year II | Chemistry IIC | 4 |
| CHE242 Process Analysis I | 3 |
| CHE262 Transfer Processes II | 3 |
| CHE291 Laboratory | 2 |
| EM2CO Vector Calculus and Differential Equations | 2 |
| EM2BD Complex Analysis and Linear Algebra | 1 |
| **Total** | **15** |

Notes:
1. Physics IB may be taken in lieu of Physics IA.
2. Standing will be granted in Mathematics I to students who complete both Mathematics IS and Mathematics 102. Students who wish to do so will be permitted to enrol in Mathematics IS and, after successful completion of that subject, permitted to enrol in Mathematics 102. Note that these subjects must be completed over a minimum of two years. Neither Mathematics IS nor Mathematics 102 contribute to WAM calculations.
3. Mathematics IIA (Topics CO, B and D) may be taken in lieu of EM2CO, EM2BD and one unit of Elective.
Students are advised to carefully note the prerequisite, corequisite and assumed knowledge requirements of the subjects in which they wish to enrol. Students who are found to have acted contrary to these requirements without a formal waiver being granted, may be withdrawn from the relevant subject(s) without notice.

Also note that Year III subjects may not normally be taken until Year I is complete and that Year IV subjects may not normally be taken until Year II is complete (see Regulation 3).

### Subject Pre-requisite(s) Corequisite(s) Assumed Knowledge

<table>
<thead>
<tr>
<th>Subject</th>
<th>Pre-requisite(s)</th>
<th>Corequisite(s)</th>
<th>Assumed Knowledge</th>
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<td>ChE002-5</td>
<td>Part-time Enrolment</td>
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<td>Chemistry IIC</td>
<td>Chemistry I</td>
<td>-</td>
<td>Mathematics I, Physics IA or IB</td>
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<td>ChE242</td>
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<td>ChE252</td>
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<tr>
<td>ChE262</td>
<td>Chem 1, Math 1, ChE141</td>
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<td>ChE291</td>
<td>-</td>
<td>ChE262</td>
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<td>EM2CO</td>
<td>Mathematics I</td>
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<tr>
<td>EM2BD</td>
<td>Mathematics I</td>
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<td>ChE343</td>
<td>ChE242</td>
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<td>ChE355</td>
<td>ChE362, Chem IIC, EM2CO</td>
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<td>ChE363</td>
<td>ChE262</td>
<td>-</td>
<td>-</td>
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<tr>
<td>ChE371</td>
<td>Chem IIC</td>
<td>ChE262</td>
<td>-</td>
</tr>
<tr>
<td>ChE372</td>
<td>Chem 1</td>
<td>ChE262</td>
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<tr>
<td>ChE373</td>
<td>ChE262</td>
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<td>ChE374</td>
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<td>ChE383</td>
<td>ChE355, ChE363</td>
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<td>ChE389</td>
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<td>ChE392</td>
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<td>ChE452</td>
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<td>ChE463</td>
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<td>ChE474</td>
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<td>ChE475</td>
<td>ChE372, ChE373</td>
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<td>ChE484</td>
<td>ChE483</td>
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<td>-</td>
</tr>
<tr>
<td>ChE485</td>
<td>EM2CO, ChE363</td>
<td>ChE486</td>
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<tr>
<td>ChE486</td>
<td>EM2CO or Mathematics IIA</td>
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<td>ChE490</td>
<td>All Year III subjects</td>
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<tr>
<td>ChE491</td>
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<td>ChE492</td>
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</tr>
<tr>
<td>ChE497P</td>
<td>All Year III subjects</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Undergraduate students may only enrol in 500 or 600 level subjects with the permission of the Head of the Department of Chemical and Materials Engineering.
The Department of Civil Engineering and Surveying is the department responsible, under the regulations governing Bachelors Degrees offered in the Faculty of Engineering (see Section 3) and the policies of the Faculty Board (see Section 4), for matters relating to the specialisation of Civil Engineering.

The programme of subjects set out below has been approved by the Faculty Board and leads to the award of the degree of Bachelor of Engineering (BE) in the specialisation of Civil Engineering.

Students enrolled prior to 1988 should carefully note the transition requirements.

**APPROVED PROGRAMME**

<table>
<thead>
<tr>
<th>Year I</th>
<th>Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mathematics</td>
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<tr>
<td></td>
<td>Physics I B</td>
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<tr>
<td></td>
<td>CE111 Mechanics &amp; Structures</td>
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<tr>
<td></td>
<td>GE101 Introduction to Engineering</td>
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<tr>
<td></td>
<td>GE151 Introduction to Materials Science</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>ME111 Graphics and Engineering Drawing</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>SV111 Surveying</td>
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<table>
<thead>
<tr>
<th>Year II</th>
<th>Subject</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Chemistry IS</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>CE212 Mechanics of Solids</td>
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</tr>
<tr>
<td></td>
<td>CE213 Theory of Structures</td>
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</tr>
<tr>
<td></td>
<td>CE223 Engineering Geology</td>
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</tr>
<tr>
<td></td>
<td>CE224 Civil Engineering Materials</td>
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</tr>
<tr>
<td></td>
<td>CE231 Fluid Mechanics I</td>
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<td>CE252 Fluid Mechanics II</td>
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<td></td>
<td>EM200 Vector Calculus and Differential Equations</td>
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<tr>
<td></td>
<td>GE204 Engineering Computations I</td>
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</tr>
<tr>
<td></td>
<td>GE205 Engineering Computations II</td>
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<tr>
<td></td>
<td>GE250 Principles of Electrical Engineering</td>
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<td><strong>Total</strong></td>
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<table>
<thead>
<tr>
<th>Year III</th>
<th>Subject</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>CE314 Theory of Structures II</td>
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<tr>
<td></td>
<td>CE315 Structural Design</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>CE316 Stress Analysis</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>CE324 Soil Mechanics</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>CE325 Concrete and Metals Technology</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>CE333 Fluid Mechanics III</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>CE334 Open Channel Hydraulics</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>CE341 Hydrology</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>CE351 Civil Engineering Systems</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>CE372 Transportation</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>GE381 Statistical Methods</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>GE301 Technology and Human Values</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

**Notes:**

1. Physics IA may be substituted for Physics IB, with the approval of the Head of Department. This option is recommended for students with a strong mathematically/physics background who may wish to follow a combined degree programme or otherwise undertake further studies in Physics.

2. Standing will be granted in Mathematics I to students who complete both Mathematics IS and Mathematics 102. Students who wish to do so will be permitted to enrol in Mathematics IS and, after successful completion of that subject, permitted to enrol in Mathematics 102. Note that these subjects must be completed over a minimum of two years. Neither Mathematics IS nor Mathematics 102 contribute to WAM calculations.

3. SV111 involves a compulsory five-day series of surveying field exercises.

4. Chemistry I may replace Chemistry IS and two units of Elective.

5. CE223J involves two compulsory one-day field excursions.

6. Geology I may replace CE223J Engineering Geology and two units of Elective.

7. Mathematics IIA or IIB may replace EM200 and two units of Elective provided Topic CO is included.

8. In exceptional circumstances and with permission of the Head of Department of Civil Engineering and Surveying, CE456 Project may replace CE454 Civil Engineering Design and CE455 Project.

**SECTION FIVE**

**CIVIL ENGINEERING COURSE PROGRAMME**

<table>
<thead>
<tr>
<th>Year IV</th>
<th>Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CE417 Theory of Structures III</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>CE426 Geotechnical Engineering</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>CE442 Public Health Engineering</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>CE443 Water Resources Engineering</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>CE452 Civil Engineering Management</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>CE453 Civil Engineering Construction</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>CE454 Civil Engineering Design</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>CE455 Project</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Electives</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

**ELECTIVE REQUIREMENTS**

Five Elective units may be chosen from the following list of subjects offered by the Department of Civil Engineering and Surveying subject to the approval of the Head of that Department. Not all Elective subjects may be offered in any one year.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE418 Masonry and Timber Design</td>
<td>1</td>
</tr>
<tr>
<td>CE419 Dynamics and Stability of Structures</td>
<td>1</td>
</tr>
<tr>
<td>CE427 Rock Mechanics</td>
<td>1</td>
</tr>
<tr>
<td>CE435 River and Coastal Engineering</td>
<td>1</td>
</tr>
<tr>
<td>CE473 Engineering Surveying II</td>
<td>1</td>
</tr>
<tr>
<td>CE474 Highway Engineering</td>
<td>1</td>
</tr>
<tr>
<td>CE482 Finite Element Methods</td>
<td>1</td>
</tr>
<tr>
<td>CE490 Special Topic</td>
<td>1</td>
</tr>
<tr>
<td>CE491 Special Topic</td>
<td>1</td>
</tr>
<tr>
<td>CE692 Industrial Experience</td>
<td>1</td>
</tr>
<tr>
<td>CE693 Industrial Experience</td>
<td>1</td>
</tr>
<tr>
<td>CE694 Industrial Experience</td>
<td>1</td>
</tr>
<tr>
<td>CE695 Industrial Experience</td>
<td>1</td>
</tr>
<tr>
<td>SV561 Photogrammetry</td>
<td>2</td>
</tr>
<tr>
<td>SV572 Land Valuation</td>
<td>1</td>
</tr>
<tr>
<td>SV573 Town Planning</td>
<td>1</td>
</tr>
</tbody>
</table>

The five Elective units may consist of any subjects from the above list or any subjects offered within the Faculty of Engineering at 300 or 400 level, or by other Faculties subject to the approval of the Heads of the Department of Civil Engineering and Surveying and of the Department responsible for the subject.

**Notes:**

Elective subjects taken outside the Faculty of Engineering may only be selected from those subjects approved by Faculty Board. The list of approved subjects is presented at the end of Section 6.
### SUBJECTS ENTRY REQUIREMENTS

Students are advised to carefully note the prerequisite, corequisite and assumed knowledge requirements of the subjects in which they wish to enrol. Students who are found to have acted contrary to these requirements without a formal waiver being granted, may be withdrawn from the relevant subject(s) without notice. Also note that Year III subjects may not normally be taken until Year I is complete and that Year IV subjects may not normally be taken until Year II is complete (see Regulation 3).

<table>
<thead>
<tr>
<th>Subject</th>
<th>Prerequisite(s)</th>
<th>Corequisite(s)</th>
<th>Assumed Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE2092-5</td>
<td>Part-time Enrolment</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CE2012</td>
<td>CE111</td>
<td>-</td>
<td>Mathematics I</td>
</tr>
<tr>
<td>CE2013</td>
<td>CE111</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CE2231</td>
<td>-</td>
<td>-</td>
<td>GE151</td>
</tr>
<tr>
<td>CE224</td>
<td>-</td>
<td>-</td>
<td>Math I, Phys IA or IB</td>
</tr>
<tr>
<td>CE225</td>
<td>CE231</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CE232</td>
<td>CE231</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>EM250</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CE314</td>
<td>CE212</td>
<td>-</td>
<td>CE212</td>
</tr>
<tr>
<td>CE315</td>
<td>CE212</td>
<td>-</td>
<td>CE213</td>
</tr>
<tr>
<td>CE316</td>
<td>CE212</td>
<td>-</td>
<td>CE213</td>
</tr>
<tr>
<td>CE324</td>
<td>-</td>
<td>-</td>
<td>CE222, GE151</td>
</tr>
<tr>
<td>CE325</td>
<td>-</td>
<td>-</td>
<td>GE224, GE151</td>
</tr>
<tr>
<td>CE333</td>
<td>CE231</td>
<td>-</td>
<td>CE232</td>
</tr>
<tr>
<td>CE334</td>
<td>-</td>
<td>-</td>
<td>CE233</td>
</tr>
<tr>
<td>CE341</td>
<td>-</td>
<td>-</td>
<td>CE232, CE381</td>
</tr>
<tr>
<td>CE351</td>
<td>EM250</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CE371</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CE381</td>
<td>EM250</td>
<td>-</td>
<td>GE204 or SV232</td>
</tr>
<tr>
<td>GE301</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CE417</td>
<td>-</td>
<td>-</td>
<td>CE314, CE315, CE316</td>
</tr>
<tr>
<td>CE418</td>
<td>-</td>
<td>-</td>
<td>CE314, CE315</td>
</tr>
<tr>
<td>CE419</td>
<td>-</td>
<td>-</td>
<td>CE314</td>
</tr>
<tr>
<td>CE426</td>
<td>-</td>
<td>-</td>
<td>CE234</td>
</tr>
<tr>
<td>CE427</td>
<td>-</td>
<td>-</td>
<td>CE234</td>
</tr>
<tr>
<td>CE435</td>
<td>-</td>
<td>-</td>
<td>CE234</td>
</tr>
<tr>
<td>CE442</td>
<td>-</td>
<td>-</td>
<td>Chem IS</td>
</tr>
<tr>
<td>CE443</td>
<td>-</td>
<td>-</td>
<td>CE341, CE351</td>
</tr>
<tr>
<td>CE452</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CE453</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CE454</td>
<td>All Year III subjects</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CE455</td>
<td>All Year III subjects</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CE456</td>
<td>All Year III subjects</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CE473</td>
<td>SV111 (or CE171)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CE474</td>
<td>-</td>
<td>-</td>
<td>CE372</td>
</tr>
<tr>
<td>CE482</td>
<td>GE204, GE205</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CE490</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CE491</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### RECOMMENDED PART-TIME ATTENDANCE PATTERN

The Approved Programme may be completed by 7 Stages as given below. Students considering part-time study are advised to consult the Guide to Attendance Patterns at the beginning of this Section of the Handbook.

<table>
<thead>
<tr>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
<th>Stage 4</th>
<th>Stage 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics</td>
<td>Physics IB</td>
<td>Electrical Engineering</td>
<td>Chemical Engineering</td>
<td>Mathematics</td>
</tr>
<tr>
<td>CE111</td>
<td>CE111</td>
<td>CE233</td>
<td>CE151</td>
<td>CE151</td>
</tr>
<tr>
<td>GE101</td>
<td>GE205</td>
<td>GE250</td>
<td>GE204</td>
<td>GE204</td>
</tr>
<tr>
<td>GE151</td>
<td>GE204</td>
<td>GE204</td>
<td>GE204</td>
<td>GE204</td>
</tr>
</tbody>
</table>

### TRANSITION ARRANGEMENTS

The Approved Programme of the Civil Engineering course has been amended with effect from the 1988 academic year. All students enrolled in this course or a combined degree course of which it forms part, are required to meet the requirements of the new Approved Programme subject to the transition arrangements given below.

#### Year By Year Transition

<table>
<thead>
<tr>
<th>Year Completed in</th>
<th>Required to Complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987</td>
<td>In Subsequent Years</td>
</tr>
<tr>
<td>Year I</td>
<td>Year II less GE250 plus 1 unit of Elective, Year III and Year IV</td>
</tr>
<tr>
<td>Year II</td>
<td>Year III and Year IV</td>
</tr>
<tr>
<td>Year III</td>
<td>Year IV</td>
</tr>
</tbody>
</table>

Students by Subject Transition

Students out of phase with year by year progression in the Approved Programme and who have completed a particular subject or subjects in the list below will not be required to complete the corresponding subject or subjects listed.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Corresponding Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE130</td>
<td>GE250 Principles of Electrical Engineering</td>
</tr>
<tr>
<td>CE171</td>
<td>2 units of GE301 Surveying I</td>
</tr>
<tr>
<td>CE150</td>
<td>GE204 Electrical Engineering</td>
</tr>
<tr>
<td>GE211</td>
<td>GE204 Electrical Engineering</td>
</tr>
</tbody>
</table>
SECTION FIVE

COMPUTER ENGINEERING COURSE PROGRAMME

The Department of Electrical and Computer Engineering is the department responsible, under the Regulations Governing Bachelor Degrees Offered in the Faculty of Engineering (see Section 3) and the policies of the Faculty Board (see Section 4), for matters relating to the specialisation of Computer Engineering.

The programme of subjects set out below has been approved by the Faculty Board and leads to the award of the degree of Bachelor of Engineering (BE) in the specialisation of Computer Engineering.

Students enrolled prior to 1988 should carefully note the transition requirements.

APPROVED PROGRAMME

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year I</td>
<td></td>
</tr>
<tr>
<td>Mathematics I</td>
<td>4</td>
</tr>
<tr>
<td>Physics IA</td>
<td>4</td>
</tr>
<tr>
<td>EE100 Electrical and Computer Engineering I</td>
<td>4</td>
</tr>
<tr>
<td>GE101 Introduction to Engineering</td>
<td>1</td>
</tr>
<tr>
<td>GE151 Introduction to Materials Science</td>
<td>1</td>
</tr>
<tr>
<td>CE111 Mechanics and Structures</td>
<td>1</td>
</tr>
<tr>
<td>ME111 Graphics and Drawing Engineering</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
</tr>
<tr>
<td>Year II</td>
<td></td>
</tr>
<tr>
<td>Computer Science I</td>
<td>4</td>
</tr>
<tr>
<td>Mathematics IIA</td>
<td>4</td>
</tr>
<tr>
<td>EE200 Electrical Engineering II</td>
<td>5</td>
</tr>
<tr>
<td>Ph221 Electromagnetics and Quantum Mechanics</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
</tr>
<tr>
<td>Year III</td>
<td></td>
</tr>
<tr>
<td>Computer Science II</td>
<td>4</td>
</tr>
<tr>
<td>EE320 Electronics</td>
<td>4</td>
</tr>
<tr>
<td>EE350 Communications</td>
<td>2</td>
</tr>
<tr>
<td>EE370 Computer Engineering II</td>
<td>4</td>
</tr>
<tr>
<td>GE361 Automatic Control</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
</tr>
<tr>
<td>Year IV</td>
<td></td>
</tr>
<tr>
<td>EE483 Computer Engineering Project</td>
<td>4</td>
</tr>
<tr>
<td>EE485 Seminar</td>
<td>1</td>
</tr>
<tr>
<td>Computer Engineering Electives</td>
<td>6</td>
</tr>
<tr>
<td>General Electives</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
</tr>
</tbody>
</table>

Mathematics 102. Note that these subjects must be completed over a minimum of two years. Neither Mathematics 101 nor Mathematics 102 contribute to WAM calculations.

3. Only Computer Engineering students who have completed Computer Science I may enrol in Computer Science II. Those students granted standing in Computer Science I under 1987 transition arrangements will be provided with a transition programme.

ELECTIVE REQUIREMENTS

1. General Electives must be chosen from the list given below, except that:
   a) Part-time students may count up to 4 units of Industrial Experience subjects (EE092-5) as General Electives; and
   b) In exceptional circumstances, the Head of the Department of Electrical and Computer Engineering may permit students to take subjects approved by Faculty Board for Elective purposes (see Section 6) in place of those listed below in satisfaction of General Elective requirements. Enrolment in subjects other than those listed below will not be approved by the Dean unless the application is accompanied by written permission of the Head of Department.

   General Electives (preferred)
   
<table>
<thead>
<tr>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>GB301 Technology &amp; Human Values I*</td>
</tr>
<tr>
<td>ME481 Engineering Administration*</td>
</tr>
<tr>
<td>ME482 Engineering Economics I*</td>
</tr>
<tr>
<td>Economics I</td>
</tr>
<tr>
<td>Psychology I</td>
</tr>
<tr>
<td>Philosophy I</td>
</tr>
<tr>
<td>Mathematics IIC</td>
</tr>
<tr>
<td>Mathematics IICS</td>
</tr>
</tbody>
</table>

2. Computer Engineering Electives must be chosen from the list given below.

   Computer Engineering Electives Units
   
   | EE420 Advanced Electronics | 2 |
   | EE440 Advanced Control | 2 |
   | EE450 Advanced Communications | 2 |
   | EE460 Computer Software | 2 |
   | EE470 Computer Systems | 2 |

   Not all Computer Engineering Electives may be available in any one year.

*Notes:

1. All students enrolled prior to 1988 should carefully note the Transition Requirements and amended Elective Requirements published later in this section.
2. Standing will be granted in Mathematics I to students who complete both Mathematics IA and Mathematics 102. Students who wish to do so will be permitted to enrol in Mathematics IA and, after successful completion of that subject, permitted to enrol in

SUBJECTS ENTRY REQUIREMENTS

Students are advised to carefully note the prerequisite, corequisite and assumed knowledge requirements of the subjects in which they wish to enrol. Students who have found to have acted contrary to these requirements without a formal waiver being granted, may be withdrawn from the relevant subject(s) without notice.

Also note that Year III subjects may not normally be taken until Year I is complete and that Year IV subjects may not normally be taken until Year II is complete (see Regulation 3).

<table>
<thead>
<tr>
<th>Subject</th>
<th>Prerequisite(s)</th>
<th>Corequisite(s)</th>
<th>Assumed Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE000 subjects</td>
<td>Part-time Enrolment</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Mathematics IIA</td>
<td>Mathematics I</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>EE100</td>
<td>EE100 and Mathematics I</td>
<td>Physics IA</td>
<td>Mathematics I</td>
</tr>
<tr>
<td>EE201</td>
<td>EE201</td>
<td>Physics IA</td>
<td>EE100</td>
</tr>
<tr>
<td>Computer Science II</td>
<td>Computer Science I</td>
<td>EE310</td>
<td>EE200</td>
</tr>
<tr>
<td>EE320</td>
<td>EE320</td>
<td>EE350</td>
<td>EE320</td>
</tr>
<tr>
<td>EE350</td>
<td>EE350</td>
<td>EE370</td>
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<tr>
<td>EE370</td>
<td>EE370</td>
<td>EE370</td>
<td>EE370</td>
</tr>
<tr>
<td>GE361</td>
<td>EE361</td>
<td>EE361</td>
<td>EE361</td>
</tr>
<tr>
<td>GE420</td>
<td>GE420</td>
<td>GE420</td>
<td>GE420</td>
</tr>
<tr>
<td>GE440</td>
<td>GE440</td>
<td>GE440</td>
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<tr>
<td>GE450</td>
<td>GE450</td>
<td>GE450</td>
<td>GE450</td>
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<tr>
<td>GE460</td>
<td>GE460</td>
<td>GE460</td>
<td>GE460</td>
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<tr>
<td>EE470</td>
<td>EE470</td>
<td>EE470</td>
<td>EE470</td>
</tr>
<tr>
<td>EE483</td>
<td>EE483</td>
<td>EE483</td>
<td>EE483</td>
</tr>
<tr>
<td>EE485</td>
<td>EE485</td>
<td>EE485</td>
<td>EE485</td>
</tr>
</tbody>
</table>

Undergraduate students may only enrol in 500 or 600 level subjects with the permission of the Head of the Department of Electrical and Computer Engineering.

The prerequisite requirements of transition subjects are given in the relevant subject descriptions.

RECOMMENDED PART-TIME ATTENDANCE PATTERN

The Approved Programmes may be completed by 7 Stages as given below. Students considering part-time study are advised to consult the Guide to Attendance Patterns at the beginning of this section of the Handbook.

Stage I Mathematics I 8 units
EE100 8 units
EE100* 9 units
Stage II Physics IA 4 units
GE101 4 units
GE361 4 units
Stage III Mathematics IIA 4 units
EE200 4 units
EE200* 5 units
Stage IV Computer Science I 4 units
EE350 4 units
EE350* 5 units

* Students may elect to complete 4 industrial experience elective units EE092 - EE093 in lieu of 4 units of General Elective in Stage 6. In such cases the maximum rate at which industrial experience electives may be completed is one per year. The recommended pattern of EE100 subjects is shown in brackets. Taking 09 subjects in Stages 2 to 5 will allow students to bring Electrical or Computer Engineering Electives forward from Stage 7 to Stage 6.

TRANSITION ARRANGEMENTS

The Approved Programme in Computer Engineering has been amended with effect from the 1988 academic year to complete the revision commenced in 1987. All students enrolled in this course or a combined degree course of which it forms part, are required to meet the requirements of the new Approved Programme subject to the transition arrangements given below.

1. Students who commenced studies in 1987 will not be affected by the transition unless they were granted standing in subjects counting in Years III or IV.
2. Other students will be individually advised of the transition programme which they are required to follow in order to complete degree requirements. This programme, when taken with the subjects completed prior to 1988 will total 61 units for students first enrolled in the course in 1987 and 60 units for students who were enrolled in the course prior to that date.
3. Note that only Computer Engineering students who have completed Computer Science I may enrol in Computer Science II.
SECTION FIVE

ELECTRICAL ENGINEERING COURSE PROGRAMME

Science II. Students who were granted standing in Computer Science II under the 1987 transition arrangements will be advised of the transition subjects to be completed in lieu of Computer Science II.

Subject by Subject Transition

The transition arrangements to be determined for each subject will generally be based on the table of corresponding subjects presented below. The table is presented here as a matter of record.

Subjects | Corresponding Subjects
--- | ---
Mathematics II Parts 1 and 2 | Mathematics IIA
EE313 and EE314 | EE310 Power and Machines
EE323, EE324 and EE315 | EE320 Electronics
EE333 | 1 unit to be determined
EE451 and EE344 | EE350 Communications
EE326, EE326, GE325 and EE463 | EE370 Computer Engineering II
EE413 and EE417 | EE410 Advanced Power and Machines
EE421 and EE422 | EE420 Advanced Electronics
EE435 and EE447 | EE450 Advanced Communications
EE426 and EE425 | EE470 Computer Systems
EE486 | EE483, EE485 and 1 unit to be determined.

Exceptional Circumstances Arising in Transition

In order to provide for exceptional circumstances arising in particular transition cases the Dean may determine the transition programme to be followed.

ELECTRICAL ENGINEERING

The Department of Electrical and Computer Engineering is the department responsible, under the Regulations Governing Bachelors Degrees Offered in the Faculty of Engineering (see Section 3) and the policies of the Faculty Board (see Section 4), for matters relating to the specialisation of Electrical Engineering.

The programme of subjects set out below has been approved by the Faculty Board and leads to the award of the degree of Bachelor of Engineering (BE) in the specialisation of Electrical Engineering.

Students enrolled prior to 1988 should carefully note the transition requirements.

APPROVED PROGRAMME

Subjects | Units
--- | ---
Year I | 16
Mathematics I | 4
EE100 Electrical and Computer Engineering I | 4
GB101 Introduction to Engineering | 1
GB151 Introduction to Materials Science | 1
CE111 Mechanics and Structures | 1
ME111 Graphics and Engineering Drawing | 1

Year II | 15
Mathematics IIA | 4
EE200 Electrical Engineering II | 5
EE265 Electrical Engineering Computations | 2
ME231 Dynamics | 2
Ph221 Electromagnetics and Quantum Mechanics | 2

Year III | 15
EE310 Power and Machines | 2
EE320 Electronics | 3
EE350 Communications | 2
EE370 Computer Engineering II | 4
GE361 Automatic Control | 2
ME309 Mechanical Engineering Science | 2

Year IV | 15
EE484 Electrical Engineering Project | 4
EE485 Seminar | 1
Electrical Engineering Electives | 6
General Electives | 4

* Notes:

1. Students enrolled prior to 1987 are not required to complete GE101.
2. All students enrolled prior to 1988 should carefully note the Transition Requirements and amended Elective Requirements published later in this section.

DEAN UNLESS THE APPLICATION IS ACCOMPANIED BY WRITTEN PERMISSION OF THE HEAD OF DEPARTMENT.

General Electives (*preferred) | Units
--- | ---
EE301 Technology & Human Values I | 2
ME481 Engineering Administration | 1
ME482 Engineering Economics I | 4
Economics | 4
Psychology | 4
Philosophy | 4
Mathematics IIC | 4
Mathematics IICS | 4

2. Electrical Engineering Electives must be chosen from the list given below.

Electrical Engineering Electives | Units
--- | ---
EE410 Advanced Power and Machines | 2
EE420 Advanced Electronics | 2
EE440 Advanced Control | 2
EE540 Advanced Communications | 2
EE570 Computer Systems | 2
Not all Electrical Engineering Electives may be available in any year.

SUBJECTS ENTRY REQUIREMENTS

Students are advised to carefully note the prerequisite, corequisite and assumed knowledge requirements of the subjects in which they wish to enrol. Students who are found to have acted contrary to these requirements without a formal waiver being granted, may be withdrawn from the relevant subject(s) without notice.

Also note that Year III subjects may not normally be taken until Year II is complete and that Year IV subjects may not normally be taken until Year II is complete (see Regulation 3).

Subject | Prerequisite(s) | Corequisite(s) | Assumed Knowledge
--- | --- | --- | ---
EE09 subjects | Part-time Enrolment | - | -
Mathematics IIA | Mathematics I | - | -
EE200 | EE100 and Mathematics I | - | Physics IA
EE265 | Mathematics I | - | -
ME231 | Math I, Physics IA | - | -
Ph221 | Physics IA | - | Mathematics I
EE310 | EE200 | Ph221 | -
EE320 | EE200 | Ph221 | -
EE350 | EE200 | - | Ph221
EE370 | EE100 | - | -
GE361 | Mathematics IIA | - | -
ME309 | Math I, Physics IA | - | -
EE410 | EE310 | - | -
EE420 | - | - | -
EE440 | GE361 | - | -
EE450 | EE350 | - | -
EE470 | EE370 | - | -
EE484 | All Year III subjects | - | -
EE485 | - | EE483 or EE485 | -

Undergraduate students may only enrol in 500 or 600 level subjects with the permission of the Head of the Department of Electrical and Computer Engineering.

The prerequisite requirements of transition subjects are given in the relevant subject descriptions.
RECOMMENDED PART-TIME ATTENDANCE PATTERN

The Approved Programme may be completed by 7 Stages as given below. Students considering part-time study are advised to consult the Guide to Attendance Patterns at the beginning of this Section of the Handbook.

Stage 1
Mathematics I
EE100 8 units

Stage 2
Physics IA
GE101 6 units
GE151 6 units
GE111 6 units
ME111 6 units

Stage 3
Mathematics IIA
EE200 9 units

Stage 4
EE265 6 units
EE330 6 units
ME231 6 units
Ph221 (EE294)* 9 units

TRANSITION ARRANGEMENTS

The Approved Programme in Electrical Engineering has been amended with effect from the 1988 academic year to complete the revision commenced in 1987. All students enrolled in this course or a combined degree course of which it forms part, are required to meet the requirements of the new Approved Programme subject to the transition arrangements given below.

1. Students who commenced studies in 1987 will not be affected by the transition unless they were granted standing in subjects counting in Years III or IV.

2. Other students will be individually advised of the transition programme which they are required to follow in order to complete degree requirements. This programme, when taken with the subjects completed prior to 1988 will total 61 units for students commencing the course in 1987 and 60 units for students who were enrolled in the course prior to 1987.

Subject by Subject Transition

The transition arrangements to be determined for each student will generally be based on the table of corresponding subjects presented below. The table is presented here as a matter of record.

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Corresponding Subjects</th>
</tr>
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<tbody>
<tr>
<td>Mathematics IIA Parts 1 and 2</td>
<td>Mathematics IIA</td>
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<tr>
<td>ME131 and ME232</td>
<td>ME231 Dynamics</td>
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<td>EE313 and EE314</td>
<td>EE310 Power and Machines</td>
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<td>EE323, EE324 and EE315</td>
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<tr>
<td>EE333</td>
<td>1 unit to be determined</td>
</tr>
<tr>
<td>EE451 and EE444</td>
<td>EE310 Communications</td>
</tr>
<tr>
<td>EE325, EE362 and 2 units of Year III Elective</td>
<td>EE310 Computer Engineering II</td>
</tr>
<tr>
<td>ME251 and ME271</td>
<td>ME309 Mechanical Engineering Science</td>
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<td>EE413 and EE417</td>
<td>EE410 Advanced Power and Machines</td>
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<tr>
<td>EE421 and EE422</td>
<td>EE420 Advanced Electronics</td>
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<td>EE435 and EE447</td>
<td>EE450 Advanced Communications</td>
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<td>EE426 and EE455</td>
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<tr>
<td>EE486</td>
<td>EE494, EE485 and 1 unit to be determined.</td>
</tr>
</tbody>
</table>

Exceptional Circumstances Arising in Transition

In order to provide for exceptional circumstances arising in particular transition cases the Dean may determine the transition programme to be followed.

SECTION FIVE

ELECTRICAL ENGINEERING COURSE PROGRAMME

The Department of Mechanical Engineering is the department responsible, under the Regulations Governing Bachelors Degrees Offered in the Faculty of Engineering (see Section 3) and the policies of the Faculty Board (see Section 4), for matters relating to the specialization of Industrial Engineering.

The programme of subjects set out below has been approved by the Faculty Board and leads to the award of the degree of Bachelor of Engineering (BE) in the specialization of Industrial Engineering.

Students enrolled prior to 1987 should carefully note the transition requirements.

APPROVED PROGRAMME

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics I</td>
<td>Year I</td>
</tr>
<tr>
<td>Physics IB</td>
<td>4</td>
</tr>
<tr>
<td>CE111 Mechanics and Structures</td>
<td>4</td>
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<tr>
<td>EE100 Electrical and Computer Engineering I</td>
<td>4</td>
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<tr>
<td>GE101 Introduction to Engineering</td>
<td>2</td>
</tr>
<tr>
<td>ME111 Graphics and Engineering Drawing</td>
<td>1</td>
</tr>
<tr>
<td>Mathematics IIA Parts 1 and 2</td>
<td>Year II</td>
</tr>
<tr>
<td>ME215 Mechanical Engineering Design I</td>
<td>2</td>
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<tr>
<td>ME251 Dynamics</td>
<td>1</td>
</tr>
<tr>
<td>ME251 Fluid Mechanics I</td>
<td>1</td>
</tr>
<tr>
<td>ME271 Thermodynamics I</td>
<td>1</td>
</tr>
</tbody>
</table>

Notes:
1. Students who wish to do so will be permitted to enrol in Mathematics 102. Note that these subjects must be completed over a minimum of two years. Neither Mathematics 102 nor Mathematics 101 contribute to WAM calculations.
2. Students who complete both Mathematics 101 and Mathematics 102. Students who wish to do so will be permitted to enrol in Mathematics 102. Note that these subjects must be completed over a minimum of two years. Neither Mathematics 102 nor Mathematics 101 contribute to WAM calculations.
3. The final year project may be expanded by the selection of Project Elective Units ME497 or ME498. Students may enrol in either of these electives only with the written approval of the Head of the Department, after suitable supervisory arrangements have been made.

ELECTIVE REQUIREMENTS

Eight elective units shall be chosen in accordance with the following rules:
1. Elective units shall be selected from the list of Approved Elective Subjects (except as provided below).
2. At least one unit of Elective must be chosen from ME100 level subjects.
3. Part-time students may select up to 3 units from the Industrial Experience units offered by the Department of Mechanical Engineering.
4. In exceptional circumstances, the Head of the Department of Mechanical Engineering may approve the selection of elective units not listed in the list of Approved Elective Subjects.

Approved Elective Subjects

The list of approved Elective Subjects is set out in the Mechanical Engineering section. In addition, Industrial Engineering students may select ME413 Mechanical Engineering Design II.

SUBJECTS ENTRY REQUIREMENTS

Students are advised to carefully note the prerequisite, corequisite and assumed knowledge requirements of the subjects in which they wish to enrol. Students who are
SECTION FIVE  
INDUSTRIAL ENGINEERING COURSE PROGRAMME

The Approved Programme of the Industrial Engineering programme is the department responsible, under the Regulations Governing Bachelors Degrees Offered in the Faculty of Engineering (see Section 3) and the policies of the Faculty Board (see Section 4), for matters relating to the specialisation of Materials Engineering.

The programme of subjects set out below has been approved by the Faculty Board and leads to the award of the degree of Bachelor of Engineering (BEng) in the specialisation of Materials Engineering. This course is to be introduced in 1988 for the first time.

Year I and Year II subjects will be offered in 1988. Year III subjects are expected to be offered in 1989 and Year IV subjects offered in 1990.

APPROVED PROGRAMME

**Subjects**

<table>
<thead>
<tr>
<th>Year</th>
<th>Mathematics I</th>
<th>Chemistry I</th>
<th>Physics I</th>
<th>CEI111</th>
<th>MEI111</th>
<th>GEI01</th>
<th>GEI251</th>
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<tbody>
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<td>I</td>
<td>4</td>
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<td>II</td>
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<td>III</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Electives**

a) Subject to the approval of the Head of the Department of Chemical and Materials Engineering, Elective units may be selected from:

- Additional Mat400 level subjects; subjects offered in other engineering specialisations within the Faculty of Engineering; or from the Faculty of Engineering list of Approved Elective Units (see Section 6).

b) Part-time students may count Industrial Engineering subjects (Mat003 - Mat006) as Mat400 level Elective units.

**Notes**

1. With the approval of the Head of Department: Physics IB may be taken in lieu of Physics IA; ChE141 may be taken in lieu of GEI01; and CE212 may be taken in lieu of MEI214.

2. Standing will be granted in Mathematics I to students who complete both Mathematics I and Mathematics II. Students who wish to do so will be permitted to enrol in Mathematics II and, after successful completion of that subject, permitted to enrol in Mathematics I.

SECTION FIVE  
MATERIALS ENGINEERING COURSE PROGRAMME

**Elective Requirements**

a) Mat400 level Electives

i) a) These Elective units may be selected from any Mat400 level subjects not included in the Approved Programme.

b) Part-time students may count Industrial Engineering subjects (Mat003 - Mat006) as Mat400 level Elective units.

ii) Electives

- a) Subject to the approval of the Head of the Department of Chemical and Materials Engineering. Elective units may be selected from additional Mat400 level subjects; subjects offered in other engineering specialisations within the Faculty of Engineering; or from the Faculty of Engineering list of Approved Elective Units (see Section 6).

- b) Part-time students may count Industrial Engineering subjects (Mat003 - Mat006) as Elective units.

**Year I**

- EM215 Mechanical Engineering Design I
- MA214 Materials Engineering II
- MA203 Materials Engineering I
- MA205 Materials Engineering Laboratory
- MA211 Selection & Use of Materials

**Year II**

- MA316 Mechanical Engineering Design II
- MA303 Materials Engineering II
- MA305 Materials Engineering Laboratory II
- MA211 Selection & Use of Materials
- MA355 Electrochemistry & Corrosion

**Year III**

- MA371 Kinetics & Thermodynamics
- MA316 Mechanical Engineering Design II
- MA303 Materials Engineering II
- MA305 Materials Engineering Laboratory II
- MA211 Selection & Use of Materials
- MA355 Electrochemistry & Corrosion

**Year IV**

- MA482 Engineering Economics I
- MA484 Engineering Economics II
- MA491 Seminar
- MA496 Research Project

- Mat400 level Electives
- Electives

- 15
SUBJECTS ENTRY REQUIREMENTS

Students are advised to carefully note the prerequisite, corequisite and assumed knowledge requirements of the subjects in which they wish to enrol. Students who are found to have acted contrary to these requirements without a formal waiver being granted, may be withdrawn from the relevant subject(s) without notice.

Also note that Year III subjects may not normally be taken until Year I is complete and that Year IV subjects may not normally be taken until Year II is complete (see Regulation 3).

**Subject** | **Prerequisite(s)** | **Corequisite(s)** | **Assumed Knowledge**
--- | --- | --- | ---
Ma103-6 | Part-time Enrolment | - | -
EM220 | Mathematics I | - | -
EM220D | Mathematics I | - | -
GE204 | Mathematics I | - | -
GE205 | GE204 | - | -
Ma203 | GE151 | - | -
Ma205 | - | - | -
Ma211 | - | - | -
ME214 | CE111 | - | -
ME215 | CE111, ME111 | - | -
Ma311 | - | - | -
Ma300 level subjects (other than Ma311) and Ma400 level subjects will not be offered in 1988.

**RECOMMENDED PART-TIME ATTENDANCE PATTERN**

The Approved Programme may be completed by 7 Stages as given below. Students considering part-time study are advised to consult the Guide to Attendance Patterns at the beginning of this Section of the Handbook.

**Stage 1**
- Mathematics I
- CE111
- GE111
- GE151
- 8 units

**Stage 2**
- Physics IA*
- Chemistry I
- 8 units

**Stage 3**
- EM220
- GE204
- GE205
- ME215
- Ma211
- Ma303
- 8 units

**Stage 4**
- EM220D
- ME214*
- Ma203
- Ma205
- Ma311
- Ma404
- 9 units

**Stage 5**
- Chem31
- ME316
- Ma311
- Ma355
- 3 Elective units
- Ma405
- 9 units

**Stage 6**
- Ma303
- Ma305
- Ma306
- Ma406
- Ma407
- Ma408
- 10 units

**Stage 7**
- Ma491
- Ma496
- 9 units

**Year I**
- Mathematics I
- Physics IB
- CE111
- Physics III
- EE100
- Electrical and Computer Engineering
- GE101
- Introduction to Engineering
- GE115
- Introduction to Materials Science
- ME111
- Graphics and Engineering Drawing
- 16 units

**Year II**
- EM225
- Applied Statistics
- EM220
- Vector Calculi and Differential Equations
- GE204
- Engineering Computations I
- GE205
- Engineering Computations II
- Ma211
- Selection and Use of Materials I
- ME204
- Experimental Methods I
- ME214
- Mechanics of Solids I
- ME215
- Mechanical Engineering Design I
- ME231
- Dynamics
- ME251
- Fluid Mechanics I
- ME271
- Thermodynamics I
- 15 units

**Year III**
- GE211
- Theory and Applications of Electrical Energy Conversion
- GE301
- Technology and Human Values I
- GE301
- Automatic Control
- Ma341
- Selection and Use of Materials II
- ME305
- Experimental Methods II
- ME316
- Mechanical Engineering Design II
- ME333
- Dynamics of Machines
- ME343
- Mechanics of Solids II
- ME353
- Fluid Mechanics and Heat Transfer
- ME373
- Thermodynamics II
- 15 units

**Year IV**
- ME413
- Mechanical Engineering Design III
- ME406
- Project/Seminar
- Electives
- 10 units

**Notes:**
1. Physics IA may be taken in lieu of Physics IB. This is recommended for students with a strong mathematics/physics background who may wish to follow a combined degree programme or otherwise undertake further studies in Physics.
2. Standing will be granted in Mathematics I to students who complete both Mathematics IS and Mathematics 102. Students who wish to do so will be permitted to enrol in Mathematics 104 and, after successful completion of that subject, permitted to enrol in Mathematics 102. Note that these subjects must be completed over a minimum of two years. Neither Mathematics IS nor Mathematics 102 contribute to WAM calculations.
3. The final year project may be expanded by the selection of Project Elective Units ME497 or ME498. Students may enrol in either of these electives only with the written approval of the Head of the Department, after suitable supervisory arrangements have been made.

ELECTIVE REQUIREMENTS

Ten elective units shall be chosen in accordance with the following rules:

1. Elective units shall be selected from the list of Approved Elective Subjects (except as provided in rules 3 and 4 below).
2. At least four units of Elective must be chosen from Ma400 level subjects.
3. No more than 4 units may be selected from Strand 7 - Humanities.
4. Part-time students may select up to 3 units from the Industrial Experience units offered by the Department of Mechanical Engineering.
5. In exceptional circumstances, the Head of the Department of Mechanical Engineering may approve the selection of elective units not listed in the list of Approved Elective Subjects.

Approved Elective Subjects

The following subjects have been approved for selection by the Faculty Board and leads to the award of the degree of Bachelor of Engineering in the specialisation of Mechanical Engineering.

The programme of subjects set out below has been approved by the Faculty Board and leads to the award of the degree of Bachelor of Engineering (BE) in the specialisation of Mechanical Engineering.

Students enrolled prior to 1987 should carefully note the transition requirements.

**APPROVED PROGRAMME**

<table>
<thead>
<tr>
<th>Subject</th>
<th>Units</th>
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<tbody>
<tr>
<td>Mathematics I</td>
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<td>Physics IB</td>
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**Year I**

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**Year II**

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**Year III**

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<td>ME413</td>
<td>1</td>
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<tr>
<td>ME406</td>
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</tr>
</tbody>
</table>

**Notes:**
1. Notes apply to the selection of subjects in accordance with the Elective Requirements of their respective course.
2. Timetable clashes may prevent the selection of certain combinations of Elective subjects.
### SECTION FIVE
#### MECHANICAL ENGINEERING COURSE PROGRAMME

<table>
<thead>
<tr>
<th>Strand 1</th>
<th>Engineering Science</th>
<th>Units</th>
<th>Strand 6</th>
<th>Project/Directed Reading</th>
</tr>
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<tbody>
<tr>
<td>EM28D</td>
<td>Complex Analysis and Linear Algebra</td>
<td>1</td>
<td>ME497</td>
<td>Project/Directed Reading</td>
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<tr>
<td>Mat411</td>
<td>Selection and Use of Materials</td>
<td>1</td>
<td>ME498</td>
<td>Project/Directed Reading</td>
</tr>
<tr>
<td>Mat411</td>
<td>Selection and Use of Materials</td>
<td>1</td>
<td></td>
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</tr>
<tr>
<td>ME434</td>
<td>Fluid Mechanics and Heat Transfer</td>
<td>3</td>
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<tr>
<td>ME444</td>
<td>Fracture Mechanics</td>
<td>1</td>
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<td>ME445</td>
<td>Mechanics of Solids</td>
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<td>ME453</td>
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<td>Heat Transfer</td>
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<table>
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<tr>
<th>Strand 2</th>
<th>Computing</th>
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<tr>
<td>GE325</td>
<td>Microprocessor Systems and Applications</td>
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</tr>
<tr>
<td>GE405</td>
<td>Advanced Numerical Programming</td>
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### SUBJECTS ENTRY REQUIREMENTS

Students are advised to carefully note the prerequisites, corequisites and assumed knowledge requirements of the subjects in which they wish to enrol. Students who are found to have acted contrary to these requirements without a formal waiver being granted, may be withdrawn from the relevant subject(s) without notice.

Also note that Year III subjects may not normally be taken until Year I is complete and that Year IV subjects may not normally be taken until Year II is complete (see Regulation 3).

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<tr>
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<td>ME498</td>
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Undergraduate students may only enrol in 500 or 600 level subjects with the permission of the Head of the Department of Mechanical Engineering.
RECOMMENDED PART-TIME ATTENDANCE PATTERN

The Approved Programme may be completed by 7 Stages as given below. Students considering part-time study are advised to consult the Guide to Attendance Patterns at the beginning of this Section of the Handbook.

Stage 1

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<thead>
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Stage 2

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Stage 3

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Stage 4

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Stage 5

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TRANSITION ARRANGEMENTS

The Approved Programme of the Mechanical Engineering course was amended with effect from the 1987 academic year. All students enrolled in this course or a combined degree course of which it forms part, are required to meet the requirements of the new Approved Programme subject to the transition arrangements given below.

Year by Year Transition

Year Completed in 1988: Required to Complete Subsequent Years

Year I

- Year I less ME215 and ME231 plus EE131, GE130 and ME316
- ME122 plus ME232 and ME332
- ME413

Year II

- Year III less GE360 plus

Year III

- Year IV

Exceptional Circumstances Arising in Transition

In order to provide for exceptional circumstances arising in particular transition cases the Dean may determine the transition programme to be followed.

SECTION FIVE: MECHANICAL ENGINEERING COURSE PROGRAMME

APPROVED PROGRAMME

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ELECTIVE REQUIREMENTS

1. Students who completed Chemistry IS prior to 1987 but have not completed GE131, must complete GE131 and ME122
2. Students who completed ME202 prior to 1987 but have not completed GE360, must complete GE361, ME202 and then count as 1 unit of Elective.

SECTION FIVE: SURVEYING COURSE PROGRAMME

APPROVED PROGRAMME

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<tr>
<td>Physics IB</td>
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ELECTIVE REQUIREMENTS

1. Physics 1A may be substituted for Physics IB, with the approval of the Head of Department. This option is recommended for students with a strong mathematical physics background who may wish to follow a combined degree programme requiring Physics or otherwise undertake further studies in Physics.
2. Standing will be granted in Mathematics 1 to students who complete both Mathematics 1 and 2. Students who wish to do so will be permitted to enrol in Mathematics 2 and, after successful completion of that subject, permitted to enrol in Mathematics 2. Note that these subjects must be completed over a minimum of two years. Neither Mathematics 2 nor Mathematics 1 contribute to WAM calculations.
3. SV111 involves a compulsory five-day series of surveying field exercises.
4. CE223J involves two compulsory one-day field excursions.
5. SV213 includes a 5-day survey camp.
6. SV313 includes a 10-day live-in survey camp.
### SUBJECTS ENTRY REQUIREMENTS

Students are advised to carefully note the prerequisite, corquisite and assumed knowledge requirements of the subjects in which they wish to enrol. Students who are found to have acted contrary to these requirements without a formal waiver being granted, may be withdrawn from the relevant subject(s) without notice.

Also note that Year III subjects may not normally be taken until Year IV is complete and that Year IV subjects may not normally be taken until Year II is complete (see Regulation 3).

<table>
<thead>
<tr>
<th>Subject</th>
<th>Prerequisite(s)</th>
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### ENTRY REQUIREMENTS

**Year I**

- SV214, SV232, SV233
- SV213

**Year II**

- SV214
- SV232
- SV381

**Year III**

- SV371

**Year IV**

- SV475

### ATTENDANCE PATTERN

The Approved Programme may be completed by 7 Stages as given below. Subjects completing part-time study are advised to consult the Guide to Attendance Patterns at the beginning of this Section of the Handbook.

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<tr>
<th>Stage</th>
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### TRANSITION ARRANGEMENTS

The Approved Bachelor of Surveying Programme has been amended with effect from the 1988 academic year to complete the revision commenced in 1987. All students enrolled in this course are advised to carefully note the prerequisite, corequisite and assumed knowledge requirements of the subjects.

### Subject by Subject Transition

- **Economics I**
  - ME111, GE101 and 2 units of Elective
- **SV271**
  - SV314
- **SV241**
  - SV241
- **EM2AS**
  - CE381
- **Geodesy II**
  - 1 unit Elective
- **SV463 Advanced Cartography**
  - 1 unit Elective
- **Additional Transition Requirements**
  1. Students who have completed either Geography lIB or CE302 Civil Eng III prior to 1988 must complete CE302 and Geography IIB respectively. Students who have completed Geography IIB must enrol in CE302 in 1988.
  2. In exceptional circumstances, the Head of the Department may permit students to enrol in GE301 Technology and Human Values in lieu of SV371 Principles of Economics.

### Exceptional Circumstances Arising in Transition

In order to provide for exceptional circumstances arising in particular transition cases the Dean may determine the transition programme to be followed.

### Year by Year Transition

<table>
<thead>
<tr>
<th>Year Completed in 1987</th>
<th>Required to Complete in Subsequent Years</th>
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<tbody>
<tr>
<td>Year I</td>
<td>Year II less CE212 plus CE111</td>
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<tr>
<td>Year II</td>
<td>Year III less CE324, CE341, SV371, CE381</td>
</tr>
<tr>
<td>Year III</td>
<td>Year IV less CE443</td>
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</table>
About This Section

This section sets out detailed descriptions of the subjects offered by the Departments of the Faculty of Engineering and those subjects offered by departments of other faculties which are core subjects in the undergraduate programmes offered in the Faculty of Engineering.

A list of Approved Elective Subjects is also included. Students will need to consult the subject descriptions for these subjects in the relevant Faculty Handbooks.

A Guide to Subject Descriptions is given on this page.

GUIDE TO SUBJECT DESCRIPTIONS

Units

In undergraduate engineering subjects, one unit involves a total of 42 hours per year (1.5 hours per week for the whole year, or 3 hours per week for half a year) of lectures, laboratories, and tutorials. Where subjects from other faculties form part of an Engineering course, the unit value is determined by the Faculty Board.

In the Master of Engineering Science Requirements a unit is defined as exactly one-twelfth of a full-time year, and in all postgraduate course, including the Master of Engineering and Doctor of Philosophy the unit is understood to have the same value. This "postgraduate unit" is also defined as a programme which involves a student in a total of approximately 120 hours' work. This total includes all formal course work plus assignments and study. If the "unit" is a formal instructional course the 120-hour total includes 42 hours of lectures or the equivalent.

What the two "units" - undergraduate and postgraduate - have in common is therefore the same 42 "contact-hours" per year. The postgraduate unit is a larger fraction of the year's work than the undergraduate unit as postgraduate students are expected to do more work per contact-hour than undergraduate students.

Weightings

Each subject undertaken as part of an undergraduate programme in the Faculty has a weighting for use in Weighted Average Mark (WAM) calculations (refer to Faculty Policies in Section 4). Unless otherwise determined by Faculty Board, each engineering subject has a weighting associated with the level at which it is offered as set out below.

<table>
<thead>
<tr>
<th>Level</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>1</td>
</tr>
<tr>
<td>200</td>
<td>2</td>
</tr>
<tr>
<td>300</td>
<td>3</td>
</tr>
<tr>
<td>400/500/600</td>
<td>4</td>
</tr>
</tbody>
</table>

Computer Numbers

The six digit number which precedes the subject number and title of each subject is the Computer Code Number. The computer code numbers of relevant subjects should be quoted on all enrolment and variation of programme forms. The computer code numbers of all subjects offered within the Faculty of Engineering appear with the subject descriptions and are also listed in Section 8 of this Handbook.

Subject Numbers

Each subject offered by Departments within the Faculty of Engineering has been given an identification number with prefixed letters to aid identification of subjects. This is known as the Subject Number.

The letter prefix indicates the area of specialisation and often indicates the department responsible for the teaching of the subject concerned. The letter prefixes are as follows:

- ChE - Chemical Engineering
- CE - Civil Engineering
- ECE - Electrical and Computer Engineering
- EM - Engineering Mathematics
- GE - General Engineering
- M.E - Mechanical Engineering
- Mat - Materials Engineering
- SV - Surveying

Subject Title

Each subject is provided with a title which, together with the subject number, forms the subject name as described below.

Subject Name

The Subject Name of each subject contains the subject number and title in the following way:

<table>
<thead>
<tr>
<th>Computer Number</th>
<th>Subject</th>
<th>Number Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>521105</td>
<td></td>
<td>1 unit</td>
</tr>
</tbody>
</table>

CE111 Mechanics and Structures

The Computer Number and Subject Name of each subject should be included on all enrolment and variation of programme forms.

Prerequisites and Corequisites

Prerequisites are those subjects which the student must have been passed before enrolling in the subject.

Corequisites are those subjects in which the student must enrol concurrently unless he or she has previously passed them.

The Dean, on the recommendation of the Head of Department, may relax prerequisites and corequisites. However, relaxation will only be granted in the most exceptional circumstances. Students who wish to enrol in a subject for which they do not have the required prerequisites must apply to the Head of Department offering the subject on the appropriate form. Forms are available from the offices of the Departments of the Faculty of Engineering.

Students who enrol contrary to subject entry requirements may be withdrawn from the relevant subjects without notice.

Withdrawal from a subject will normally result in withdrawal from any corequisite subjects without notice.

Assumed Knowledge

Many subjects are taught on the basis of an assumption that students have previously completed certain other subjects although those subjects have not been determined to be prerequisites. The particular subject(s) which are assumed to have been completed in each case are indicated in the Subject Entries set out in the following pages. It is the responsibility of each student to ensure that they have met the assumed knowledge requirement of each subject in which they enrol. If in doubt, students should discuss the matter with the lecturer of the subject in which they intend to enrol. It should be noted that students may enrol only in those subjects approved by the Dean. Such approval may be withheld or may be revoked where it becomes apparent that a student has not attained the level of knowledge assumed by a subject in which enrolment has been sought.

Examinations and Assessment

Refer to policies 3.1 to 3.5 of the Faculty's Policies on Undergraduate Performance and Progress published in Section 4 of this Handbook.

Hours

All subjects in the Faculty of Engineering are based on units of 42 contact hours each.

The 42 contact hours are spread over a whole year (1.5 hours per week for 28 weeks) or over a half year (3 hours per week for 14 weeks). As far as possible this information is given in the University timetable. If in doubt, students should check with Departments before completing their enrolment.

Content

Each subject entry gives a general description of the content of the subject and indicates the broad areas covered.

Texts

Where appropriate, each subject entry indicates the texts used. In most cases it is recommended that students purchase the texts indicated, however, students may wish to consult with the lecturer concerned before finalising the purchase of texts.
SECTION SIX

CHEMICAL ENGINEERING SUBJECT DESCRIPTION

INDUSTRIAL EXPERIENCE

511104 CHE002 1 unit
511105 CHE003 1 unit
511106 CHE004 1 unit
511107 CHE005 1 unit

Prerequisite Part-time enrolment

These subject units are designed to formalise periods of Industrial Experience gained by part-time students only. Each of the Industrial Experience units is equivalent to one unit of 42 hours. Students will be required to present a report giving a connected account and critical evaluation of their engineering activities and experience during the year. These units may be counted by students towards satisfaction of Elective requirements. (see also Section 4 of this Handbook)

511108 CHEI41 INDUSTRIAL PROCESS PRINCIPLES


511109 CHE151 INDUSTRIAL CHEMICAL PROCESSES AND EQUIPMENT

This subject is only available in 1988 to students requiring it for transition purposes.

An introduction to the structure and organisation of the chemical and process metallurgical industries in Australia, with reference to the world scene. Descriptions of the 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.

Text

Austin, O. T.

512224 CHE241 PROCESS ANALYSIS I

This subject is only available in 1988 to students requiring it for transition purposes.

Prerequisite CHE151

Visits to selected plants in the Newcastle (or Sydney) area. Detailed reports required on specified plants.

512221 CHE242 PROCESS ANALYSIS II

Prerequisite Mathematics I

Part 1

Elementary statics, equilibrium in two dimensional force systems, axial and shear forces, bending and twisting of bars, first and second moments and area with applications to design of simple structures and piping systems. Design of unfired pressure vessels. Membrane theory, stresses in thin-walled vessels. Code requirements.

Texts:

S.A.A. Code
Engineering Drawing Practice (AS C21-1982)

S.A.A. Code
Unfired Pressure Vessels (AS 1210-1977)

Gorenc, B.
Steel Designers Handbook (NSW University Press 1984)

Nash, W.A.
Theory and Problems of Strength of Materials (Schaum 1977)

Part 2

Computer programming with particular emphasis on programming style. The use of terminals files and editing techniques will be covered. Also some aspects of computer hardware and data handling will be considered. Some numerical analysis techniques will be discussed to provide examples for programming. These will include solution of single non-linear equations, interpolation, curve fits, differentiations, integration and systems of equations, linear and non-linear.

Texts

Handbook for VAX/VMS (University of Newcastle Computing Centre)

512225 CHE251 STRUCTURES AND PRESSURE VESSEL DESIGN

This subject is only available in 1988 to students requiring it for transition purposes.

Elementary statics, equilibrium in two dimensional force systems, axial and shear forces, bending and twisting of bars, first and second moments and area with applications to design of simple structures and piping systems. Design of unfired pressure vessels. Membrane theory, stresses in thin-walled vessels. Code requirements.

Texts:

S.A.A. Code
Engineering Drawing Practice (AS C21-1982)

S.A.A. Code
Unfired Pressure Vessels (AS 1210-1977)

Gorenc, B.
Steel Designers Handbook (NSW University Press 1984)

Nash, W.A.
Theory and Problems of Strength of Materials (Schaum 1977)

512230 CHE252 CHEMISTRY LABORATORY

Prerequisite Chemistry IIC

The laboratory courses in Organic and Inorganic Chemistry taken in the Department of Chemistry as part of Chemistry IIA may be taken as two elective units. Students passing CHE252 will be deemed to have passed Chemistry IIA for prerequisite purposes.

512226 CHE261 SEPARATION PROCESSES

This subject is only available in 1988 to students requiring it for transition purposes.

Prerequisites Chemistry I, Mathematics I, CHE141


Texts

Coulson, J.M. and Richardson, J.F.
Chemical Engineering, Vol. I (S.I. units) (Pergamon 1977)

Pitts, R.D. & Sisam, L.E.
Heat Transfer (Schaum 1977)

Perry, J.H. and Chilton, C.H.
Chemical Engineers Handbook 5th edn (McGraw-Hill 1973)

Sarofoo, A.C. & Wall, T.W.
Notes on Radiation Heat Transfer (University of Newcastle)

512232 CHE262 TRANSFER PROCESSES I

Prerequisites Chemistry I, Mathematics I, CHE141

Part 1


Texts

Coulson J.M. and Richardson, J.F.
Chemical Engineering, Vol. I (S.I. units) (Pergamon 1977)
Perry, R.D. & Sisson L.E.
Heat Transfer (Schaum 1977)

Perry, J.H. & Chilton, C.H.
Chemical Engineers Handbook 5th edn (McGraw-Hill 1985)

Sarofim, A.C. & Wall, T.F.
Notes on Radiation Heat Transfer (University of Newcastle)

SECTION 6 CHEMICAL ENGINEERING SUBJECT DESCRIPTION

Course Prerequisites

CHE291 2 units
CHE272 1 unit

Course Corequisites

CHE272 LABORATORY
Corequisite CHE262
A set of experiments illustrating the fundamentals of fluid flow, heat and mass transfer.

CHE300 SELECTED TOPICS IN CHEMICAL ENGINEERING
This subject may only be taken by students requiring it for transition purposes.

CHE342 PROCESS ANALYSIS II
This subject is only available in 1988 to students requiring it for transition purposes.

CHE324 PROCESS ENGINEERING
This subject is only available in 1988 to students requiring it for transition purposes.

CHE353 PROCESS ECONOMICS
This subject is only available in 1988 to students requiring it for transition purposes.

CHE362 TRANSFER PROCESSES II
Prerequisites CHE262, CHE355, EMECO

Part 1

Part 2

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

Shaw, D.C.
Introduction to Colloid and Surface Chemistry (Butterworth 1980)

Part 3
Heat and mass transfer in unsteady state conditions, transport theory for heat and mass transfer in laminar and turbulent flow conditions; mass transfer with chemical reaction.

Text
Bird, R.B., Stewart, W.E. and Lightfoot E.N.
Transport Phenomena (Wiley 1960)

513231 1 unit

CHE362 SOLIDS HANDLING AND MINERALS PROCESSING
This subject is only available in 1988 to students requiring it for transition purposes.

Prerequisite CHE272


Texts
McCabe, W.L. and Smith, J.C.
Unit Operations of Chemical Engineering student edition (McGraw-Hill 1976)
### SECTION SIX CHEMICAL ENGINEERING SUBJECT DESCRIPTION

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Units</th>
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<tr>
<td>513240</td>
<td>ChE353 SEPARATION PROCESSES</td>
<td>2 units</td>
</tr>
<tr>
<td><strong>Prerequisite</strong> ChE262</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>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, crystallisation and drying, hydraulic design of mass transfer equipment; stage efficiency, energy requirements; analysis of multi-component separation processes including azeotropic, extractive and complex distillation. Text</td>
<td></td>
</tr>
<tr>
<td>513232</td>
<td>ChE371 KINETICS AND THERMODYNAMICS</td>
<td>1 unit</td>
</tr>
<tr>
<td><strong>Prerequisite</strong> Chemistry 1, ChE262</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Corequisite ChE262</td>
<td></td>
</tr>
<tr>
<td>513233</td>
<td>ChE372 FUEL TECHNOLOGY I</td>
<td>1 unit</td>
</tr>
<tr>
<td><strong>Prerequisite</strong> Chemistry 1, ChE262</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Corequisite ChE262</td>
<td></td>
</tr>
<tr>
<td>513234</td>
<td>ChE373 FURNACE HEAT TRANSFER</td>
<td>1 unit</td>
</tr>
<tr>
<td><strong>Prerequisite</strong> ChE262</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Corequisite ChE262</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Furnace type and uses; high temperature transfer mechanisms. Generalised model of furnace efficiency and losses. Convector heat transfer on large surfaces, from impinging jets; heat transfer in packed beds. Conductive thermal storage losses. Radiative exchange between surfaces; exchange areas.</td>
<td></td>
</tr>
<tr>
<td>513241</td>
<td>ChE374 THEORY OF METALLURGICAL PROCESSES</td>
<td>2 units</td>
</tr>
<tr>
<td><strong>Prerequisite</strong> ChE262</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SECTION SIX  CHEMICAL ENGINEERING SUBJECT DESCRIPTION

514150  2 units
CHE486 PROCESS CONTROL.
Prerequisite EMDCO

Text
Dooherin, E.O.
Control System Principles and Design (Wiley Int.Ed., 1985)
or
Stephanopoulos, G.

514138  2 units
CHE490 DESIGN PROJECT
Prerequisite All Year III subjects
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 report, students are required to take a two day design paper.

514139  1 unit
CHE491 SEMINAR
Prerequisite All Year III subjects
Regular two hour seminar sessions will be held during the year for discussion of literature reviews, chemical engineering practice and research within the department. Each student will present not less than two half-hour papers in the course of the year.

514140  3 units
CHE492 RESEARCH PROJECT
Prerequisite All Year III subjects
An assigned task of experimental investigation, or the design, construction and testing of experimental equipment to be reported formally in a thesis.

514141  2 units
CHE494 LABORATORY PROJECT
Prerequisite All Year III subjects
A minor experimental investigation of a nominated project.

514142  2 units
CHE495 DESIGN PROJECT
Prerequisite All Year III subjects
A minor design report of a nominated small chemical factory.

514144  4 units
CHE496 RESEARCH PROJECT
Prerequisite All Year III subjects
An assigned task of experimental investigation, or the design, construction and testing of experimental equipment to be reported formally in a thesis.

514145  4 units
CHE497 DESIGN PROJECT
Prerequisite All Year III subjects
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 report, students are required to take a two day design paper.

514152  4 units
CHE497P DESIGN PROJECT
Prerequisite All Year III subjects
As for CHE497, with an emphasis on topics drawn from the field of extractive metallurgy.

514157  2 units
CHE511 COAL COMBUSTION
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 relation with ash formation, deposition, ash collection, SOx emissions, 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 characterizing coal.

514158  2 units
CHE512 COAL TECHNOLOGY
The course will cover the existing technologies associated with coal use, particularly those for coal fired plant. Topics

GENERAL INFORMATION  PRINCIPAL DATES 1988

<table>
<thead>
<tr>
<th>SUBJECT DESCRIPTION</th>
<th>PRINCIPAL DATES 1988</th>
</tr>
</thead>
<tbody>
<tr>
<td>(See separate entry for Faculty of Medicine)</td>
<td>November</td>
</tr>
<tr>
<td>January</td>
<td>7 Monday Annual Examinations begin</td>
</tr>
<tr>
<td>1 Friday Public Holiday — New Year’s Day</td>
<td>25 Friday Annual Examinations end</td>
</tr>
<tr>
<td>8 Friday Last day for return of Application for Re-Enrolment Forms — Continuing Students</td>
<td>1989 January</td>
</tr>
<tr>
<td>13 Wednesday Deferred Examinations begin</td>
<td>9 Monday Deferred Examinations begin</td>
</tr>
<tr>
<td>22 Friday Deferred Examinations end</td>
<td>20 Friday Deferred Examinations end</td>
</tr>
<tr>
<td>26 Tuesday Public Holiday — Australia Day</td>
<td>1989 February</td>
</tr>
<tr>
<td>31 Sunday Applications for residence in Edwards Hall late after this date</td>
<td>20 Monday First Term begins</td>
</tr>
</tbody>
</table>

February
2 Wednesday
2 New students attend in person to enrol and pay charges
5 Friday
9 Tuesday
10 Re-enrolment Approval Sessions for re-enrolling students
11 Thursday
16 Tuesday Last enrolment session for new students
19 Friday Last enrolment session for re-enrolling students
22 Friday First Term begins

April
11 Friday Good Friday — Easter Recess commences
18 Friday
25 Friday Public Holiday — Anzac Day
28 Monday Last day for withdrawal without academic penalty from first half year subjects
(See page (iv) for Dean’s discretion)
29 Friday First Term ends

May
1 Monday Examinations begin
6 Monday Examinations end
20 Monday Second Term begins

June
6 Monday Public Holiday — Queen’s Birthday
27 Monday Examinations begin
30 Thursday closing date for applications for selection to the Bachelor of Medicine course in 1989

July
8 Friday Examinations and
31 Friday Examinations end

August
1 Monday Last day for withdrawal without academic penalty from fall year subjects
(See page (iv) for Dean’s discretion)
12 Monday Second Term ends
15 Monday Examinations begin
19 Friday Examinations end
26 Monday Third Term begins

September
5 Monday Third Term begins
26 Monday Last day for withdrawal without academic penalty from second half year subjects
(See page (iv) for Dean’s discretion)

October
1 Saturday Closing date for applications for enrolment 1989 (Undergraduate courses other than Medicine)
3 Monday Public Holiday — Labor Day
28 Friday Third Term ends

#Note: Date not finalised
The following groups will be effectively exempted from the charge by receiving a special allowance to offset the charge:
- beneficiaries under Austudy;
- holders of an award under the Postgraduate Awards Scheme, and
- holders of Absoluta grants.

Students in these categories will be reimbursed through the student allowance payments arrangements.

Overseas students who are liable for the Overseas Students Charge (OSC) will be required to pay the administration charge to the University, but the OSC calculated each year will be reduced by the amount of the administration charge.

**Assistance**

(a) **Austudy**
Higher education students on Austudy allowance will receive a special payment of $253 to cover the administration charge.

(b) **Loans**
Loans are available to eligible students to pay university charges. The loan period is normally 3-6 months but in appropriate circumstances may be taken over 12 months. Enquiries should be directed to Mr J. Birch, Student Administration Office.

**METHOD OF PAYMENT**

Students are requested to pay charges due by mailing their cheque and the Statement of Charges Payable form to the University Cashier. The Cashier's internal mail deposit box in the McMullin Building may also be used. Payment should be addressed to the Cashier, University of Newcastle, NSW 2308. Cheques and money orders should be payable to the University of Newcastle. Cash payment must be made at the Cashier's Office in the McMullin Building between the hours of 10 am to 12 noon or 2 pm to 4 pm. These hours will be extended in February.

**SCHOLARSHIP HOLDERS AND SPONSORED STUDENTS**

Students holding scholarships or receiving other forms of financial assistance must lodge with the Cashier their Statement of Charges Payable form together with a warrant or other written evidence that charges will be paid by the sponsor. Sponsors must provide a separate voucher warrant or letter for each student sponsored.

**LOANS**

Students who do not have sufficient funds to pay charges should seek a loan from their bank, building society, credit union or other financial institution. Applications for a loan from the Student Loan Fund should be made to Mr. J. Birch, Student Administration Office. Arrangements should be made well in advance to avoid the risk of a late charge.

**REFUND OF CHARGES**

A refund of the General Services Charge paid on enrolment or part thereof will be made when the student notifies the Student and Faculty Administration Office of a complete withdrawal from studies by the following dates.

- Notification on or before 11th March 1988: 100% refund.
- Notification on or before 24th June 1988: 50% refund.
- After 24th June 1988: No refund.

A refund cheque will be mailed to a student or if applicable a sponsor. Any change of address must be advised.

A refund will not be made before 31 March 1988.

The Higher Education Administration Charge will only be refunded if notification of complete withdrawal is received on or before 19th February 1988. A refund of the charge for complete withdrawal will not be made after that date.

**HIGHER DEGREE CANDIDATES**

Higher degree candidates are required to pay the Higher Education Administration charge and the General Services charge and Union Entrance charge, if applicable. Where the enrolment is effective from First or Second Term, the General Services charge covers the period from the first day of the term to the Friday immediately preceding the first day of First Term in the following academic year. Where enrolment is on or after the first day of Third Term, the General Services charge paid will cover liability to the end of the long vacation following the next academic year.

The Higher Education Administration charge applies to each academic year, e.g. if enrolment is on the first day of third term the charge is payable for that term. On enrolment in the subsequent year a further charge is payable for each year.

**CAMPUS TRAFFIC AND PARKING**

Persons wishing to bring motor vehicles (including motor cycles) on to the campus are required to complete a parking registration form for each vehicle. Completed forms must be lodged with the Attendant (Patrol) Office located off the foyer of the Great Hall. All persons must comply with the University's Traffic and Parking Regulations including parking in approved parking areas, complying with road signs and not exceeding 35 k.p.h. on the campus.

If the Manager, Buildings and Grounds, after affecting the person a period of seven days in which to submit a written statement is satisfied that any person is in breach of Regulations, he may:

- (a) warn the person against committing any further breach;
- (b) impose a fine; or
- (c) refer the matter to the Vice-Chancellor.

The range of fines which may be imposed in respect of various categories of breach includes:

- Parking in areas not set aside for parking, up to $15
- Parking in special service areas, e.g. loading bays, by fire hydrants, etc., up to $15
- Driving offences — including speeding and dangerous driving, up to $30
- Failing to stop when signalled to do so by an Attendant (Patrol), up to $30
- Refusing to give information to an Attendant (Patrol), up to $30
- Failing to obey the directions of an Attendant (Patrol), up to $30
- The Traffic and Parking Regulations are stated in full in the Calendar, Volume 1.

**CHEMICAL ENGINEERING SUBJECT DESCRIPTION**

Covered may 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 fluidized firing, fluidized bed and clean up for gases and solids will also be given.

510159 2 units

**CHEM 513 FURNACE ENGINEERING**

Furnace construction and refractories. Heat balances and efficiency. The importance of conversion and radiative transfer. The treatment of radiation in furnaces, emitters in coal fired furnaces, surface emissivities 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, swirled jets. The modelling of flame processes and furnace heat transfer.
### Section Six

<table>
<thead>
<tr>
<th>Subject Description</th>
<th>CIVIL ENGINEERING SUBJECT DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Industrial Experience</strong></td>
<td></td>
</tr>
<tr>
<td>521092 CE002</td>
<td>1 unit</td>
</tr>
<tr>
<td>521093 CE093</td>
<td>1 unit</td>
</tr>
<tr>
<td>521094 CE094</td>
<td>1 unit</td>
</tr>
<tr>
<td>521095 CE095</td>
<td>1 unit</td>
</tr>
</tbody>
</table>

Prerequisite: Part-time enrolment

These subject units are designed to formalise periods of Industrial Experience gained by part-time students only. Each student of the Industrial Experience units is equivalent to one unit of 42 hours. 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 by part-time students as electives. (See Section 4 of this Handbook).

<table>
<thead>
<tr>
<th>Subject Description</th>
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</thead>
<tbody>
<tr>
<td>521105 1 unit CE111</td>
<td>MECHANICS AND STRUCTURES</td>
</tr>
</tbody>
</table>

Introduction to the behaviour of structures. Statics; forces as vectors, resultant, equilibrium in two dimensions. Beams, trusses; method of joints, method of sections. Statical determinacy. Compatibility, properties of sections, stress, vectors, resultant, equilibrium in two dimensions. Beams, stability. Sections, combined stresses, failure criteria; column, stability, Euler's formula.

Texts
- Atkins, K.J. et al Mechanics and Structures (Science Press)
- Atkins, K.J., Teaching Programmes in Mechanics and Structures (Science Press)

Prerequisite: CE111

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>522112 2 units CE214</td>
<td>CIVIL ENGINEERING MATERIALS</td>
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</tbody>
</table>

Assumed Knowledge GE151


Texts
- Jackson, N., Civil Engineering Materials (Macmillan 1983)

Prerequisite: CE212

<table>
<thead>
<tr>
<th>Subject Description</th>
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<tbody>
<tr>
<td>522202 1 unit CE231</td>
<td>FLUID MECHANICS I</td>
</tr>
</tbody>
</table>

Assumed Knowledge Mathematics I, Physics IA or IB

Fluid properties. Fluid statics, stability of submerged and floating bodies, relative equilibrium. Fluid-flow concepts and basic equations of continuity, energy, linear and angular momentum.

Text

Prerequisite: CE231

<table>
<thead>
<tr>
<th>Subject Description</th>
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</thead>
<tbody>
<tr>
<td>522204 1 unit CE232</td>
<td>FLUID MECHANICS II</td>
</tr>
</tbody>
</table>


Text As for CE231

Prerequisite: CE232

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<tr>
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</thead>
<tbody>
<tr>
<td>523333 2 units CE302</td>
<td>CIVIL ENGINEERING IIIS</td>
</tr>
</tbody>
</table>

Assumed Knowledge CE201


Prerequisite: CE302

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<thead>
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<tbody>
<tr>
<td>523312 1 unit CE314</td>
<td>THEORY OF STRUCTURES II</td>
</tr>
</tbody>
</table>

Assumed Knowledge CE212

Consider moment distribution, introduce sway. Converse flexibility (force) method. Stiffness method; member stiffness matrix, structure stiffness matrix by deformation approach. Influence lines. Introduce plastic theory of structures, bounding theorems.

Texts

Prerequisite: CE312

<table>
<thead>
<tr>
<th>Subject Description</th>
<th>CIVIL ENGINEERING SUBJECT DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>523315 2 units CE315</td>
<td>STRUCTURAL DESIGN</td>
</tr>
</tbody>
</table>

Assumed Knowledge CE213


Texts

Prerequisite: CE312

<table>
<thead>
<tr>
<th>Subject Description</th>
<th>CIVIL ENGINEERING SUBJECT DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>523356 1 unit CE333</td>
<td>FLUID MECHANICS III</td>
</tr>
</tbody>
</table>

Assumed Knowledge CE232


Text As for CE231

Prerequisite: CE333

<table>
<thead>
<tr>
<th>Subject Description</th>
<th>CIVIL ENGINEERING SUBJECT DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>523311 1 unit CE334</td>
<td>OPEN CHANNEL HYdraulics</td>
</tr>
</tbody>
</table>

Assumed Knowledge CE333


Text
- French, R.H. Open Channel Hydraulics (McGraw-Hill 1986)

Prerequisite: CE334

<table>
<thead>
<tr>
<th>Subject Description</th>
<th>CIVIL ENGINEERING SUBJECT DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>523315 1 unit CE341</td>
<td>HYDROLOGY</td>
</tr>
</tbody>
</table>

Assumed Knowledge or Corequisites CE222, CE381

Hydrologic cycle processes; precipitation, infiltration, evaporation, transpiration, runoff and groundwater. Measurement of precipitation and streamflow. Flood hydrology; rainfall frequency analysis, rational method, unit hydrograph methods, runoff and flood routing. Yield hydrology; water balance, rainfall-runoff relationships, flow duration, storage yield analysis. Groundwater hydrology; aquifers, well hydraulics, recharge and extraction, geohydraulics, digital models.
CE351 CIVIL ENGINEERING SYSTEMS
General introduction to the systems approach. Techniques available as aids to the identification of optimal policies - mathematical modelling, computer simulation, various mathematical programming techniques, heuristics. Choice of techniques, problem formulation. Example applications of the systems approach to civil engineering problems.

CE372 TRANSPORTATION ENGINEERING
Elements of regional planning, land-use/transport interaction; transportation modes and system characteristics; transportation demand estimates, data collection; traffic engineering; highway engineering; driver, vehicle and road characteristics, road geometrics; road construction, drainage, pavements, maintenance.

Texts
Lay, M.G.
- Source Book for Australian Roads (Australian Road Research Board)

CE381 STATISTICAL METHODS
Prerequisite EM2CO
Assumed Knowledge GE204 or SV232

Texts
Bowles, J.E.

CE419 DYNAMICS AND STABILITY OF STRUCTURES
Assumed Knowledge CE314

CE426 GEOTECHNICAL ENGINEERING
Assumed Knowledge CE324
Site investigation, design of shallow foundations, piled foundations, soil improvement, design of embankments, cuttings, earth dams.

Text
Bowles, J.E.

CE427 ROCK MECHANICS
Assumed Knowledge CE324
Index properties and classification, rock strength and failure criteria, deformation of rocks, in situ stress, planes of weakness, foundations on rock, underground openings, rock slopes.

CE428 GEOTECHNICAL ENGINEERING
Assumed Knowledge CE324
Site investigation, design of shallow foundations, piled foundations, soil improvement, design of embankments, cuttings, earth dams.

Text
Bowles, J.E.

CE435 RIVER AND COASTAL ENGINEERING
Assumed Knowledge CE334

Text
Henderson, F.M.
- Open Channel Flow (Collier-Macmillan, 1966)

CE443 WATER RESOURCES ENGINEERING
Assumed Knowledge CE341 and CE351
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.

CE452 CIVIL ENGINEERING MANAGEMENT
Management: construction company failures and the need for efficient management; principles of management, management functions and techniques; nature and type of organisational structures. Industrial relations and law. Administration: costing; estimating; engineering contracts; drawings and specifications; tendering, Project Planning and Control; planning; constructing and analysing networks; resource levelling; cost minimization; presentation of information; control.

CE453 CIVIL ENGINEERING CONSTRUCTION
Construction Plant: classification, selection and use of plant; plant organisation; plant cost, purchase or hire; site investigation and temporary works; Construction Methods and Equipment: earthmoving; drilling and blasting; tunneling; foundation drilling; piling; bridge and building construction.

Text
Antill, J.M. and Ryan, P.W.S.
- Civil Engineering Construction (Angus and Robertson, 1973)

CE454 CIVIL ENGINEERING DESIGN
Prerequisite All Year III subjects
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.

CE455 PROJECT
Prerequisite All Year III subjects
In exceptional circumstances and with the permission of the Head of the Department of Civil Engineering and Surveying...

Part 2


Part 3


Part 4

An introduction to structured programming and the design of algorithms which use these data structures. An introduction to the concept of an abstract data type and the abstraction and implementation of data types including lists, stacks, queues, trees and graphs. Particular attention is given to the problem of sorting and some common algorithms and design techniques such as divide-and-conquer, backtracking and greedy algorithms.
SECTION SIX

ELECTRICAL AND COMPUTER ENGINEERING SUBJECT DESCRIPTION

The course comprises a series of lectures, tutorials and laboratory sessions which introduce electrical power generation systems and power utilisation by electrical machines.

Topic A (EE314)


Topic B (EE313)

Structure of electrical power systems, energy sources; the synchronous machine; transmission lines; surge phenomena, switchgear, and VAR flow control; substations and control rooms; distribution systems; reliability.

Text: Electrical Machines - Course notes

Woody, B.M.

Power Systems (John Wiley)

533201

1 unit

EE313 POWER SYSTEMS

This subject is only available to Electrical or Computer Engineering students requiring it for transition purposes.

Prerequisite EE211

Structure of electrical power systems, energy sources; the synchronous machine; transmission lines; surge phenomena, switchgear, and VAR flow control; substations and control rooms; distribution systems; reliability.

Text: Electrical Machines - Course notes

Woody, B.M.

Power Systems (John Wiley)

533106

1 unit

EE314 ELECTRICAL MACHINES

This subject is only available to Electrical or Computer Engineering students requiring it for transition purposes.

Prerequisite EE211


Text: Electrical Machines - Course notes

Woody, B.M.

Power Systems (John Wiley)

533111

1 unit

EE315 POWER ELECTRONICS

This subject is only available to Electrical or Computer Engineering students requiring it for transition purposes.

Prerequisite EE222

Power supplies, voltage regulators, power devices- JFET, MOSFET, SCR's and TRIACS (device limitations and protection), Converter topologies and analysis. Inverter topologies and analysis.

Text: Electrical Machines - Course notes

Woody, B.M.

Power Systems (John Wiley)

533120

3 units

EE320 ELECTRONICS

Prerequisite EE200

Assumed Knowledge Ph221

This course will consist of approximately 65 hours of lectures, 40 hours of laboratory and 15 hours of tutorials. The course consists of three topics.

Topic A (EE323)

Discrete Component Electronics. Material covered will include: FET and BJT switching circuits, amplifier circuits, current sources, matched devices, introduction to amplifier frequency response.

Topic B (EE324)


Topic C (EE315)

Power supplies, voltage regulators, power devices- JFET, MOSFET, SCR's and TRIACS (device limitations and protection), Converter topologies and analysis. Inverter topologies and analysis.

Text: The Art of Electronics (Cambridge University Press)

Horowitz & Hill

Power Electronics Lecture Notes

533117

1 unit

EE323 LINEAR ELECTRONICS I

This subject is only available to Electrical or Computer Engineering students requiring it for transition purposes.

Prerequisite EE221

Discrete Component Electronics. Material covered will include: FET and BJT switching circuits, amplifier circuits, current sources, matched devices, introduction to amplifier frequency response.

Text: The Art of Electronics (Cambridge University Press)

Horowitz & Hill

533118

1 unit

EE324 LINEAR ELECTRONICS II

This subject is only available to Electrical or Computer Engineering students requiring it for transition purposes.

Prerequisite EE323


Text: The Art of Electronics (Cambridge University Press)

Horowitz & Hill

ELECTRICAL AND COMPUTER ENGINEERING SUBJECT DESCRIPTION

SECTION SIX

533119

1 unit

EE332 DIGITAL DESIGN AND TECHNOLOGY

This subject is only available to Electrical or Computer Engineering students requiring it for transition purposes.

Prerequisite EE360 or consent of Instructor


Bus Control Techniques: Centralised/distributed, Bus handshaking.

Text: Weedy, B.M.

Introduction to Communication Systems 2nd edn (Addison Wesley 1982)

533222

1 unit

EE342 SWITCHING THEORY AND LOGIC DESIGN

This subject is only available to Electrical or Computer Engineering students requiring it for transition purposes.

Prerequisite EE200 or consent of Instructor

Boolean algebra, combinational logic, logical circuits, minimization techniques, threshold logic. Data representation, binary arithmetic, codes, error checking and correcting, Sequential logic, flip-flops, state diagrams, state reduction, races and hazards. Logic subsystems; registers, address counters, decoders, combinators, coders, etc. Basic architecture of digital systems.

Lectures will be supplemented by practical assignments on logic trainers and some tutorial sessions.

Text: Mano, M.M.

Digital Design (Prentice-Hall 1984)

533170

4 units

EE370 COMPUTER ENGINEERING II

Prerequisite EE100

A course of lectures and practical exercises on the hardware and software aspects of computer systems design, with particular emphasis on microprocessor systems.

For 1987 the course will be taught in four sections:

Assumed Knowledge Ph221

This subject comprises two topics which expand the fundamentals of communication systems, propagation and antennas. The lectures are supplemented by laboratory work and tutorials.

Text: A course of lectures and practical exercises on the hardware and software aspects of computer systems design, with particular emphasis on microprocessor systems.

For 1987 the course will be taught in four sections:

Prerequisite EE344

Spectral Analysis: Random Signals and Noise; Fundamentals of Analog Signal Processing; Modulation, frequency modulation, phase modulation, pulse modulation; Noise in communication systems; Analysis of commercial communication systems: AM and FM radio, colour television.

Topic II (EE451)


Text: Stremler, P.G.

Introduction to Communication Systems 2nd edn (Addison Wesley 1982)
SECTION SIX ELECTRICAL AND COMPUTER ENGINEERING SUBJECT DESCRIPTION

(6) Logic design & computer architecture (EE362)

(7) Multiprogramming and operating systems (EE463)

(8) Digital design (EE362)

(9) Microprocessor interfacing & assembly language (GE325)

Texts

Moylan, P.J., *Assembly Language for Engineers* (Ellis Horwood 1987)


534208 1 unit

EE380 PROJECT/DIRECTED READING

This subject is only available to Electrical or Computer Engineering students requiring it for transition purposes.

Prerequisite Written permission of the Head of Department.

Private work of laboratory, literature search or theoretical nature requiring the preparation of a report. Taken under the direction of a supervisor with whom the topic should be negotiated.

534152 2 units

EE410 ADVANCED ELECTRONICS AND MACHINES

Prerequisite EE310

The subject comprises 2 advanced topics in power engineering. The lectures are supplemented by laboratory work and tutorials.

Topic A: Power Systems

Power flow analysis, economic dispatch; fault calculations; synchronous machine transients; protection; automatic generation control; power system stability; system expansion studies.

Texts


534146 1 unit

EE417 VARIABLE SPEED DRIVE SYSTEMS

This subject is only available to Electrical or Computer Engineering students requiring it for transition purposes.

Prerequisite EE315

Application of converters and choppers to d.c. machine drive systems; Performance analysis of d.c. machines under transient conditions. Control systems for variable speed d.c. drives. Application of cycloconverter and inverters to a.c. machine drives. Performance analysis of a.c. machines under transient conditions. Control systems for variable speed a.c. drives.

Texts


534153 2 units

EE420 ADVANCED ELECTRONICS

Prerequisite EE320

This course consists of approximately 55 hours of lectures and 25 hours of laboratory work.

Topic A (EE421)

Advanced Amp. circuits, instrumentation amplifiers, noise and interference in electronic circuits, shielding and grounding, high-speed circuits and techniques.

Topic B (EE422)

Broadband amplifiers, Narrowband amplifiers, z, y, h and s parameters, oscillators, phase locked loops, f o and V to f converters, Analog multipliers, A-D Converters, D-A Converters.

Texts


534109 1 unit

EE421 ELECTRONIC DESIGN A

This subject is only available to Electrical or Computer Engineering students requiring it for transition purposes.

Prerequisite EE323

Advanced Amp. circuits, instrumentation amplifiers, noise and interference in electronic circuits, shielding and grounding, high-speed circuits and techniques.

Texts


534110 1 unit

EE422 ELECTRONIC DESIGN B

This subject is only available to Electrical or Computer Engineering students requiring it for transition purposes.

Prerequisite EE323

Broadband amplifiers, Narrowband amplifiers, z, y, h and s parameters, oscillators, phase locked loops, f o and V to f converters, Analog multipliers, A-D Converters, D-A Converters.

Texts


534147 1 unit

EE426 ADVANCED DIGITAL SYSTEMS

This subject is only available to Electrical or Computer Engineering students requiring it for transition purposes.

Prerequisite GE325

Computer architecture covering parallel computing, multiprocessor architectures and interconnection techniques.

Texts


534154 2 units

EE440 ADVANCED CONTROL

Prerequisite GE364

This subject gives an advanced treatment of estimation and control theory with emphasis on techniques with industrial relevance. The subject comprises 2 topics as follows:

Topic A: Background Theory

Topics to be covered include: State space models, digital control, advanced transform techniques, controllability, observability, modern control system design, multivariable systems, digital filtering, adaptive control and digital implementation issues. The material will be illustrated by industrial case studies.

Topic B: Design

The theory outlined above will be used to design controllers for practical examples. Simulation studies and/or laboratory examples will be conducted.

Texts


534134 1 unit

EE447 DIGITAL COMMUNICATIONS

This subject is only available to Electrical or Computer Engineering students requiring it for transition purposes.

Prerequisite EE344 or Consent of Instructor

Fundamentals of information theory and channel capacity, baseband data transmission, digital carrier modulation, quantisation schemes, pulse code modulation, timing recovery, matched filters, equalisation, error control coding, local area networks, satellite communications, fibre optic transmission.

Texts

Wai-Kai Chen, Passive and Active Filters (John-Wiley & Sons 1986)


534148 1 unit

EE451 ELECTROMAGNETIC PROPAGATION AND ANTENNAS

This subject is only available to Electrical or Computer Engineering students requiring it for transition purposes.

Prerequisites PA221 and Mathematics II


534156 2 units

EE460 COMPUTER SOFTWARE

Not offered in 1988.

Prerequisite Computer Science II

Assumed Knowledge EE370

A course consisting primarily of practical work on a large software development project.
SECTION SIX ELECTRICAL AND COMPUTER ENGINEERING SUBJECT DESCRIPTION

534124  
EE463 COMPUTER OPERATING SYSTEMS  
1 unit

This subject is only available to Electrical or Computer Engineering students requiring it for transition purposes.

Prerequisite EE264, (Topic ML) or Consent of Instructor

Views of an operating system. Multiprogramming, interacting concurrent processes, process control primitives. Processor management, memory management, name management. Protection.

534157  
EE470 COMPUTER SYSTEMS  
2 units

Prerequisite EE200

Assumed Knowledge Ph221

A course consisting of 84 hours of lectures, tutorials and laboratory work covering the areas of real-time system design, multiprocessor architectures and VLSI. The course is divided into three topics as follows:

Topic A: (EE426)

Computer architecture covering parallel computing, multiprocessor architectures and interconnection techniques.

Topic B: (EE525/1)

Real-time systems design which is a laboratory based component dealing with the interrelationship between hardware and software in real-time systems.

Topic C: (EE525/2)

Introduction to large scale integrated circuit design.

Text:

Hwang, K. and Briggs, F. A.

Computer Architecture & Parallel Processing (McGraw-Hill 1985)

534159  
EE485 SEMINAR  
1 unit

Corequisite EE483 or EE484

Students are required to present a seminar based on their project work. A series of seminars is also given by invited guest speakers. Weekly attendance at seminars is compulsory.

LIST OF EE500-600 SUBJECTS

A limited selection of the following subjects will be offered each year subject to adequate enrolments.

530144  
EE513 POWER SYSTEM ANALYSIS AND OPERATION  
1 unit

530107  
EE516 ADVANCED POWER SYSTEMS  
1 unit

Prerequisite EE410

Selected topics from power system analysis, control, stability and security.

Texts

Anderson, P.M. and Fouad, A.A.

Power System Control and Stability (Iowa State University Press 1977)

Pai, M. A.


Yao-Nan Yu,


530105  
EE517 VARIABLE SPEED DRIVE SYSTEMS  
1 unit

530143  
EE525 MICROPROGRAMMED AND MICROPROCESSOR SYSTEMS  
1 unit

530142  
EE526 ADVANCED DIGITAL SYSTEMS  
1 unit

530149  
EE527 VLSI AND DESIGN AUTOMATION  
1 unit

530145  
EE541 ADVANCED DIGITAL SIGNAL PROCESSING  
1 unit

530124  
EE542 SYSTEMS THEORY  
1 unit

Prerequisite EE440

Selected topics from nonlinear systems analysis, stability theory, geometric concepts, complex behaviour, controller synthesis and applications.

SECTION SIX ELECTRICAL AND COMPUTER ENGINEERING SUBJECT DESCRIPTION

Texts

Vidyasagar, M.

Nonlinear Systems Analysis (Prentice-Hall 1978)

Hill, D.J. and Moylan, P.J.

Dissipativeness and Stability of Nonlinear Systems (to appear)

Gakeheimer, J. and Holmes, P.

Nonlinear Oscillations, Dynamical Systems and Bifurcations of Vector Fields (Springer-Verlag 1983)

Isidori, A.

Nonlinear Control Systems : An Introduction (Springer-Verlag 1985)

530120  
EE543 OPTIMIZATION TECHNIQUES  
1 unit

530146  
EE545 ADVANCED COMMUNICATION SYSTEMS  
1 unit

530129  
EE547 DIGITAL COMMUNICATIONS  
1 unit

530143  
EE551 ELECTROMAGNETIC PROPAGATION AND ANTENNAS  
1 unit

530142  
EE552 TOPICS IN SWITCHING THEORY  
1 unit

530117  
EE553 COMPUTER OPERATING SYSTEMS  
1 unit

530147  
EE560 AUTOMATA THEORY  
1 unit

530125  
EE567 COMPUTER PROCESS CONTROL  
1 unit

530121  
EE568 ADVANCED COMPUTER ARCHITECTURE  
1 unit

530135  
EE580 PROJECT  
2 units

530139  
EE580 PROJECT  
3 units

530161  
EE580 PROJECT  
4 units

530111  
EE590 SEMINAR  
1 unit

530137  
EE591 SEMINAR  
1 unit

530138  
EE592 SEMINAR  
1 unit

530140  
EE593 SEMINAR  
1 unit

A series of seminars for full-time postgraduate students who each will prepare approximately one seminar per semester on a technical or theoretical subject. Each student will also attend EE496 seminars.

530150  
EE641 ADAPTIVE CONTROL  
1 unit

Prerequisite EE440


Texts

Goodwin and Sin

Adaptive Filtering, Prediction and Control (Prentice-Hall 1984)

Goodwin and Middleton

Digital Estimations and Control : A Unified Approach (to appear)

530151  
EE642 ESTIMATION AND SYSTEM IDENTIFICATION  
1 unit

Prerequisite EE440


Texts

Goodwin and Payne

Dynamic System Identification (Academic Press 1977)

Ljung and Soderstrom

Theory and Practice of Recursive Identification (MIT Press 1983)

Spectral Time Series Analysis (Springer Verlag 1986)

530137  
EE591 SEMINAR  
1 unit

530138  
EE592 SEMINAR  
1 unit

530140  
EE593 SEMINAR  
1 unit

A series of seminars for full-time postgraduate students who each will prepare approximately one seminar per semester on a technical or theoretical subject. Each student will also attend EE496 seminars.
### ELECTRICAL AND COMPUTER ENGINEERING SUBJECT DESCRIPTIONS

#### SECTION SIX

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Title</th>
<th>Prerequisite</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>501103</td>
<td>GE101 INTRODUCTION TO ENGINEERING</td>
<td>1 unit</td>
<td>A course of lectures, seminars and plant visits intended to enhance understanding of the role of the professional engineer in industry and society.</td>
</tr>
<tr>
<td>501102</td>
<td>GE151 INTRODUCTION TO MATERIALS SCIENCE</td>
<td>1 unit</td>
<td>The course provides a general introduction to materials engineering and the relationships which exist between structures, properties and applications. The detailed treatment of various aspects is left to the latter stages of the degree programme. The following sections are given approximately equal amounts of time and emphasis: Atomic bonding; atomic arrangements in metals, glasses and polymers; the effect of stress and temperature on simple metals; the control of metallic structures by composition and thermal treatments; common metals of engineering importance; the structures and properties of ceramics and cement products. Polymeric rubbers and woody; engineering applications for polymers; the mechanical testing of materials; composite materials; the electrical, magnetic, optical and thermal properties of solid materials.</td>
</tr>
<tr>
<td>502002</td>
<td>GE205 ENGINEERING COMPUTATIONS I</td>
<td>1 unit</td>
<td>This course is concerned with developing a student's ability to write computer programs that use numerical analysis techniques to solve problems in the engineering field. Some discussion of the theories behind the numerical analysis techniques is given but the main emphasis is on computing. The programming work of Engineering Computations I is extended to include some advanced Fortran programming techniques, the use of graph-plotting routines and the use of computer libraries such as the NAG library. Emphasis is placed on curve fitting to well-ordered data and to experimental data and the differentiation and integration of such data. Systems of equations, both linear and non-linear are considered. Other material covered includes solution of ordinary differential equations and partial differential equations.</td>
</tr>
<tr>
<td>502003</td>
<td>GE206 COMPUTATIONAL METHODS I</td>
<td>1 unit</td>
<td>This subject is only available in 1988 to students requiring it for transition purposes.</td>
</tr>
<tr>
<td>502004</td>
<td>GE207 COMPUTATIONAL METHODS II</td>
<td>1 unit</td>
<td>This subject is only available in 1988 to students requiring it for transition purposes.</td>
</tr>
</tbody>
</table>

**SIXNETWORKS**

**Subject Code** | **Title** | **Prerequisite** | **Description** |
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<tbody>
<tr>
<td>502005</td>
<td>GE211 THEORY AND APPLICATIONS OF ELECTRICAL ENERGY CONVERSION</td>
<td>1 unit</td>
<td>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 in Lab; Synchronous Machines; Electronic Power Conversion and Control Systems.</td>
</tr>
<tr>
<td>502006</td>
<td>GE250 PRINCIPLES OF ELECTRICAL ENGINEERING</td>
<td>1 unit</td>
<td>Students enrolled in the Computer, Electrical, Mechanical or Industrial Engineering programmes may not enrol in this subject. A series of lectures and tutorials offered by the Department of Electrical and Computer Engineering as a service course for students enrolled in the Civil Engineering programme. Elementary circuit theory for resistive circuits. Introduction of inductance and capacitance. Transient response of RL and RC circuits. Extension of circuit theory to simple AC circuits. Overview of Electrical Machines.</td>
</tr>
<tr>
<td>503001</td>
<td>GE491 TECHNOLOGY AND HUMAN VALUES</td>
<td>2 units</td>
<td>A course of lectures and discussions focusing on the ethical, spiritual, social, political and economic issues that arise in technological decisions. The course is presented in two parallel strands. Strand A is based on an examination of Australian energy policy. This example of decision making is used to develop an awareness of (i) how non-technical dimensions enter decisions and (ii) a systematic approach to public policy making.</td>
</tr>
</tbody>
</table>
SECTION SIX

GENERAL ENGINEERING SUBJECT DESCRIPTION

Strand B complements Strand A by introducing a range of additional topics which broaden the horizon of consideration and deepen the treatment of specific features of decision making.

Texts

- Teich, A.H. (ed.)
- Commoner, B.
- Schumacher, E.F.
- Saddler, J.

503002 2 units

GE301 AUTOMATIC CONTROL

Prerequisite Mathematics IIA or Mathematics IIB or EM200


Text

Doebelin, O.O., Control System Principles and Design (Wiley IntEd. 1985)

or

Stephanopoulou, G., Chemical Process Control (Prentice-Hall IntEd. 1984)

500106 2 units

GE302 TECHNOLOGY AND HUMAN VALUES II

Corequisite GE301

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 technological 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/team's assessment of individual contributions. Example projects are Nuclear Electric Power 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 term.

500103 1 unit

GE303 MICROPROCESSOR SYSTEMS AND APPLICATIONS


Text

Moylan, P.J., Assembly Language for Engineers (Ellis Horwood 1987)

503006 2 units

GE304 AUTOMATIC CONTROL

Prerequisite Mathematics IIA or Mathematics IIB or EM200


Text

Doebelin, O.O., Control System Principles and Design (Wiley IntEd. 1985)

or

Stephanopoulou, G., Chemical Process Control (Prentice-Hall IntEd. 1984)

500104 2 units

GE305 MINERAL MATTER IN COAL

Prerequisite A first course in coal properties

Types, composition and origins of the mineral matter in coal. Analytical methods for the analysis and characterisation of the inorganic matter in coal. Examination of a number of coal applications in which minerals and inorganics determine successful usage and aspects of coal preparation and clean-up. Depending on interest this may include: grindability, furnace fouling, fly ash collection, NOx and SOx emissions, material aspects (including reactivity).

500105 2 units

GE306 MINING GEOLOGY

Prerequisites Relevant topics from Geology II and Geology III or their equivalents.

The formation of coal and coal as a basis for an understanding of exploratory and analytical methods. Plant types, coal types, petrography. Analysis of coal measure sequences. "Floor-seam roof systems", mine planning "collarhy and open-cut". Mine layout based on geological features. Mine services. Mining and extraction operations.

Text

Commoner, B.

TECHNOLOGY OF MINING AND COAL UTILISATION

1981)

500106 2 units

SECTION SIX

MATERIALS ENGINEERING SUBJECT DESCRIPTION

GENERAL ENGINEERING SUBJECTS

CONTINUED

GE305 METALLURGICAL ASPECTS OF COAL UTILISATION

Content To be advised.

GE505 MINING GEOLGY

Prerequisites Relevant topics from Geology II and Geology III or their equivalents.

The formation of coal and coal as a basis for an understanding of exploratory and analytical methods. Plant types, coal types, petrography. Analysis of coal measure sequences. "Floor-seam roof systems", mine planning "collarhy and open-cut". Mine layout based on geological features. Mine services. Mining and extraction operations.

500105 2 units

500104 2 units

500103 2 units

500102 2 units

500101 1 unit

GE301 AIR POLLUTION STUDIES I

Content To be advised.

500102 1 unit

GE302 COAL ANALYSIS AND PROPERTIES


500103 2 units

GE303 MINERAL MATTER IN COAL

Prerequisite A first course in coal properties

Types, composition and origins of the mineral matter in coal. Analytical methods for the analysis and characterisation of the inorganic matter in coal. Examination of a number of coal applications in which minerals and inorganics determine successful usage and aspects of coal preparation and clean-up. Depending on interest this may include: grindability, furnace fouling, fly ash collection, NOx and SOx emissions, material aspects (including reactivity).

500104 2 units

GE304 COAL PREPARATION

Prerequisite A first course in coal properties

The principles of particle sizing, crushing, washability and separation techniques. Analysis of the unit operations of coal preparation such as jig washing, dense medium, cyclones and flotation. Flow sheeting of washeries, plant control, optimisation and computer modelling.

Text

Alexander, W.O. et al., Essential Metallurgy for Engineers (Van Nostrand Reinhold)

500105 1 unit

500104 1 unit

500103 1 unit

500102 1 unit

500101 1 unit

500100 1 unit

Mat211 SELECTION AND USE OF MATERIALS

Assumed knowledge GE151

The aim is to provide an introduction to the factors that must be considered when a material is chosen for a specific engineering application. Materials selection, manufacture and engineering design. The mechanical properties of materials, thermal and mechanical properties, failure analysis, materials testing, economic considerations.

Text

Alexander, W.O. et al., Essential Metallurgy for Engineers (Van Nostrand Reinhold)

500103 1 unit

500102 1 unit

500101 1 unit

500100 1 unit

Mat203 MATERIALS ENGINEERING I

Prerequisite GE151


Text To be announced.

632205 3 units

Mat205 MATERIALS ENGINEERING LABORATORY

A laboratory course to complement the theory in Mat 203. Includes practical microscopy, electron microscopy, x-ray diffraction and experiments on the deformation and mechanical properties of materials.

632100 1 unit

Mat211 SELECTION AND USE OF MATERIALS

Assumed knowledge GE151

The aim is to provide an introduction to the factors that must be considered when a material is chosen for a specific engineering application. Materials selection, manufacture and engineering design. The mechanical properties of materials, thermal and mechanical properties, failure analysis, materials testing, economic considerations.

Text

Alexander, W.O. et al., Essential Metallurgy for Engineers (Van Nostrand Reinhold)

632203 3 units

INDUSTRIAL EXPERIENCE

631003 1 unit

631004 1 unit

631005 1 unit

631006 1 unit

These subject units are designed to formalise periods of Industrial Experience gained by part-time students only. Each of the Industrial Experience units is equivalent to one unit of 42 hours. 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 by part-time students as electives. (See Section 4 of this Handbook).

632203 3 units
MATERIALS ENGINEERING SUBJECT DESCRIPTION

633303 5 units
Mat303 MATERIALS ENGINEERING II
Prerequisite Mat 203
The fabrication and processing of metals, ceramics, polymers and their composites and an advanced study of the physical properties of materials. A selective review of the structure, properties and processing methods and uses of advanced engineering materials. Topics to be covered include transformation toughened ceramics, metallic glasses, cements, nuclear and nuclear waste materials, semi-conducting compounds, superconducting compounds, fibre reinforced materials, biomechanical processing and advanced surface treatment and coatings.

633305 2 units
Mat305 MATERIALS ENGINEERING LABORATORY
A laboratory programme to illustrate some of the material presented in Mat 303.

631100 1 unit
Mat311 SELECTION AND USE OF MATERIALS II
Assumed Knowledge Mat 211
This course outlines the processes involved in choosing between alternative materials and how this process may be made quantitative. The factors to be considered, mechanical properties, the effects of mechanical and thermal cycling, corrosion and wear, processing methods.

Text:
Cran, F.A. and Charles, J.H.
Selection and Use of Engineering Materials
(Buiterworths)

631355 1 unit
Mat325 ELECTROCHEMISTRY AND CORROSION

Text To be announced

634491 1 unit
Mat491 SEMINAR
Students will be expected to present seminars on topics in the area of Materials Engineering.

634494 4 units
Mat496 RESEARCH PROJECT
A theoretical and/or experimental investigation into some aspect of Materials Engineering. The results of the investigation are to be presented in a formal report.

INDUSTRIAL EXPERIENCE

541302 ME092 1 unit
541303 ME093 1 unit
541304 ME094 1 unit
Prerequisite Part-time Enrolment
These subject units are designed to formalise periods of Industrial Experience gained by part-time students only. Each of the Industrial Experience units is equivalent to one unit of 42 hours. Students who wish to study any or all of the Industrial Experience units ME092-094 will be required to attend nominated lecture and tutorial periods which will deal with working and professional environments, essentials of communication and report writing. In addition, each student will be required to present a seminar relating to aspects of his experience and to report to his industrial experience tutor twice per term. Some assignments relating to employment and experience will be set. 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 used by students in lieu of electives.

541307 ME097 2 units
541308 ME098 2 units
Prerequisite Permission of Head of Department
As above except that each of ME097-98 is the equivalent of two units. These Industrial Experience units are available to sandwich course students only and are designed to cover Industrial Experience gained over two years.

541104 ME111 GRAPHICS AND ENGINEERING DRAWING
A study in communication and analysis by pictorial means. Methods of projection covering orthogonal projection, isometric projection, perspective projection ands, orthographic projection, dimensioning and sectioning, isometric projection; perspective projection.

Text

542206 ME201 EXPERIMENTAL METHODS I
1 unit
Prerequisite Only available to students selected to complete ME201 prior to 1987 and is not expected to be available after 1988.
Assumed Knowledge ME111, ME214, CE111
Design procedures for mechanical components. Load estimation. Typical allowable stresses and factor of safety values. Stress calculations. Detailed considerations of the design of shafts, bearings, couplings, bolted joints, welded connections, wall brackets, eccentric connections, levers, flat and vee belt drives and springs. Horsepower calculations for single and helical spur gear reductions.

Text
Spots

542105 ME204 MECHANICS OF SOLIDS I
1 unit
Prerequisite CE111
Assumed Knowledge Mathematics 1
ME215 MECHANICAL ENGINEERING DESIGN I
Prerequisites CE111, ME111
Corequisite ME214

Text
Shigley, J.E.

ME231 DYNAMICS
Prerequisite Mathematics I
Assumed Knowledge Physics I A or IB and CE111
Part A

Part B

Text
Meriam, J.L. and Kraige, L.G.

ME251 FLUID MECHANICS I
Assumed Knowledge Mathematics I and Physics IA or IB
Fluid properties and definitions. Fluid statics: forces on surfaces, buoyant forces, stability of floating and submerged bodies. Types of flow, continuity equation, Euler's and Bernoulli equations, energy equation, linear and angular momentum applications. Introduction to dimensional analysis. Viscous effects, fluid resistance, laminar and turbulent flow in pipes and conduits. Fluid measurement.

Text
Steele, V.L. and Wylie, E.B.
Fluid Mechanics 7th edn (McGraw-Hill 1979)

ME316 MECHANICAL ENGINEERING DESIGN II
Prerequisite ME215
A selection of design projects which integrate concepts and component analysis covered in ME215 Mechanical Engineering Design I. New material covered includes: Lubrication and journal bearings, Clutches and brakes. Epicyclic gear trains.

Text
Shigley, J.E.

ME333 DYNAMICS OF MACHINES
Prerequisite ME231
Assumed Knowledge EM2CO

Text
Mabie, H. H. and Reimbolt, C.F.
Mechanisms and Dynamics of Machinery SI version 4th edn (Wiley 1987)

ME353 FLUID MECHANICS AND HEAT TRANSFER
Prerequisite ME231
Assumed Knowledge EM2CO
The fluid mechanics content of the course will include the following topics: Kinematics of fluids, Dynamics of incompressible fluids. Similarity and the application of dimensional analysis. Exact solutions of Navier-Stokes equations. Hydrodynamic lubrication. Laminar and turbulent flows.

Text
Antonia, R.A.
Notes for Fluid Mechanics II (Department of Mechanical Engineering, University of Newcastle)

ME372 HEAT TRANSFER
Prerequisite ME231
Assumed Knowledge EM2CO

Text
Antonia, R.A.
Notes for Fluid Mechanics II (Department of Mechanical Engineering, University of Newcastle)

ME371 FLUID MECHANICS AND HEAT TRANSFER
Prerequisite ME231
Assumed Knowledge EM2CO
Only available to students who completed ME352 but not ME372 prior to 1987 and not expected to be available after 1988.

Text
White, F.M.
Heat Transfer (Addison-Wesley 1984)

ME332 FLUID MECHANICS II
Only available to students who completed ME352 but not ME351 prior to 1987 and not expected to be available after 1988.

Text
White, F.M.
Heat Transfer (Addison-Wesley 1984)
<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Description</th>
<th>Unit</th>
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</thead>
<tbody>
<tr>
<td>54311</td>
<td>THERMODYNAMICS II</td>
<td>1</td>
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<tr>
<td>ME373</td>
<td>Prerequisite: ME271</td>
<td></td>
</tr>
<tr>
<td>543501</td>
<td>METHODS ENGINEERING</td>
<td>1</td>
</tr>
<tr>
<td>ME381</td>
<td>Prerequisite: All Year II subjects</td>
<td></td>
</tr>
<tr>
<td>544109</td>
<td>ADVANCED DESIGN CONCEPTS I</td>
<td>1</td>
</tr>
<tr>
<td>ME410</td>
<td>Prerequisite: ME316</td>
<td></td>
</tr>
<tr>
<td>544426</td>
<td>Advanced Design Concepts I</td>
<td>1</td>
</tr>
<tr>
<td>ME419</td>
<td>BULK MATERIALS HANDLING SYSTEMS I</td>
<td>1</td>
</tr>
<tr>
<td>544469</td>
<td>Prerequisite: All Year II subjects</td>
<td></td>
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<tr>
<td>ME420</td>
<td>BULK MATERIALS HANDLING SYSTEMS II</td>
<td>1</td>
</tr>
<tr>
<td>544473</td>
<td>Prerequisite: ME419</td>
<td></td>
</tr>
<tr>
<td>ME444</td>
<td>FRACTURE MECHANICS</td>
<td>1</td>
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<tr>
<td>544482</td>
<td>Prerequisite: Mat211 and ME214</td>
<td></td>
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<tr>
<td>544483</td>
<td>ADVANCED NUMERICAL PROGRAMMING</td>
<td>1</td>
</tr>
<tr>
<td>ME405</td>
<td>Prerequisite: GB205</td>
<td></td>
</tr>
<tr>
<td>54453</td>
<td>COMPUTER AIDED DESIGN AND MANUFACTURING</td>
<td>1</td>
</tr>
<tr>
<td>ME407</td>
<td>Prerequisite: Permission of the Department, Department of Mechanical Engineering.</td>
<td></td>
</tr>
<tr>
<td>54455</td>
<td>Prerequisite: All Year II subjects</td>
<td></td>
</tr>
<tr>
<td>54458</td>
<td>COMPUTER AIDED DESIGN AND MANUFACTURING</td>
<td>1</td>
</tr>
<tr>
<td>ME414</td>
<td>Prerequisite: All Year II subjects</td>
<td></td>
</tr>
<tr>
<td>54469</td>
<td>Energy analysis packages. Solution of problems using the ANVIL-4000 system.</td>
<td>1</td>
</tr>
<tr>
<td>ME418</td>
<td>Prerequisite: All Year II subjects</td>
<td></td>
</tr>
<tr>
<td>54473</td>
<td>Determination of mass-flow, funnel-flow, and related flow patterns.</td>
<td>1</td>
</tr>
<tr>
<td>ME421</td>
<td>Prerequisite: ME422</td>
<td></td>
</tr>
<tr>
<td>54477</td>
<td>Maintenance Engineering.</td>
<td>1</td>
</tr>
<tr>
<td>ME422</td>
<td>Prerequisite: ME214 and ME215</td>
<td></td>
</tr>
<tr>
<td>54482</td>
<td>Maintenance Engineering.</td>
<td>1</td>
</tr>
<tr>
<td>ME444</td>
<td>As an introduction to the theory of plates and shells with extensions to thick pressure vessels and creep effects.</td>
<td>1</td>
</tr>
<tr>
<td>54483</td>
<td>Prerequisite: ME343</td>
<td></td>
</tr>
<tr>
<td>ME445</td>
<td>Prerequisite: ME419</td>
<td></td>
</tr>
<tr>
<td>54487</td>
<td>Methods of numerical (approximate) methods.</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: Each subject code is followed by the title of the subject, the unit of credit, and any prerequisite or description as needed.
Lectures and laboratory work dealing with a selection from ME453 FLUID MECHANICS III

Prerequisite

ME473 THERMODYNAMICS III

Thermodynamic relations; the Maxwell relations; general equations for enthalpy, internal energy and entropy; compressibility factor; equations of state; generalised charts for enthalpy and entropy. Availability concepts and applications. Thermodynamics of irreversible processes. Applications of statistical thermodynamics. Direct energy conversion.

Text

Holman, J.P.

Thermodynamics (McGraw-Hill 1969)

ME474 HEAT TRANSFER II

Prerequisite ME353

Development of the general forms of the continuity, momentum and energy equations. Application of these equations to a range of convection heat transfer problems. Advanced conduction and radiation heat transfer. Heat transfer with change of phase.

Text

Karlekar, B.V. and Desmonds, R.M.

Engineering Heat Transfer (West Publishing Company 1977)

ME480 ENGINEERING ADMINISTRATION

Prerequisite All Year II subjects


Text

ME481 ENGINEERING ECONOMICS I

Prerequisite All Year II subjects


Text

Smith, G.W.


ME482 ENGINEERING ECONOMICS II

Prerequisite ME482

Scheduling for single machines, parallel machines, flow shops and job shops. Optimal schedules by Branch and Bound and Dynamic Programming methods. General purpose and specific heuristic methods. Computational requirements. Critical Path method and PERT.

Text

Karlekar, B.V. and Desmond, R.M.


Year II subjects

Yoram Koren


ME483 PRODUCTION SCHEDULING

Prerequisite All Year II subjects


Text

Holman, J.P.


ME484 ENGINEERING ECONOMICS II

Prerequisite ME482


Text

ME485 NUMERICAL CONTROL AND COMPUTER AIDED MANUFACTURING

Prerequisite All Year II subjects


Text

Yoram Koren


ME486 OPERATIONS RESEARCH - FUNDAMENTAL TECHNIQUES

Prerequisite All Year II subjects

Concept of optimisation; Optimisation approaches; Formulation of Models; Linear Programming; Allocation and assignment; Simplex Method; Duality; Theory of Games, Parametric Programming; Decomposition principle. Network theory; Dynamic Programming. Geometric Programming. Applications.

Text

Hillier, F.S. and Lieberman, G.J.

Introduction to Operations Research (Holden-Day) or

Taha, H.A.

Operations Research (Macmillan) or

Wagner, H.M.

Principles of Operations Research (Prentice-Hall)

ME487 OPERATIONS RESEARCH - PLANNING, INVENTORY CONTROL AND MANAGEMENT

Prerequisite EM22

Statistical decision theory; Forecasting methods; moving average, exponentially smoothed average. Inventory control theory. Fixed order quantity; fixed order cycle systems; Production - inventory systems. Queuing theory; simple Queue - Multi-server queues. Queues in series. Transients in queues; simulation of systems. Applications.

Text

As for ME487

ME488 PROJECT/SEMINAR

Prerequisite All Year III subjects

Major undergraduate project usually consisting of literature survey and review, analytical and/or experimental investigation into a mechanical or industrial engineering problem. Presentation of seminars. Two (2) copies of the Project Report are required.

ME489 PROJECT / DIRECTED READING

Prerequisite Permission of the Head of the Department of Mechanical Engineering.

Private work of laboratory, literature search or theoretical nature requiring preparation of a report. Work will be undertaken at the discretion of a supervisor with whose topic should be negotiated. The work undertaken in this subject may form part of an extended ME496 Project or an independent topic.

Text

ME490 PROJECT / DIRECTED READING

Prerequisite Permission of the Head of the Department of Mechanical Engineering.

Private work of laboratory, literature search or theoretical nature requiring preparation of a report. Work will be undertaken at the discretion of a supervisor with whose topic should be negotiated. The work undertaken in this subject may form part of an extended ME496 Project or an independent topic.

Text

ME500 LEVEL SUBJECTS

ME500 PROJECT / DIRECTED READING

Prerequisite Permission of the Head of the Department of Mechanical Engineering.

Private work of laboratory, literature search or theoretical nature requiring preparation of a report. Work will be undertaken at the discretion of a supervisor with whose topic should be negotiated. The work undertaken in this subject may form part of an extended ME496 Project or an independent topic.

Text

ME510 ADVANCED DESIGN CONCEPTS I

Prerequisite Permission of the Head of the Department of Mechanical Engineering.

Private work of laboratory, literature search or theoretical nature requiring preparation of a report. Work will be undertaken at the discretion of a supervisor with whose topic should be negotiated. The work undertaken in this subject may form part of an extended ME496 Project or an independent topic.

Text

ME511 ADVANCED DESIGN CONCEPTS II

Prerequisite Permission of the Head of the Department of Mechanical Engineering.

Private work of laboratory, literature search or theoretical nature requiring preparation of a report. Work will be undertaken at the discretion of a supervisor with whose topic should be negotiated. The work undertaken in this subject may form part of an extended ME496 Project or an independent topic.

Text

ME512 ADVANCED DESIGN CONCEPTS III

Prerequisite Permission of the Head of the Department of Mechanical Engineering.

Private work of laboratory, literature search or theoretical nature requiring preparation of a report. Work will be undertaken at the discretion of a supervisor with whose topic should be negotiated. The work undertaken in this subject may form part of an extended ME496 Project or an independent topic.

Text

ME513 ADVANCED DESIGN CONCEPTS IV

Prerequisite Permission of the Head of the Department of Mechanical Engineering.

Private work of laboratory, literature search or theoretical nature requiring preparation of a report. Work will be undertaken at the discretion of a supervisor with whose topic should be negotiated. The work undertaken in this subject may form part of an extended ME496 Project or an independent topic.

Text

ME514 COMPUTER AIDED DESIGN AND MANUFACTURING

Prerequisite Permission of the Head of the Department of Mechanical Engineering.

Private work of laboratory, literature search or theoretical nature requiring preparation of a report. Work will be undertaken at the discretion of a supervisor with whose topic should be negotiated. The work undertaken in this subject may form part of an extended ME496 Project or an independent topic.

Text

ME515 COMPUTER CONTROL OF MANUFACTURING SYSTEMS

Prerequisite Permission of the Head of the Department of Mechanical Engineering.

Private work of laboratory, literature search or theoretical nature requiring preparation of a report. Work will be undertaken at the discretion of a supervisor with whose topic should be negotiated. The work undertaken in this subject may form part of an extended ME496 Project or an independent topic.

Text

ME516 COMPUTER CONTROL OF MANUFACTURING SYSTEMS

Prerequisite Permission of the Head of the Department of Mechanical Engineering.

Private work of laboratory, literature search or theoretical nature requiring preparation of a report. Work will be undertaken at the discretion of a supervisor with whose topic should be negotiated. The work undertaken in this subject may form part of an extended ME496 Project or an independent topic.

Text

ME517 COMPUTER CONTROL OF MANUFACTURING SYSTEMS

Prerequisite Permission of the Head of the Department of Mechanical Engineering.

Private work of laboratory, literature search or theoretical nature requiring preparation of a report. Work will be undertaken at the discretion of a supervisor with whose topic should be negotiated. The work undertaken in this subject may form part of an extended ME496 Project or an independent topic.

Text

ME518 COMPUTER CONTROL OF MANUFACTURING SYSTEMS

Prerequisite Permission of the Head of the Department of Mechanical Engineering.

Private work of laboratory, literature search or theoretical nature requiring preparation of a report. Work will be undertaken at the discretion of a supervisor with whose topic should be negotiated. The work undertaken in this subject may form part of an extended ME496 Project or an independent topic.

Text

ME519 BULK MATERIALS HANDLING SYSTEMS I

Prerequisite Permission of the Head of the Department of Mechanical Engineering.

Private work of laboratory, literature search or theoretical nature requiring preparation of a report. Work will be undertaken at the discretion of a supervisor with whose topic should be negotiated. The work undertaken in this subject may form part of an extended ME496 Project or an independent topic.

Text

ME520 BULK MATERIALS HANDLING SYSTEMS II

Prerequisite Permission of the Head of the Department of Mechanical Engineering.

Private work of laboratory, literature search or theoretical nature requiring preparation of a report. Work will be undertaken at the discretion of a supervisor with whose topic should be negotiated. The work undertaken in this subject may form part of an extended ME496 Project or an independent topic.

Text

ME521 CONVEYING OF BULK SOLIDS

Prerequisite Permission of the Head of the Department of Mechanical Engineering.

Private work of laboratory, literature search or theoretical nature requiring preparation of a report. Work will be undertaken at the discretion of a supervisor with whose topic should be negotiated. The work undertaken in this subject may form part of an extended ME496 Project or an independent topic.

Text

ME522 MAINTENANCE ENGINEERING

Prerequisite Permission of the Head of the Department of Mechanical Engineering.

Private work of laboratory, literature search or theoretical nature requiring preparation of a report. Work will be undertaken at the discretion of a supervisor with whose topic should be negotiated. The work undertaken in this subject may form part of an extended ME496 Project or an independent topic.

Text

The course has been divided into three approximately equal parts as follows.

(1) Statistical methods for the design and evaluation of experiments.
(2) Model analysis, use of true and distorted models as well as analogues. Use of dimensional analysis.
(3) Methods of measurement, mechanical, optical, electrical and electronic instrumentation, Recording techniques and data processing. Use of computers. Planning of computer laboratory operation.

The course has been divided into three approximately equal parts as follows.

(1) Statistical methods for the design and evaluation of experiments.
(2) Model analysis, use of true and distorted models as well as analogues. Use of dimensional analysis.
(3) Methods of measurement, mechanical, optical, electrical and electronic instrumentation, Recording techniques and data processing. Use of computers. Planning of computer laboratory operation.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME544</td>
<td>MECHANICS OF SOLIDS III</td>
<td>as for ME545 with additional material.</td>
<td>The study of the behavior of solid materials under applied forces.</td>
</tr>
<tr>
<td>ME553</td>
<td>FLUID MECHANICS II</td>
<td>as for ME553 with additional material.</td>
<td>The analysis of fluid flow and transport phenomena.</td>
</tr>
<tr>
<td>ME554</td>
<td>COMPUTATION OF FLUID FLOWS AND HEAT TRANSFER</td>
<td>as for ME484 with additional material.</td>
<td>Numerical methods for solving fluid dynamics and heat transfer problems.</td>
</tr>
<tr>
<td>ME555</td>
<td>THERMODYNAMICS III</td>
<td>as for ME573 with additional material.</td>
<td>The study of the behavior of gases and heat transfer.</td>
</tr>
<tr>
<td>ME556</td>
<td>HEAT TRANSFER II</td>
<td>as for ME474 with additional material.</td>
<td>The analysis of heat transfer processes.</td>
</tr>
<tr>
<td>ME557</td>
<td>MATHEMATICAL PROGRAMMING II</td>
<td>as for ME478 or ME587.</td>
<td>The study of optimization problems.</td>
</tr>
<tr>
<td>ME558</td>
<td>SIMULATION</td>
<td>Assumed Knowledge ME587, ME588.</td>
<td>The use of computer models to simulate real-world systems.</td>
</tr>
<tr>
<td>ME559</td>
<td>VIBRATION AND NOISE PROBLEMS IN INDUSTRY</td>
<td>Assumed Knowledge ME509.</td>
<td>The study of vibration and noise in industrial settings.</td>
</tr>
<tr>
<td>ME560</td>
<td>TURBULENT FLOWS</td>
<td>Assumed Knowledge GE204, ME353 (or ME352 and ME372).</td>
<td>The analysis of turbulent fluid flow.</td>
</tr>
<tr>
<td>ME561</td>
<td>ADVANCED DESIGN CONCEPTS II</td>
<td>Assumed Knowledge ME510.</td>
<td>Advanced design principles and methodologies.</td>
</tr>
<tr>
<td>ME562</td>
<td>MATERIALS HANDLING AND TRANSPORTATION SYSTEMS</td>
<td>Assumed Knowledge GE204, ME353 (or ME352 and ME372).</td>
<td>The study of materials handling and transportation systems.</td>
</tr>
<tr>
<td>ME563</td>
<td>ADVANCED OPERATIONS RESEARCH</td>
<td>Assumed Knowledge ME587, ME588.</td>
<td>Advanced operations research techniques.</td>
</tr>
</tbody>
</table>

**SECTION SIX MECHANICAL ENGINEERING SUBJECT DESCRIPTION**

The application of system analysis principles to the solution of problems associated with the design of mechanisms. Formalisation of the design process. Fundamental concepts of reliability. Reliability analysis. Methods of improving the reliability of systems. Computer programming for mechanical design applications. The optimum design of typical mechanical components. (This section continues on from ME510.)

**SECTION SIX MECHANICAL ENGINEERING SUBJECT DESCRIPTION**

The application of the Operational Research Method and techniques to tactical and strategic industrial problems. Analysis and simulation of production - inventory control systems. Queueing systems, investment and replacement, quality control and reliability.
SECTION SIX

SURVEYING SUBJECT DESCRIPTION

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>521070</td>
<td>SV091</td>
<td>1</td>
</tr>
<tr>
<td>521071</td>
<td>SV092</td>
<td>1</td>
</tr>
<tr>
<td>521072</td>
<td>SV093</td>
<td>1</td>
</tr>
</tbody>
</table>

Prerequisite: Part-time enrolment

These subject units are designed to formalise periods of Industrial Experience gained by part-time students only. Each of the Industrial Experience units is equivalent to one unit of 42 hours. 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 by part-time students as electives. (See Section 4 of this Handbook.)

521110 4 units

SV111 SURVEYING I

Elementary surveying principles - nature, causes and classes of errors - elementary error propagation - linear measurement with tapes, ordinary differential levelling, the theodolite, angle measurement, plane table, magnetic compass, detail surveys, field notes, chain surveys, traversing and traverse calculations, contour surveys by stadia, road surveys, areas and volumes, horizontal curves, transition curves, vertical curves. A brief history of surveying and surveying instruments. A daily series of fieldwork exercises will form a compulsory component of this subject.

Text

521111

SV121 SURVEY CAMP I

This subject is only available to students who have passed SV111 prior to 1988.

Prerequisite: SV121 Survey Camp I

Duration: 5 days

Extensive engineering survey - control by plane triangulation and traversing - setting out road centreline, including transition and circular curves - calculation of grades and earthworks quantities, and associated drawings.

Text
Ingham, A.E. Hydrography for the Surveyor and Engineer, 2nd edn (Granada 1964)

522405

SV222 SURVEY CAMP II

This subject is only available to students who have passed SV121 prior to 1988.

Prerequisite: SV121 Survey Camp I

Duration: 5 days

Extensive engineering survey - control by plane triangulation and traversing - setting out road centreline, including transition and circular curves - calculation of grades and earthworks quantities, and associated drawings.

Text
Ingham, A.E. Hydrography for the Surveyor and Engineer, 2nd edn (Granada 1964)

522407

SV232 SURVEY COMPUTATIONS I

Prerequisite: Mathematics I

This course is concerned with computer programming, with particular emphasis on programming style. The use of terminals, files and editing techniques will be covered. Also some aspects of computer hardware and data handling will be considered. Some numerical analysis techniques will be discussed to provide examples for programming. This will include solutions of single non-linear equations, interpolation and integration.

Text
Brown, L.W.B. A Fortran Primer (Ponicao-Hall 1982)

522409

SV233 SURVEY COMPUTATIONS II

Prerequisite: SV111

Corequisite: SV233

Programmming in Standard Fortran 77 (Heinemann 1979)

Handbook for VAX/VMS (The University of Newcastle Computing Centre)

Text

522411

SV213 SURVEYING II

Prerequisite: SV111

Corequisite: SV233

Part A (Surveying)


Part B (Optics)


This subject includes a 5-day survey camp.

522412 1 unit

SV214 HYDROGRAPHIC SURVEYING

Corequisite: SV213

Assumed Knowledge: SV111


Text
Ingham, A.E. Hydrography for the Surveyor and Engineer, 2nd edn (Granada 1964)

522405

SV222 SURVEY CAMP II

This subject is only available to students who have passed SV121 prior to 1988.

Prerequisite: SV121 Survey Camp I

Duration: 5 days

Extensive engineering survey - control by plane triangulation and traversing - setting out road centreline, including transition and circular curves - calculation of grades and earthworks quantities, and associated drawings.

Text
Ingham, A.E. Hydrography for the Surveyor and Engineer, 2nd edn (Granada 1964)

522407

SV232 SURVEY COMPUTATIONS I

Prerequisite: Mathematics I

This course is concerned with computer programming, with particular emphasis on programming style. The use of terminals, files and editing techniques will be covered. Also some aspects of computer hardware and data handling will be considered. Some numerical analysis techniques will be discussed to provide examples for programming. This will include solutions of single non-linear equations, interpolation and integration.

Text
Brown, L.W.B. A Fortran Primer (Ponicao-Hall 1982)

522409

SV233 SURVEY COMPUTATIONS II

Prerequisite: SV111

Corequisite: SV233

Plane trigonometrical formulae - calculation of triangles, areas, roadways, subdivisions. Use of calculators. Traverse computations, including offsets and missing data problems. Areas from co-ordinates and lines, areas, roadways, subdivisions. Determination of directions, angles, lengths. Large project development.

Text

Notes on Survey Investigations (NSW Govt. Printer)

Willis

523305

SV313 SURVEYING III

Prerequisites: SV233

Revision of DC and AC circuits - transformers, vacuum tubes, semi-conductor devices - amplifiers, oscillators, transducers - wave-shaping - logic circuits - scalers - propagation of electromagnetic waves - modulation and heterodyning - phase measurement - principles of Electronic Distance Measurement (EDM) - study of EDM systems - corrections to EDM distances - electronic angle measurement and total station instruments - Global Positioning System (GPS). Includes 10-day survey camp.

Text
Burnside, C.D. Electromagnetic Distance Measurement 2nd edn (Granada 1982)

523325

SV334 SURVEY COMPUTATIONS III

Prerequisite: SV233

Revision and extension of error theory - adjustment by least squares - error ellipse calculations.

Text

523328

SV351 GEODESY

Corequisites: SV331, SV334

Prerequisites: SV291, SV292

This course includes a 5-day survey camp.

Text

SV341 SURVEYING IV

Prerequisites: SV313 and SV334

Review of statistics and error analysis. Analysis of field procedures and design of surveys. Mechanical principles of instrument design, optical tooling in industry, pointing
SECTION SIX

SURVEYING SUBJECT DESCRIPTION

accu...r systems. Land information systems. Evolution of the N.S.W. cadastral. Mapping - methods of preparing and reproducing line maps and other map products. Principles of automatic cartographic procedures, review of equipment examples of automated mapping.

524135

SY472 LAND VALUATION

General principles of urban and rural land valuation - improved and unimproved capital values - valuation of leasehold 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

Hornby, D. Appraisal One (Oxford 1976)

Murray, F.M. Principles and Practice of Land Valuation (Commonwealth Inst. of Valuers 1974)

524136

SY473 TOWN PLANNING

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

Texts

Torga, W. Geodesy (de Gruyter)

Mikhail, E.M. Observations and Least Squares (IEP)

524130

SY462 PHOTOGRAMMETRY II

Prerequisite: SV361

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)

524140

SY465 ADVANCED CARTOGRAPHY

Prerequisite: SV361

A project for candidates for the Diploma in Surveying. Further details are available from the Head of Department.

SECTION SIX

CORE SUBJECTS OFFERED OUTSIDE THE FACULTY OF ENGINEERING

DEPARTMENT OF CHEMISTRY

721110

CHEMISTRY I

Prerequisites Nil

Advisory Prerequisites At least Mathematics 2-unit course, Physics 2-unit course and Chemistry 2-unit course with ranking in the top 50% in each case.

Hours About 3 lecture hours and 3 hours of tutorial and laboratory classes per week.

Examination The subject is examined progressively with three examinations each of two hours duration distributed throughout the year.

The laboratory mark counts 10% towards the final grading. A pass in the laboratory course is required in order to pass the subject.

Contents

Inorganic Chemistry (30 lectures)

Revision of basic concepts; periodic properties of the elements and their compounds; bonding and structure; coordination compounds.

Organic Chemistry (30 lectures)

Historical development. The shapes, structures and names of organic compounds; reactions of common functional group; synthesis, differentiation and structural elucidation of organic compounds.

Physical Chemistry (30 lectures)

Chemical equilibria; thermodynamics; electrochemistry; chemical kinetics.

Texts


Ham,H. Organic Chemistry 6th edn (Houghton Mifflin 1983)

721900

CHEMISTRY IS

(For Civil Engineering Students)

Prerequisites Nil

Hours About 2 lecture hours and 1 hour of tutorials, computational classes and student participation per week.

Examination A student may satisfy the examiners EITHER:

(i) by achieving an overall satisfactory performance in the three 1-hour examinations held at the end of each term; OR

(ii) by achieving performance in a 3 hour paper on the whole year's work, held in the November examination period.

Students who attempt both sets of examinations will be credited with the higher of the two results.

Content

The course deals primarily with material and energy resources.

One term is devoted to structures, properties and behaviour of inorganic materials, minerals and metals.

One term is devoted to chemical energetics and to chemical and physical equilibria.

One term is devoted to organic chemistry with special reference to petrochemicals, polymers, fuels and lubricants.

In all three terms tutorials designed to support the lecture are held.

Texts


Stoedman, W. et al Chemistry for the Applied Sciences (Pergamon 1970)

722200

CHEMISTRY IA

6 units: weighting=2

Prerequisite: Chemistry I

Preparatory Subjects: Mathematics I & either Physics IA or IB

Hours About 3 lecture hours and 6 hours of tutorial and laboratory classes per week.

Examination The subject is examined progressively with seven hours of examinations distributed throughout the year. The laboratory mark counts 20% towards the final grading. A pass in the laboratory course is required in order to pass the subject.

Contents

Analytical Chemistry

Basic principles of selected range of instrumental methods of analysis.

Inorganic Chemistry

Symmetry, structure and bonding, main group chemistry; transient metal chemistry and co-ordination complexes; structure elucidation; acceptor complexes and organoelemental compounds.

Dynamics

Kinetics; chemical affinity; electrochemical cells.

Organic Chemistry

Aliphatic and aromatic chemistry.

Thermodynamics

Basic laws, and applications to ideal and non-ideal systems.

Texts

Atkins, P.W. Physical Chemistry 2nd edn (Oxford 1982)

Pine, S.H. Hendrikson, J.B. et al  

Also advisable, particularly if proceeding to Chemistry IIIA.

Shoemaker, D.P. Garland, C.W., et al  

Skog, D.A. & West, D.M.  
Principles of Instrumental Analysis 2nd edn (Saunders College, Philadelphia 1980)

Model Kit  
Orbit Molecular Model Kit. (Cochranes, Oxford)

DEPARTMENT OF ECONOMICS

421100 4 units: weighting=1  
ECONOMICS I  
Lecturer D. B. Hughes  
Prerequisites Nil  
Hours 3 lecture hours per week, and weekly tutorials  
Examination Two 1-hour quizzes plus one 2-hour examination each semester  
Content  
The course is designed to introduce the students 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, eg., inflation, unemployment, government policy, pollution, poverty, urban quality of life, and environmental 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 applications.

The second semester is concerned with Macroeconomics. It will involve a study of the relationship between aggregate scales such as consumption, investment, employment, 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 issues of theoretical controversy and provide some explanation as to why economists can advocate incompatible "solutions" to the same problem.

Tests To be advised

References  
Gwartney, J.O. & Stroup, R.  

Lipsey, R. Langley, P. & Mahoney, D.  

Sawin, C.  
Economics of Markets: An Introduction to Economic Analysis, (Wiley, 1974).

* Notes: students also enrolled in Geography IIA must count 4 units towards Geography Methods in IIB only, and take all semester units offered in IIA.

DEPARTMENT OF GEOGRAPHY

531200 4 units: weighting=1  
GEOGRAPHY IIB — Physical Geography  
(For BSurv students)  
Prerequisite Geography I

Hours Four hours of lectures/practicals/tutorials and two hours of Geographical Methods per week; up to six days of fieldwork.

Geography IIB students are required to take Geographical Methods plus all courses offered.

Semester 1  
Semester 2

Climatology  
Geomorphology

Biogeography A  
Biogeography B

Examination Two two-hour papers  
Content  
A study of the physical environment. In 1988 themes will be established around the following specific fields of interest.

Climatology (Dr H. A. Bridgman, Dr G. N. McIntyre) An introduction to the study on a synoptic and meso-climatic scale including radiation and total budgets; thermodynamics; precipitation processes; climates of the world; climatic change; agricultural climatology; applied climatology.

Geomorphology (Prof. E.A. Colhoun, Dr R. L. Langham) Rocks and their weathering, structural landforms, soils, slope development and mass movements, fluvial, aeolian and coastal processes and landforms.

Biogeography (Dr. J.C. Turner)  
To be advised

Tests

Attenborough, D.  
Life on earth (1987)

Linacre, E. & Hobbs, J.  
The Australian Climatic Environment (Wiley, Paperback, 1983)

Pears, N.  
Basic Geography (Longman, 1985, 2nd edn.)

Selby, M.J.  
Earth's Changing Surface (Clarendon Press, Oxford, 1985)

DEPARTMENT OF MATHEMATICS

681100 4 units: weighting=1  
COMPUTER SCIENCE I  
In the Faculty of Engineering only students enrolled in the Computer Engineering programme may enrol in this subject.

Prerequisite Computer Science I

Hours 4 lecture hours and 4, 2-hour tutorials and practical work per week

Examinations By topic  
Content  
This subject comprises the four topics:

Assembly Language

Commercial Programming

Comparative Programming Languages

Data Structures & Algorithms

Reflections of these topics appear as the subject descriptions for the Diploma in Computer Science subjects of the same name.

661100 4 units: weighting=1  
MATHEMATICS I  
Advisory Prerequisite

Students intending to study Mathematics I are advised that although the minimum assumed knowledge for Mathematics I is 2 units of Mathematics at the Higher School Certificate, nevertheless students who have less than 3 units of preparation will usually find themselves seriously disadvantaged.

Hours 4 lecture hours and 2 tutorial hours per week

Examination Two 3-hour papers

Content

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 (compiler and operating systems). Applications of computers. Social issues raised by computers. An extensive introduction to programming in Pascal and a shorter introduction to programming in FORTRAN 77.

Tests

Goldshleger, L. & Lister, A.  

and either

Cooper, D. & Clancy, M.  
Condensed Pascal (Norton 1987)

or

Savich, W.J.  
Pascal, An Introduction to the Art and Science of Programming (2nd edn Benjamin/Cummings 1987)
SECTION SIX: CORE SUBJECTS OFFERED OUTSIDE THE FACULTY OF ENGINEERING

Content
The following four topics:

Algebra
Real Analysis
Calculus
Statistics and Computing

Text
Mathematics I: Tutorial Notes (1988)
University of Newcastle

Anton, H
Elementary Linear Algebra 5th edn (Wiley 1987)

Binmore, K.G.

Furrrand, S. & Poxoo, N.J.
Calculus (Harcourt Brace Jovanovich, 1984)

References
See under individual topics

MATHMATICS 1 TOPIC DESCRIPTIONS

Algebra
P.K. Smir

Text
Bridley, W.A.
Introduction to Linear Algebra (Wiley 1973)

Johnson, R.S. & Vinson, T.O.
Elementary Linear Algebra (Harcourt Brace Jovanovich 1987)

Kolman, B.
Elementary Linear Algebra (Macmillan 1977)

Liebeck, H.
Algebra for Scientists and Engineers (Wiley 1971)

Lipschutz, S.
Linear Algebra (Schaum 1974)

Real Analysis - J.R. Giles

Text
Battley, W.A.
Introduction to Linear Algebra (Wiley 1973)

Binmore, K.G.

Furrrand, S. & Poxoo, N.J.
Calculus (Harcourt Brace Jovanovich, 1984)

Statistics and Computing

References
See under individual topics

MATHEMATICS 2 TOPIC DESCRIPTIONS

Algebra

P.K. Smir


Text
Bridley, W.A.
Introduction to Linear Algebra (Wiley 1973)

Johnson, R.S. & Vinson, T.O.
Elementary Linear Algebra (Harcourt Brace Jovanovich 1987)

Kolman, B.
Elementary Linear Algebra (Macmillan 1977)

Liebeck, H.
Algebra for Scientists and Engineers (Wiley 1971)

Lipschutz, S.
Linear Algebra (Schaum 1974)

Real Analysis - J.R. Giles

Text
Battley, W.A.
Introduction to Linear Algebra (Wiley 1973)

Binmore, K.G.

Furrrand, S. & Poxoo, N.J.
Calculus (Harcourt Brace Jovanovich, 1984)

Statistics and Computing

References
See under individual topics

MATHEMATICS 3 TOPIC DESCRIPTIONS

Algebra

P.K. Smir


Text
Bridley, W.A.
Introduction to Linear Algebra (Wiley 1973)

Johnson, R.S. & Vinson, T.O.
Elementary Linear Algebra (Harcourt Brace Jovanovich 1987)

Kolman, B.
Elementary Linear Algebra (Macmillan 1977)

Liebeck, H.
Algebra for Scientists and Engineers (Wiley 1971)

Lipschutz, S.
Linear Algebra (Schaum 1974)

Real Analysis - J.R. Giles

Text
Battley, W.A.
Introduction to Linear Algebra (Wiley 1973)

Binmore, K.G.

Furrrand, S. & Poxoo, N.J.
Calculus (Harcourt Brace Jovanovich, 1984)

Statistics and Computing

References
See under individual topics
SECTION SIX  CORE SUBJECTS OFFERED OUTSIDE THE FACULTY OF ENGINEERING

**Content**

Complex numbers, Cartesian and polar forms, geometry of the complex plane, solutions of polynomials equations, Complex functions, mapping theory, limits and continuity, Differentiation, the Cauchy-Riemann Theorem. Elementary functions, exponential, logarithmic, trigonometric and hyperbolic functions, Integration, the Cauchy-Goursat Theorem, Cauchy's integral formulae, Laurent's Theorem and the Fundamental Theorem of Algebra. Taylor and Laurent series, analytic continuation. Residue theory, evaluation of some real integrals and series, the Argument Principle and Rouche's Theorem. Conformal mapping and applications.

**Texts**

References


Kreyzig, E. Advanced Engineering Mathematics (Wiley 1979)

Levinson, N. & Redheffer, R.M. Complex Variables (Heddon-Day 1970)

O'Neill, P.V. Advanced Engineering Mathematics (Wadsworth 1983)


Tall, D.O. Functions of a Complex Variable I and II (Routledge & Kegan Paul 1970)

662109  **TOPIC CO — VECTOR CALCULUS & DIFFERENTIAL EQUATIONS**

Lecturer: W. Summerton

Prerequisite: Mathematics I

Hours: 2 lecture hours per week and 1 tutorial hour per week

Examination: One 3-hour paper

**Content**


Texts

Kreyzig, E. Advanced Engineering Mathematics 5th edn (Papberback, Wiley 1979)(5th edn is preferable but 4th or 3rd edn will suffice)

Greenberg, M.D. Foundations of Applied Mathematics (Prentice-Hall) (1976)

References


Courant, R. Differential and Integral Calculus Vol.II (Wiley 1966)


Finizio, N. & Ladas, G. Ordinary Differential Equations with Modern Applications 2nd edn (Wadsworth 1982)


O'Neill, P.V. Advanced Engineering Mathematics (Wadsworth 1983)


Spiegel, M.R. Theory and Problems of Vector Analysis (Schaum 1959)


662104  **TOPIC D — LINEAR ALGEBRA**

Lecturer: R.B. Eggleton

Prerequisite: Mathematics I

Hours: 1 lecture hour per week and 1 tutorial hour per fortnight

Examination: One 2-hour paper

**Content**

First semester: A brief review of some material in the algebra component of Mathematics I. Linear maps, matrix representations, diagonalisation, eigenvalues and eigenvectors. Inner product spaces, Orthogonal, unitary, hermitian and normal matrices, Difference equations, Quadratic forms. Linear programming.


Texts

References

Anton, H. Elementary Linear Algebra 4th edn (Wiley 1984)

Bloom, D.M. Linear Algebra and Geometry (Cambridge 1979)

Briksy, W. A Basis for Linear Algebra (Wiley 1973)

Lipschutz, S. Linear Algebra (Schaum 1974)

Nering, E.D. Linear Algebra and Matrix Theory (Wiley 1964)

Reza, F. Linear Spaces in Engineering (Ginn 1971)

Roman, S. An Introduction to Linear Algebra (Saunders 1985)

Rorres, C. & Anton, H. Applications of Linear Algebra (Wiley 1979)

**SELECTED ENGINEERING MATHEMATICS TOPICS**

Note: Mathematics I is a prerequisite for all EM subjects.

662112  **EM2AS APPLIED STATISTICS**

Content: See Topic AS.

662106  **EM2D COMPLEX ANALYSIS**

Content: See Topic B.

662111  **EM2B COMPLEX ANALYSIS AND LINEAR ALGEBRA**

Pre-or Co-requisite: EM2CO.

Content: Consists of first half year's work in Topic B Complex Analysis and Topic D Linear Algebra.

662110  **EM2CO VECTOR CALCULUS AND DIFFERENTIAL EQUATIONS**

Content: See Topic CO.

662118  **EM2D LINEAR ALGEBRA**

Content: See Topic D.

DEPARTMENT OF PHYSICS

741200  **PHYSICS IA**

Prerequisite Nil

Hours: 3 lecture hours and an average of 3 hours of laboratory and tutorial work per week.

Examination: One paper mid-year, one paper at the end of year, together with laboratory and tutorial assessment.

**Content**

Physics IA is the principal prerequisite for students wishing to proceed to Physics II. Some students in the Faculty of Engineering may be required to take the subject Physics IA while others may have the option of attempting Physics IB. Students in the Faculty of Engineering should consult the Approved Programme for the course in which they are enrolled. (See Section 5 of this Handbook.)

A rigorous, mathematically based discipline with emphasis on the unifying principles which link together different areas of the subject. Lectures will cover mechanics, oscillations and waves, optics, and quantum physics. The treatment throughout will assume some knowledge of calculus.

Texts


7411300  **PHYSICS IB**

Prerequisite Nil

Hours: 3 lecture hours and an average of 3 hours of laboratory and tutorial work per week.

Examination: One paper mid-year, one paper at end of year, together with laboratory and tutorial assessment.

**Content**

Physics IB covers the same topics as outlined for Physics IA, though somewhat less deeply and with less mathematical rigour. It is designed for students who enter the University with the intention of studying Physics for only one year. However, students who develop an interest in Physics during their studies are encouraged to consult with the Head of Department of Physics if they wish to enter Physics II on the basis of performance in the Physics IB course.

Texts

All undergraduate engineering programmes include Elective units which may be selected in accordance with specific requirements. The elective Requirements of each programme are set out following the Approved Programme and students should consult these requirements before selecting their elective subjects (see relevant course entry in Section 5).

Subject to the Elective Requirements of the relevant course, Elective units may be selected from:

• Subjects offered by Departments of the Faculty of Engineering (except EE100);
• Subjects offered by Departments outside the Faculty which are core subjects in an Engineering course (except Computer Science 1) and are therefore listed in the previous part of this Session;
• Subjects included in the list below; and
• Subjects which may be specially approved by Faculty Board on the recommendation of the Head of the responsible Department. The unit value and weighting of any subject so approved will also be determined by Faculty Board.

Full descriptions of the subjects listed below, including any prerequisite or corequisite requirements, may be found in the relevant Faculty Handbook.

The unit value and weighting of the subjects listed below have been approved by Faculty Board for use in the event that such subjects are approved as Elective subjects in accordance with course Elective Requirements.

**Computer Science**

- 311400 Classical Civilisation I
- 261100 Drama I
- 331100 English I
- 341101 French IA
- 341300 French IS
- 351100 Geography I
- 361500 German IN
- 361600 German IS
- 311100 Greek I
- 371100 History I
- 291100 Japanese I
- 311200 Latin I
- 271100 Linguistics I
- 381100 Philosophy I
- 381202 Philosophy IF

- **Content:** Either the first or the second half of the core strand of Philosophy I plus two Philosophy I options.
- **Content:** Either the first or the second half of the core strand of Philosophy I plus one Philosophy I option.
- **Content:** Either the core strand of Philosophy I or one Philosophy I option.

**Economics and Commerce**

- 411100 Accounting I
- 440126 CS Commercial Programming Management
- 421100 Economics I
- 421105 Economic History I
- 451100 Legal Studies I

**Mathematics**

Notes: The descriptions of EM subjects offered by the Departments of Computer Science, Mathematics and Statistics correspond to the descriptions of the topic of the same name and level which may be found in the Faculty of Mathematics Handbook. For example, the content of EM2A Mathematical Models is identical to the content of Mathematics II, Topic A Mathematical Models. The prerequisite and corequisite requirements of Mathematics Topics apply to the related EM subject.

**Department of Computer Science**

- 682200 EM2CPL Comparative Programming Languages
- 683120 EM3PL Programming Languages and Systems
- 684202 EM4 Advanced Operating System Principles
- 684201 EM4 Artificial Intelligence
- 684200 EM4 Computer Graphics
- 684203 EM4 Concurrence, Complexity and VLSI
- 684204 EM4 Formal Semantics of Programming Languages
- 684206 EM4 Software Engineering Principles
- 684205 EM4 Software-Oriented Computer Architecture

**Department of Mathematics**

- 662105 EM2A Mathematical Models
- 662300 Mathematics IIC
- 662106 EM2B Complex Analysis
- 662111 EM2BD Complex Analysis and Linear Algebra
- 662110 EM2CO Vector Calculus and Differential Equations
- 662108 EM2D Linear Algebra
- 662212 EM2E Topic in Applied Mathematics
- 662206 EM2F Numerical Analysis and Computing
- 662215 EM2G Discrete Mathematics
- 662307 EM2K Topic in Pure Mathematics
- 662308 EM2L Analysis of Metric Spaces
- 663135 EM2M General Tensors and Relativity
- 663131 EM2N Variational Methods & Integral Equations
- 663136 EM30 Mathematical Logic and Set Theory
- 663120 EM3P Ordinary Differential Equations
- 663124 EM3PD Partial Differential Equations
- 663132 EM3Q Fluid Mechanics
- 663147 EM3QS Quantum and Statistical Mechanics
- 663127 EM3S Geometry
### SECTION SIX

**APPROVED ELECTIVE SUBJECTS**

<table>
<thead>
<tr>
<th>Computer Number</th>
<th>Subject</th>
<th>Department</th>
<th>Unit Value</th>
<th>Weighting Value</th>
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<tbody>
<tr>
<td>663140</td>
<td>EM3' Group Theory</td>
<td></td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>663137</td>
<td>EM3TC Theory of Computing</td>
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<td>3</td>
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<tr>
<td>663125</td>
<td>EM3Y Measure Theory and Integration</td>
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<td>3</td>
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<td>663214</td>
<td>EM3W Functional Analysis</td>
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<tr>
<td>663150</td>
<td>EM3X Fields and Equations</td>
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<tr>
<td>663125</td>
<td>EM3Y Stochastic Processes</td>
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<td>663112</td>
<td>EM32 Mathematical Principles of Numerical Analysis</td>
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<td>664404</td>
<td>EM4 Algebraic Graph Theory</td>
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<td>664413</td>
<td>EM4 Analysis of Categorical Data</td>
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<td>664414</td>
<td>EM4 Astrophysical Applications of Magnetohydrodynamics</td>
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<td>664415</td>
<td>EM4 Banach Algebra</td>
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<td>664416</td>
<td>EM4 Combinatorics</td>
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<td>EM4 Convex Analysis</td>
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<td>664419</td>
<td>EM4 Foundations of Modern Differential Geometry</td>
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<td>664420</td>
<td>EM4 General and Algebraic Topology</td>
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<td>664415</td>
<td>EM4 Fluid Statistical Mechanics</td>
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<td>664409</td>
<td>EM4 History of Analysis to Around 1900</td>
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<td>EM4 Linear Operators</td>
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<td>664423</td>
<td>EM4 Mathematical Models of Phase Transitions</td>
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<td>664424</td>
<td>EM4 Mathematical Physiology</td>
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<td>EM4 Mathematical Problem Solving</td>
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<td>664425</td>
<td>EM4 Nonlinear Oscillations</td>
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<td>EM4 Number Theory</td>
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<td>EM4 Quantum Mechanics</td>
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<td>EM4 Radicals and Annihilators</td>
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<td>664430</td>
<td>EM4 Symmetry and Groups</td>
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<td>664431</td>
<td>EM4 Topological Graph Theory</td>
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<td>664432</td>
<td>EM4 Viscous Flow Theory</td>
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**Department of Statistics**

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<th>Department</th>
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<th>Weighting Value</th>
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### SECTION SEVEN

**COMBINED DEGREE PROGRAMMES**

About This Section

This section sets out the detailed programmes of combined degree courses which may be taken by students enrolled in the various BE programmes.

Admission to these programmes must be approved by the Dean of the Faculty of Engineering and the Dean of the other faculty concerned. Entry to the courses is normally made after completion of the first year of a BE Approved Programme. Students normally require a Weighted Average Mark (WAM) of at least 70 before permission will be given to enter a combined degree programme. Combined degree programmes are taken on a full-time basis.

**ENTRY TO COMBINED DEGREE PROGRAMMES**

Students wishing to enter a combined degree programme must apply for entry after completion of the first year of the Approved Programme of their BE course. Applications are made by submitting an Application for Course Transfer form (for transfer to the Application for Re-enrolment form. The forms must be lodged at the Student Administration Office in the McMullen Building by the due date for return of the latter form.

**BACHELOR OF ENGINEERING IN CHEMICAL ENGINEERING**

The following combined courses leading to the degrees of Bachelor of Engineering (BE) in the specialty of Chemical Engineering, and the degree of Bachelor of Arts (BA), Bachelor of Commerce (BCom), Bachelor of Economics (BEc), Bachelor of Mathematics (BMath) or Bachelor of Science (BSc) are to be submitted to the relevant Faculty Boards.

**Year I**

Identical to Year I of the Approved Programme for the B.E. in Chemical Engineering, except that students contemplating enrolment in the BMath/BE and BSc/BE combined degrees programmes should include Physics I in their first year programme rather than taking Physics II.

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### SECTION SEVEN

**CIVIL ENGINEERING COMBINED DEGREE PROGRAMMES**

**BACHELOR OF ENGINEERING IN CIVIL ENGINEERING**

The following combined courses leading to the degrees of Bachelor of Engineering (BE) in the specialty of Civil Engineering, and the degree of Bachelor of Arts (BA), Bachelor of Mathematics (BMath), Bachelor of Science (BSc) or Bachelor of Surveying (BSurv) are to be submitted to the relevant Faculty Boards. Combined courses leading to the degrees of Bachelor of Engineering (BE) in the specialty of Civil Engineering, and the degree of Bachelor of Commerce (BCom) or Bachelor of Economics (BEE) may be submitted to the relevant Faculty Boards for approval but will require 6 years full-time study for completion. Prospective students may prefer to consider a first degree in the specialty of Civil Engineering followed by a course leading to the award of Master of Business Administration (MBA).

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**SECTION SEVEN**

**COMPUTER ENGINEERING COMBINED DEGREE PROGRAMMES**

**BACHELOR OF ENGINEERING IN COMPUTER ENGINEERING**

The Bachelor of Engineering programme in Computer Engineering may be combined with studies leading to the award of the degrees of Bachelor of Arts (BA), Bachelor of Commerce (BCom), Bachelor of Computer Science (BCompSc), Bachelor of Economics (BEC), Bachelor of Mathematics (BMath) or Bachelor of Science (BSc).

Three of these combined programmes may be taken over 5 years full-time. They are the combined Bachelor of Engineering and Bachelor of Science, Bachelor of Engineering and Bachelor of Commerce, Bachelor of Engineering and Bachelor of Mathematics.

### Year I

Identical to Year I of the Approved Programme for the BE in Computer Engineering.

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<th>Bachelor of Engineering</th>
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* An additional essay is required to complete BCompSc requirements - see section 4(1)(b) of the BCompSc Degree Regulations.
BACHELOR OF ENGINEERING IN ELECTRICAL ENGINEERING

The Bachelor of Engineering programme in Electrical Engineering may be combined with studies leading to the award of the degrees of Bachelor of Arts (BA), Bachelor of Commerce (BCom), Bachelor of Economics (BSc), Bachelor of Mathematics (BMath) or Bachelor of Science (BSc). These courses are to be submitted to the relevant Faculty Boards.

Two of these combined programmes may be taken over 5 years full-time. They are a combined BE/BMath and BE/BSc programme majoring in Physics. These programmes are listed below. Enquiries regarding other combined degree programmes may, in the first instance, be directed to the Faculty Secretary.

Year I

Identical to Year I of the Approved Programme for the B.E. in Electrical Engineering.

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<tr>
<td>Year III</td>
<td>Programme: The Year III Electrical Engineering</td>
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<td>Bachelor of Mathematics</td>
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<td>Year IV</td>
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<tr>
<td>Bachelor of Mathematics</td>
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BACHELOR OF ENGINEERING IN INDUSTRIAL ENGINEERING

The following combined courses leading to the degrees of Bachelor of Engineering (BE) in the specialty of Industrial Engineering, and the degree of Bachelor of Arts (BA), Bachelor of Commerce (BCom), Bachelor of Economics (BSc), Bachelor of Mathematics (BMath) or Bachelor of Science (BSc) are to be submitted to the relevant Faculty Boards.

Year I

Identical to Year I of the Approved Programme for the B.E. in Civil Engineering, except that Physics IA is recommended in place of Physics IB for the BMath/BE and BSc/BE combined degrees.

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### SECTION SEVEN

**MECHANICAL ENGINEERING COMBINED DEGREE PROGRAMMES**

**BACHELOR OF ENGINEERING IN MECHANICAL ENGINEERING**

The following combined courses leading to the degrees of Bachelor of Engineering (BE) in the specialty of Mechanical Engineering, and the degree of Bachelor of Arts (BA), Bachelor of Commerce (BCom), Bachelor of Economics (BBe), Bachelor of Mathematics (BMath) or Bachelor of Science (BSc) are to be submitted to the relevant Faculty Boards.

#### Year I

Identical to Year I of the Approved Programme for the B.E. in Industrial Engineering, except that Physics IA is recommended in place of Physics IB for the BMath/BE and BSc/BE combined degrees.

<table>
<thead>
<tr>
<th>Bachelor of Arts</th>
<th>Bachelor of Commerce</th>
<th>Bachelor of Economics</th>
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### SECTION SEVEN

**SURVEYING COMBINED DEGREE PROGRAMMES**

**BACHELOR OF SURVEYING**

The following combined courses leading to the degrees of Bachelor of Surveying (BSurv) and the degree of Bachelor of Engineering (BE) in the Specialisation of Civil Engineering or Bachelor Mathematics (BMath) are to be submitted to the relevant Faculty Boards.

#### Year I

Identical to Year I of the Approved Programme for the BSurv.

<table>
<thead>
<tr>
<th>Bachelor of Engineering (Civil Engineering)</th>
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<tbody>
<tr>
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<td>Bachelor of Surveying Programme less 3 units of Elective plus Part II subject from BMath Schedule A</td>
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<td>CE453</td>
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## Regulations Governing Diplomas

### General

1. 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 Diploma in Industrial Engineering and the Diploma in Surveying.

2. **Definitions**

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

   - "course" means the total requirements as prescribed in the Schedule to qualify a candidate for the award of the Diploma;
   - "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;
   - "Diploma" means the Diploma in Industrial Engineering or the Diploma in Surveying as the case may be;
   - "Faculty Board" means the Faculty Board, Faculty of Engineering;
   - "responsible department" means the department designated as such in the Schedule;
   - "Schedule" means the Schedule to these Regulations relevant to the diploma in which a person is enrolled or proposing to enrol;
   - "subject" means any part of the course for which a result may be recorded.

   (2) The unit value of a subject for the purposes of these Regulations shall be determined by the Faculty Board.

### Admission and Enrolment

3. **To be eligible for admission to candidature an applicant shall have satisfied the requirements for admission specified in the Schedule.**

   (1) Application for admission to candidature shall be considered by the Faculty Board which may approve or reject any application.

   (2) In any year a candidate shall enrol only in those subjects approved by the Dean or his nominee.

   (3) A candidate will not be permitted to enrol in any subject which is deemed by the Faculty Board to be substantially equivalent to one which he has previously counted towards a degree or diploma.

### Standing

5. **The Faculty Board, on the recommendation of the Head of the responsible department, may grant a candidate standing in the course in recognition of work completed in this University or elsewhere on such conditions as the Faculty Board may determine.**

### Prerequisites and Corequisites

6. **To qualify for the award of the Diploma, a candidate shall pass a programme of subjects approved by the Faculty Board.**

   (1) To the Faculty Board, on the recommendation of the Head of the responsible department, may prescribe prerequisites and/or corequisites for a subject.

   (2) Except with the approval of the Dean, a candidate may not enrol in a subject unless he or she has passed any subject prescribed as its prerequisite and has already passed or concurrently enrolled in or is already enrolled in any subject prescribed as its corerequisite.

### Withdrawal

7. **A candidate who withdraws from any subject after the relevant date shall be deemed to have failed in that subject unless granted permission by the Dean to withdraw without penalty.**

   (1) The relevant date shall be:

   - (a) in the case of any subject offered only in the first half of the academic year, the last Monday of that term;
   - (b) in the case of any subject offered only in the second half of the academic year, the fourth Monday of that term;
   - (c) in the case of any other subject the last Monday of that term.

### Subject Requirements

8. **To qualify for the award of the Diploma, a candidate shall pass a programme of subjects approved by the Faculty Board.**

   (1) To complete a subject, a candidate shall attend such lectures, tutorials, seminars, laboratory classes and field work and submit such written or other work as the Department shall require.

   (2) To pass a subject a candidate shall complete it and pass such examinations as the Faculty Board shall require.

### Grading of Diploma

9. **The Diploma shall be awarded in one grade only.**

### Award of Diploma

10. **The Faculty Board has approved the subjects listed below for enrolment.**

### Schedules

#### Schedule I

<table>
<thead>
<tr>
<th>Course Code</th>
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<td>Production Scheduling I</td>
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<td>ME343</td>
<td>Production Scheduling II</td>
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### Additional Requirements

1. A candidate who has transferred from the Master of Engineering Science degree course may be granted standing in subjects equivalent to the unit value of those subjects completed while the candidate was enrolled in the degree course.

2. Except with the permission of the Faculty Board, the course shall not be completed in less than two years of part-time study.

### Diploma in Surveying

1. For the purposes of these Regulations the responsible department for the Diploma in Surveying shall be the Department of Civil Engineering and Surveying.

### Diploma in Industrial Engineering

1. For the purposes of these Regulations the responsible department for the Diploma in Industrial Engineering shall be the Department of Mechanical Engineering.
PART II — EXAMINATION AND RESULTS

10. The Examination Regulations approved from time to time by the Council shall, so far as they affect all examinations with respect to a degree of Master with the exception of the examination of a thesis which shall be conducted in accordance with the provisions of Regulations 12 to 16 inclusive of these Regulations.

11. The Faculty Board shall consider the results in subjects, including the examinations and any other requirements prescribed in the Schedule and shall decide:

(a) to recommend to the Council that the candidate be admitted to the degree; or
(b) in a case where a thesis has been submitted, to permit the candidate to resubmit an amended thesis within twelve months of the date on which the candidate is advised of the result of the first examination or within such longer period of time as the Faculty Board may prescribe; or
(c) to require the candidate to undertake such further oral, written or practical examinations as the Faculty Board may prescribe; or
(d) not to recommend that the candidate be admitted to the degree, in which case the candidate shall be terminated.

PART III — PROVISIONS RELATING TO THESSES

12. (1) The subject of a thesis shall be approved by the Faculty Board on the recommendation of the Head of the Department in which the candidate is carrying out his research.

(2) The thesis shall not contain as its main content any work or material which has previously been submitted by the candidate for any degree in any tertiary institution unless the Faculty Board otherwise permits.

13. The candidate shall give to the Secretary to the University three months’ written notice of the date he expects to submit his thesis and such notice shall be accompanied by any prescribed fee.3

14. (1) The candidate shall comply with the following provision concerning the presentation of a thesis:

(a) the thesis shall contain an abstract of approximately 200 words describing its content;
(b) the thesis shall be typed and bound in a manner prescribed by the University;
(c) three copies of the thesis shall be submitted together with:
(i) a certificate signed by the candidate that the main content of the thesis has not been submitted by the candidate for a degree of any other tertiary institution; and
(ii) a certificate signed by the supervisor indicating whether the candidate has completed the programme and whether the thesis is of sufficient academic merit to warrant examination; and

3 At present there is no fee payable.
SECTION EIGHT

POSTGRADUATE DEGREE REGULATIONS

has had previous research experience, the Faculty Board may reduce this period to not less than one academic year;

(b) except with the permission of the Faculty Board, not more than 5 years.

5. Except with the permission of the Faculty Board a candidate shall take part in research seminars within the Department in which he is carrying out his research.

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 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 programme.

3. (1) A candidate shall nominate the Department in which he is carrying out his research.

(a) the candidate's suitability for admission to candidature;

(b) the adequacy of facilities for supervision of the proposed programme;

(c) the supervisor or supervisors who should be appointed to supervise the candidate's programme.

4. To qualify for admission to the degree a candidate shall complete a programme of study comprising subjects totalling 12 units as may be prescribed by the Faculty Board. Not less than two nor more than four of such units shall comprise the investigation of and report on a project determined by the Faculty Board.

5. A candidate may be granted standing by the Faculty Board on such conditions as the Faculty Board may determine in up to six units in recognition of work completed in this University or elsewhere.

6. (1) The programme shall be completed in not less than one academic year in the case of a full-time candidate and not less than two academic years in the case of a part-time candidate.

(2) Except with the permission of the Faculty Board, the programme shall be completed in not more than two years in the case of a full-time candidate and not more than three years in the case of a part-time candidate. 4

SCHEDULE 11 — MASTER OF SCIENCE

1. A candidate for the degree of Master of Science may be enrolled in either the Faculty of Engineering or the Faculty of Science. The Faculty in which the candidate is enrolled shall be responsible for the programme.

2. (1) To be eligible for admission to candidature in the Faculty of Science an applicant shall:

(a) have satisfied all the requirements for admission to the degree of Bachelor of Science with honours Class I or Class II of the University of Newcastle or to a degree, approved for this purpose by the Faculty Board, of that or any other university; or

(b) have satisfied all the requirements for admission to the degree of Bachelor of Science of the University of Newcastle or other approved university 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 in an appropriate subject, or

(c) in exceptional cases produce evidence of possessing such other qualifications as may be approved by the Faculty Board.

3. (1) A candidate shall nominate the Department in which he is carrying out his research. The Faculty of Science shall be responsible for the programme.

(a) conduct the major proportion of the research or design work in the University; and

(b) take part in research seminars within the Department in which he is carrying out his research.

(2) Except with the permission of the Faculty Board, which shall be given only in special circumstances, a part-time candidate enrolled in the Faculty of Science shall:

(a) have satisfied all the requirements for admission to the degree of Bachelor of Science with honours Class I or Class II of the University of Newcastle or any other approved university; or

(b) have satisfied all the requirements for admission to the degree of Bachelor of Science of the University of Newcastle or other approved university 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 in an appropriate subject, or

(c) in exceptional cases produce evidence of possessing such other qualifications as may be approved by the Faculty Board.

D I R E C T O R Y  O F  T O P I C S

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 all the requirements for admission to the degree of Bachelor of Science with honours Class I or Class II of the University of Newcastle or any other approved university; or

(b) have determined and have achieved a standard at least equivalent to that required for admission to a degree in Surveying.

3. To qualify for admission to the degree a candidate shall complete the requirements of the Faculty Board of this or any other university; or

(c) in exceptional cases produce evidence of possessing such other qualifications as may be approved by the Faculty Board.

4. The programme 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, 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.

Approved Master of Engineering Science Subjects

The following subjects have been approved for inclusion in the Master of Engineering Science course programme. Not all subjects will be offered in any one year. For details of which subjects will be offered in 1988 consult the Department concerned.

Electrical and Computer Engineering

EE513 Power System Analysis and Operation
EE514 Advanced Power Systems
EE517 Variable Speed Drive Systems
EE525 Microprogrammed and Microprocessor Systems
EE526 Advanced Digital Systems
EE527 VLSI and Design Automation
EE530 Advanced Digital Signal Processing
EE542 Systems Theory
EE543 Optimization Techniques
EE545 Advanced Communication Systems
EE549 Digital Communication Systems
EE558 Electromagnetic Propagation and Antennas
EE562 Topics in Switching Theory
EE565 Computer Aiding Systems
EE566 Compiler Construction
EE566 Automata Theory
EE567 Computer Process Control
EE568 Advanced Computer Architecture
EE580 Project
EE580 Project
EE580 Project
EE590 Seminar
EE641 Adaptive Control
EE642 Stochastic Control
EE661 Estimation and System Identification

Mechanical and Industrial Engineering

ME503 Design of Experiments for Engineering Applications
ME505 Advanced Numerical Programming
ME507 Environmental Engineering
ME509 Introduction to Noise Pollution Control
ME510 Advanced Design Concepts
ME514 Computer Aided Design and Manufacturing
ME517 Building Materials Handling Systems I
ME520 Building Materials Handling Systems II
ME521 Conveying of Bulk Solids
ME521 Conveying of Bulk Solids
ME524 Maintenance Engineering
ME545 Mathematics of Solids III
ME553 Fluid Mechanics II
ME554 Computation of Fluid Flows and Heat Transfer
ME573 Thermodynamics III

For list of approved M.Eng.Sc. subjects see page 207 of this Handbook.
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**Coal Technology**

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Candidates may, if they wish, select subjects offered in other faculties subject to the approval of the Faculty Board, Faculty of Engineering.
### Industrial Experience Units

- CHE495: Design Project (2 units)
- CHE496: Research Project (4 units)
- CHE497: Design Project (4 units)
- CHE498P: Research Project (4 units)
- CHE497P: Design Project (4 units)

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### Civil Engineering — BE Subjects

#### First Year Subjects

- CHE497: Design Project (4 units)
- CHE497P: Research Project (4 units)
- CHE493: Industrial Experience
- GE151: Introduction to Materials Science
- ME111: Graphics and Engineering Drawing
- SV111: Surveying I

#### Second Year Subjects

- CHE495: Design Project (2 units)
- CHE496: Research Project (4 units)
- CHE497: Design Project (4 units)
- CHE498P: Research Project (4 units)
- CHE497P: Design Project (4 units)

#### Third Year Subjects

- CHE495: Design Project (2 units)
- CHE496: Research Project (4 units)
- CHE497: Design Project (4 units)
- CHE498P: Research Project (4 units)
- CHE497P: Design Project (4 units)

#### Fourth Year Subjects

- CHE495: Design Project (2 units)
- CHE496: Research Project (4 units)
- CHE497: Design Project (4 units)
- CHE498P: Research Project (4 units)
- CHE497P: Design Project (4 units)

### Electrical and Computer Engineering — BE Subjects

#### First Year Subjects

- CHE495: Design Project (2 units)
- CHE496: Research Project (4 units)
- CHE497: Design Project (4 units)
- CHE498P: Research Project (4 units)
- CHE497P: Design Project (4 units)

#### Second Year Subjects

- CHE495: Design Project (2 units)
- CHE496: Research Project (4 units)
- CHE497: Design Project (4 units)
- CHE498P: Research Project (4 units)
- CHE497P: Design Project (4 units)

#### Third Year Subjects

- CHE495: Design Project (2 units)
- CHE496: Research Project (4 units)
- CHE497: Design Project (4 units)
- CHE498P: Research Project (4 units)
- CHE497P: Design Project (4 units)

#### Fourth Year Subjects

- CHE495: Design Project (2 units)
- CHE496: Research Project (4 units)
- CHE497: Design Project (4 units)
- CHE498P: Research Project (4 units)
- CHE497P: Design Project (4 units)
Third and Fourth Year Subjects

502005 GE211 Theory and Applications of Electrical Energy Conversion
503001 GE301 Technology and Human Value
503003 GE325 Microprocessor Systems and Applications
503006 GE361 Automatic Control
633100 Mat311 Selection and Use of Materials II
543112 ME305 Experimental Methods II
543116 ME316 Mechanical Engineering Design II
543315 ME333 Dynamics of Machines
543316 ME343 Mechanics of Solids II
543310 ME352 Fluid Mechanics II
543314 ME353 Fluid Mechanics and Heat Transfer
543302 *ME372 Heat Transfer
543311 ME373 Thermodynamics II
543301 ME381 Methods Engineering
543502 ME383 Quality Engineering
543503 ME384 Design for Production
544481 MB405 Advanced Numerical Programming
544453 ME407 Environmental Engineering
544424 ME409 Introduction to Noise Pollution Control
544426 ME410 Advanced Design Concepts I
544410 ME413 Mechanical Engineering Design III
544107 ME414A Computer Aided Design and Manufacturing
544108 MB414B Computer Aided Design and Manufacturing
544469 ME519 Bulk Materials Handling Systems I
544472 ME520 Bulk Materials Handling Systems II

MATERIALS ENGINEERING — BE SUBJECTS

First Year Subjects
661100 Mathematics I
721100 Chemistry I
741200 Physics I
741300 Physics II
521105 CE111 Mechanics and Structures
501103 GE101 Introduction to Engineering
501102 GE151 Introduction to Materials Science
51104 ME111 Graphics and Engineering Drawing
51104 ME111 Graphics and Engineering Drawing

Second Year Subjects
662110 EM2110 Vector Calculus and Differential Equations
662111 EM2111 Complex Analysis and Linear Algebra
662110 EM2110 Vector Calculus and Differential Equations
662111 EM2111 Complex Analysis and Linear Algebra
662110 EM2110 Vector Calculus and Differential Equations
662111 EM2111 Complex Analysis and Linear Algebra

Fourth Year Subjects

631003 Mat303 Industrial Experience
631004 Mat304 Industrial Experience
631005 Mat305 Industrial Experience
631006 Mat306 Industrial Experience

ME305 Experimental Methods
ME316 Mechanical Engineering Design I

Industrial Experience Units
631003 Mat303 Industrial Experience
631004 Mat304 Industrial Experience
631005 Mat305 Industrial Experience
631006 Mat306 Industrial Experience

Surveying — BSurv Subjects

First Year Subjects
661100 Mathematics I
741200 Physics I
521105 CE111 Mechanics and Structures
501103 GE101 Introduction to Engineering
501102 GE151 Introduction to Materials Science
51104 ME111 Graphics and Engineering Drawing
521110 SV111 Surveying I
521111 *SV121 Surveying Cap I

Second Year Subjects
522112 CE212 Mechanics of Solids
522100 CE222 Engineering Geology
522202 CE231 Fluid Mechanics I
522204 CE232 Fluid Mechanics II
522212 SV214 Hydrographic Surveying
### BACHELOR OF ENGINEERING SUBJECT NUMBERS CONTINUED

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### Industrial Experience

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### COAL TECHNOLOGY SUBJECTS

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