FOREWORD

I would like to take this opportunity to welcome to the University all new students of engineering. You have chosen one of the most interesting and rewarding of professions, with a membership second only to the teaching profession. We hope that you will enjoy your time with us at the University.

Engineering offers a sound combination of Science, Engineering Science and Professional experience, together with an appreciation of human relations. The student may choose from within the Faculty either Civil, Electrical, Industrial or Mechanical Engineering; and now Chemical Engineering has become a part of the Faculty. In the near future we also expect to be offering the first two years of both a Mining Engineering course and a Surveying degree course. In both cases the latter parts of the course would be completed at The University of New South Wales in Kensington.

I would also like to extend to both the students of Chemical Engineering and the Staff of the Chemical Engineering Department a warm welcome to the Faculty of Engineering, and trust that the association will be one of mutual benefit.

This is the second year of operation of the revised engineering courses. The year 1968 was a rather difficult transition year which was completed without too many problems. In this regard, student co-operation during 1968 was very much appreciated. Student population within the Faculty continues to grow, and it might be appropriate at this time to indicate that the planning for the engineering complex of five buildings at Shortland is well advanced. These buildings are scheduled for completion by the commencement of the 1970 academic year.

Finally, students are encouraged to participate in both Faculty and general University activities. Should students require assistance with difficult problems, they are invited to consult with the Heads of Departments concerned, or other teaching staff.

A. J. CARMICHAEL
Dean, Faculty of Engineering
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PRINCIPAL DATES FOR 1969

TERM 1  March 3 to May 17
TERM 2  June 9 to August 16
TERM 3  September 8 to November 7

JANUARY
1  Monday  Public Holiday — New Year’s Day
15  Wednesday  Deans available to interview “Show Cause” to applicants
17  Friday  Last day for lodgement of Enrolment Applications — New Students
20  Monday  Deferred Examinations commence
27  Monday  Public Holiday — Australia Day

FEBRUARY
1  Saturday  Last day of Deferred Examinations
5  Wednesday  Last day for lodgement of Re-Enrolment Applications — Old Students
12  Wednesday  New students report for interview
14  Friday  Orientation commences
26  Wednesday  Last day for payment of First Term Fees

MARCH
3  Monday  FIRST TERM commences
21  Friday  Graduation Day

APRIL
4  Friday  Public Holiday — Good Friday
7  Monday  Public Holiday — Easter Monday
8  Tuesday  Easter Tuesday — No lectures
25  Friday  Public Holiday — Anzac Day

MAY
17  Saturday  FIRST TERM ends
PRINCIPAL DATES FOR 1969
(continued)

JUNE

9 Monday .... SECOND TERM begins
Public Holiday — Queen’s Birthday

20 Friday .... Last day for payment of Second Term Fees
Last day for acceptance of applications for examinations

AUGUST

16 Saturday .... SECOND TERM ends

SEPTEMBER

8 Monday .... THIRD TERM begins
19 Friday .... Last day for payment of Third Term Fees

OCTOBER

6 Monday .... Public Holiday — Six Hour Day
31 Friday .... THIRD TERM Lectures end

NOVEMBER

8 Saturday .... Annual Examinations begin
29 Saturday .... Annual Examinations end
THIRD TERM ends

1970

JANUARY

1 Thursday .... Public Holiday—New Year’s Day
19 Monday .... Proposed closing date for lodgement of Enrolment Applications — New Students
Deferred Examinations begin
26 Monday .... Public Holiday — Australia Day
31 Saturday .... Last day Deferred Examinations

FEBRUARY

4 Wednesday .... Proposed closing date for lodgement of all Enrolment Applications

FACULTY OF ENGINEERING

Dean
Professor A. J. Carmichael

CHEMICAL ENGINEERING

Professor
PROFESSOR OF CHEMICAL ENGINEERING
(HEAD OF DEPARTMENT)

Senior Lecturer

Lecturers
J. Roberts, B.Sc.(N.S.W.), M.E., A.S.T.C., A.R.A.C.I.
K. L. Smith, B.E.(Syd.), M.Sc.(N.S.W.)

STUDENT ADVISER
Dr. W. G. Kirchner
CIVIL ENGINEERING

Professor
PROFESSOR OF CIVIL ENGINEERING
(HEAD OF DEPARTMENT)

Associate Professor
A. Herzog, Dipl.Eng.(Bud.), Ph.D.(N.S.W.), F.I.E.Aust., M.ASCE.

Senior Lecturers
P. W. Kleeman, B.E.(Adel.), F.S.A.S.M.
N.O. Betts, B.Sc.(S.A.), B.Sc.(Eng.) (Capetown), M.Tech.(N.S.W.), M.I.C.E., M.I.E.Aust., A.M.(S.A.)I.C.E.
L. A. White, B.Sc.(Eng.) (Rand.), Ph.D., L.S.A., M.I.L.S.

Lecturers
R. J. Wilson, B.E.(N.S.W.), M.E., Grad.I.E.Aust., A.M.ASCE.

Professional Officer
M. G. Van Santen, M.T.S.Dip.(Utrecht)

ELECTRICAL ENGINEERING

Professor
PROFESSOR OF ELECTRICAL ENGINEERING
(HEAD OF DEPARTMENT)

Associate Professor
J. B. Moore, B.E., M.Eng.Sc.(Qld.), Ph.D.(Santa Clara), M.I.E.E.E.

Senior Lecturer
J. G. Alva, B.Sc.(Dunelm), M.Sc.(Lond.), C.Eng., M.I.E.E.

Lecturers
S. G. Loo, M.E.(N.S.W.), Ph.D.(Monash), M.I.E.E.E.

Professional Officer
MECHANICAL ENGINEERING

Professor
PROFESSOR OF MECHANICAL ENGINEERING
(HEAD OF DEPARTMENT)

Associate Professor
A. K. Johnston, B.E.(Syd.), M.S.(Iowa), Ph.D.(N.S.W.)

Senior Lecturers
E. Betz, M.E., Ph.D.(N.S.W.), A.S.T.C., F.I.E.Aust.

Lecturers
L. W. B. Browne, B.E.(Syd.)
M. J. Hallinan, A.S.T.C.
K. L. Hitz, B.E.(N.S.W.), Grad. I.E.Aust.

Professional Officers
O. J. Scott, B.E.
H. A. Willems, B.E.(N.S.W.), M.E., Dipl. Naval Arch. M.T.S.(Dordrecht), A.S.T.C.

ADMINISTRATIVE STAFF

Vice-Chancellor and Principal

Vice-Principal and Deputy Vice-Chancellor
Professor B. Newton-John, M.A.(Cantab.)

Deputy Vice-Chancellor
Professor J. A. Allen, M.Sc.(Qld.), Ph.D.(Bristol), F.R.A.C.I.

Personal Assistant to Vice-Chancellor
Nell Emanuel, B.A.(N.S.W.)

Bursar
L. W. Harris, A.A.S.A., A.C.A.A., A.B.I.A.

Deputy Bursar
M. G. Talty, B.Com.(N.S.W.), A.A.S.A.

Accountant
G. W. Walker, A.A.S.A.

Assistant Bursar—Staff
R. J. Goodbody

Secretary
P. D. Alexander, B.A., Dip.Ed.(Syd.)

Enrolments Section
H. Floyer, B.Ec.(Syd.)

Examinations Section
Glennie Jones, B.A.(N.S.W.)

Publications Section
Joan Bale, B.A.(N.S.W.)

Secretariat Section
J. D. Todd, B.Com., A.A.S.A.
University Planner
Associate Professor E. C. Parker, A.S.T.C., F.R.A.I.A.

Staff Architect
D. D. Morris, B.Arch.(N.S.W.), A.S.T.C., A.R.A.I.A.

Staff Engineer

Senior Student Counsellor
P. M. Whyte, B.A.(Melb.), M.A.Ps.S.

Student Counsellors
A. P. Loftus, B.A.(Melb.), M.A.Ps.S.

Computer Unit
Computer Programmer
P. C. Cook, B.A.(N.S.W.)

Secretary/Manager of the University Union
I. H. S. Irwin

Library Staff

University Librarian
E. Flowers, M.A.(Syd.), A.L.A.A.

Head Cataloguer
Elizabeth Guilford, B.A.(N.E.), A.L.A.A.

Reader Services Librarian
Joan E. Murray, B.A.(N.E.), A.L.A.A.

Assistant Librarians
Barbara Cook, B.A.; Dip.Lib.(N.S.W.)
Janice Tucker, B.A.(Syd.), Dip.Lib.(N.S.W.)

Graduate Library Staff
Jane Campbell, B.A.(N.E.), Dip.Ed.
L. Faidiga, B.A.
Mary Hill, B.A.
Jane Kandiah, B.A.
L. Kutas, Dip.Eng.(Bud.)
Winifred Murdoch, B.Sc.(N.E.)
The University of Newcastle began its existence as the Newcastle University College of the University of New South Wales, then known as the New South Wales University of Technology. The College was formally opened on 3rd December, 1951, and the first students were enrolled in the 1952 academic year. By the University of Newcastle Act of 1964 it became an autonomous institution on 1st January, 1965.

Enrolments in the first year of the College's existence totalled 370 of whom only five were starting degree courses — the others were seeking a diploma or were converting their diplomas into degrees. In 1954 courses in the Faculty of Arts were offered for the first time. As the New South Wales University of Technology, whose courses were given in the College, had no Faculty of Arts, supervision of these courses was entrusted to the University of New England. This relationship continued until 1959 by which time the New South Wales University of Technology had become the University of New South Wales and was empowered to offer courses in the Faculty of Arts. Enrolments have steadily increased, reaching 1000 in 1960 and 2286 in 1968.

The Newcastle University College was established on the site of the Newcastle Technical College at Tighe's Hill and some faculties still operate there. In 1960 an area of some 200 acres was acquired at Shortland and building commenced in 1964. The transfer of the University began at the end of 1965 and work is underway to have the University fully established at Shortland by the beginning of the 1970 academic year. In 1969 courses in the Faculties of Applied Science, Arts, Economics and Commerce, and Science will be offered at Shortland excepting second and later year Chemistry subjects which will be offered initially at Tighe's Hill but will move to Shortland during the year. Courses in the Faculties of Architecture and Engineering will be given at Tighe's Hill. The branch library will continue to operate at Tighe's Hill.

The University is governed by a Council of twenty-three members of whom one, the Chancellor, acts as chairman. The Council comprises representatives of the University staff, Convocation, the undergraduates, the Legislative Council and the Legislative Assembly; nominees of the Governor; and the Vice-Chancellor who is the chief executive officer of the University.


The principal academic body in the University is the Senate comprising the Vice-Chancellor, Professors, a representative of each of the Faculty Boards and certain other ex officio members. Teaching and research in each Faculty are supervised by a Faculty Board consisting principally of the permanent academic staff of the Departments in the Faculty.

The University is financed by grants from the New South Wales and Commonwealth Governments and fees paid by students. The State and Commonwealth Governments contribute equally to the cost of buildings and major items of equipment whilst with respect to recurrent expenditure, the Commonwealth contributes $1 for every $1.85 received by way of State grant and student fees.
MATRICULATION

The By-laws governing matriculation and admission to courses are set out below. The University does not conduct its own matriculation examination but recognises the New South Wales Higher School Certificate Examination and the University of Sydney Matriculation Examination for this purpose.

By-law 5.1 — Matriculation

1. (1) Except as provided in By-law 5.3.3, a candidate, before being admitted to matriculation, shall:

(a) have passed in the New South Wales Higher School Certificate Examination or the University of Sydney Matriculation Examination in at least five recognised matriculation subjects, one of which shall be English and any three of which shall be passed at least at second level; and

(b) have attained in that examination the aggregate of marks prescribed by Senate from time to time and calculated in the manner determined by Senate.

(2) The recognised matriculation subjects shall be:

- English
- Mathematics
- Science
- Agriculture
- Modern History
- Ancient History
- Geography
- Economics
- Greek
- Latin
- French
- German
- Italian
- Bahasa Indonesia
- Spanish
- Russian
- Chinese
- Japanese
- Hebrew
- Dutch
- Art
- Music
- Industrial Arts
- Russian

(3) Mathematics and Science, both passed as full courses, together shall, for the purpose of sub-section (1)(a) of this section, be counted as three subjects, but otherwise, each shall count as one subject.

(4) The qualification for matriculation must be achieved at one examination.

2. A person who has applied to undertake a course of study as a matriculated student shall upon —

(a) the approval of his admission to a Faculty and the payment of such fees as may from time to time be determined by the Council;

and

(b) signing the Matriculation Register of the University become a matriculated student of the University and shall be deemed to have accepted the privileges and obligations of membership of the University.

* Subject to approval by the Governor.

By-law 5.3 — Admission to Courses

1. (a) A candidate for any first degree of the University shall satisfy the conditions for admission to matriculation set out in By-law 5.1.1. or shall have been admitted to matriculation under section 3 of this By-law before entering on any course for such degree. Compliance with the conditions for admission to matriculation shall not in itself entitle a person to enter upon a course.

(b) A person who has satisfied the conditions for admission to matriculation may on the payment of such fees as may be determined by the Council from time to time be provided with a statement to that effect.

2. A candidate for any degree shall before entering on the course for that degree have satisfied any special conditions prescribed under By-law 5.2.

3. The Council may, with the advice of the Senate, admit as a matriculated student, under such conditions and with such standing as it may determine, any person who has satisfied the Council that he has reached a standard of education sufficient to enable him to pursue his proposed course.

4. The Council may, with the advice of the Dean of the Faculty concerned, permit any person to enrol in a subject or subjects on payment of such fees as may be determined from time to time by the Council. Such a person, not being a matriculated student, shall not have the privileges of a matriculated student and shall not be eligible to proceed to a degree.

PRE-REQUISITES

Although pre-requisites are not prescribed, lectures in the following faculties, courses or subjects will be given on the assumption that students will have studied the subjects listed below to the level indicated:

- FACULTY
- ASSUMPTION

Applied Science
- Second level Short Course Mathematics and Science including Physics and Chemistry options.

Architecture
- Second level Short Course Mathematics and Science.

Arts
- English I — Second level English.
- French I — Second level French.

Engineering
- Second level Short Course Mathematics and Science including Physics and Chemistry options.

Science
- Second level Short Course Mathematics and Science.

There is no compulsory pre-requisite for admission to the Faculty of Economics & Commerce, but students entering the Faculty are advised to have passed mathematics at the N.S.W. Higher School Certificate examination at least at the second level short course standard or to have achieved an equivalent standard in mathematics.
PROCEDURES

HOW TO ENROL

All documents relating to enrolment are obtainable from the

I. PERSONS ENROLLING IN AN UNDERGRADUATE COURSE AT THE
UNIVERSITY OF NEWCASTLE FOR

(i) WITH NORMAL MATRICULATION

Step 1—Intending students, who have obtained passes at the
N.S.W. Higher School Certificate Examination, the
N.S.W. Leaving Certificate Examination or the
Sydney University Matriculation Examination entitling them to matriculation status should lodge an
“Application for Admission” with the Student Records
Office before 5.00 p.m. on Monday, 20th January, 1969.

Step 2—The University will post a “Notification of Acceptance” to all students approved for admission — a letter will be sent to anyone whose enrolment cannot be accepted.

Step 3—Intending students will be required to report at the
University, Shortland site, within the period Wednesday,
12th February to Friday, 14th February, 1969, to discuss their intended course with an academic adviser. Details of the location of such interviews will be given with the “Notification of Acceptance”.

Step 4—Student completes enrolment by payment of fees. Wednesday, 26th February, 1969 is the last day for payment of fees.

(ii) WITH PROVISIONAL MATRICULATION

Step 1—Prospective students, seeking admission to the
University and whose educational qualifications do not appear to entitle them to normal matriculation, should arrange to interview the Dean of the
appropriate Faculty during the period Wednesday,
15th January, to Friday, 17th January, 1969 between the hours of 1.00 p.m. to 7.00 p.m. Each applicant will be required to:

(a) complete an “Application for Admission — Admissions Committee Case”

(b) produce documentary evidence of educational qualifications claimed

(c) hand both to the Dean at the time of interview. This procedure will not apply to students who will have already been advised of approval for admission or whose cases are already under consideration.

Step 2—The University will post a letter to the applicant notifying the decision on his/her application.

Step 3—Students approved for admission will be required to report at the University, Shortland site, within the period Wednesday, 12th February to Friday, 14th February, 1969 to discuss their intended course with an academic adviser. Details of the location of such interviews will be given with the “Notification of Acceptance”.

Step 4—Student completes enrolment by payment of fees. Wednesday, 26th February, 1969 is the last day for payment of fees.

(iii) INTERSTATE AND OVERSEAS STUDENTS

Students relying for matriculation on examinations taken outside New South Wales will be required to produce evidence of matriculation to their local university or some other recognised university, for example, The University of London.

Step 1—Intending students should lodge with this University before, say, Friday, 17th January, 1969 an “Application for Admission — Admissions Committee Case” supported by a statement as indicated above and documentary evidence of their educational qualifications.

Step 2—The University will post a letter to all applicants notifying the decision on his/her application. Details will be given in this letter of the procedure to be followed by student to complete enrolment.

II. PERSONS RE-ENROLLING IN UNDERGRADUATE COURSES

Undergraduates re-enrolling will be required to complete an Enrolment Form and lodge it with the Student Records Office on or before Wednesday, 5th February, 1969.

Students awaiting Deferred Examination Results — see Late Enrolments section below.

IMPORTANT

Owing to the expected increase in enrolments in 1969, new students enrolling or old students re-enrolling late, if accepted, may be allocated to the less convenient laboratory, seminar or tutorial times.

Re-enrolment forms when approved will be posted to the students.

III. CANDIDATES FOR POSTGRADUATE DIPLOMA COURSES

DIPLOMA IN APPLIED PSYCHOLOGY

Candidates for admission to this course are required to complete the enrolment form “Postgraduate Diploma” and lodge it with the Student Records Office on or before Wednesday, 5th February, 1969.

Each candidate will be required to attend the University for interview before enrolment in the course is approved.
DIPLOMA IN EDUCATION

Candidates for admission to this course are required to complete the enrolment form “Postgraduate Diploma” and lodge it with the Student Records Office on or before Wednesday, 5th February, 1969.

Notices will be displayed on the University Notice Boards giving information as to where and when prospective candidates will be interviewed concerning their studies.

DIPLOMA IN INDUSTRIAL ENGINEERING

Candidates for admission to this course are required to complete the enrolment form “Postgraduate Diploma” and lodge it with the Student Records Office on or before Wednesday, 5th February, 1969.

IV. CANDIDATES FOR THE DEGREE OF MASTER, OR DOCTOR OF PHILOSOPHY

Candidates Re-Enrolling

A letter will be sent by the University to each candidate whose re-registration is approved. A higher degree enrolment form will be enclosed with the letter and the candidate is required to complete the form and return it to the University Cashier together with the appropriate fees on or before Wednesday, 26th February, 1969.

Candidates Registering for the First Time

These persons should complete an “Application for Registration as a Candidate for a Higher Degree” and lodge it with the Student Records Office.

V. CANDIDATES FOR QUALIFYING COURSES FOR HIGHER DEGREES

Graduates intending to pursue qualifying studies for admission as a candidate for the degree of Master, or Doctor of Philosophy should complete the special form for this purpose and lodge it with the Student Records Office, preferably before Wednesday, 5th February, 1969.

NON-ACCEPTANCE

The student whose enrolment is not accepted will be notified in writing.

LATE ENROLMENTS

(i) Students who are unable to lodge their Application Form or Enrolment Form by the prescribed date, shall make written application to The Secretary for an extension of time. This application must be received by The Secretary on or before Monday, 20th January, 1969 in the case of new students, or Wednesday, 5th February, in the case of students re-enrolling, otherwise the University reserves the right not to accept the student’s application or enrolment.

(ii) No enrolments will be accepted after 31st March of each academic year without the approval of The Secretary which shall be given only in exceptional circumstances.

(iii) Deferred Examinations

A student who has taken a deferred examination will be required to lodge an Enrolment Form with the Student Records Office after the publication of the examination results and not later than Wednesday, 19th February, 1969.

(iv) “Show Cause” Students

A student, who, by failure at the Annual Examinations wishes to “Show Cause”, will be required to interview the Dean of his Faculty between the hours of 1.00 p.m. to 7.00 p.m. in the period Wednesday, 15th January to Friday, 17th January, 1969, or, by failure at the Deferred Examinations, to interview the Dean between the hours of 2.00 p.m. to 4.30 p.m. and 5.30 p.m. to 7.30 p.m. on Friday, 14th February, 1969.

A letter will be sent to all students who “Show Cause”. Those whose re-enrolment is approved will also be sent an enrolment form and details of procedure for student to complete enrolment.

(v) Sydney University Matriculation

Students relying on this examination for matriculation should call at the Student Records Office, Shortland site, after the publication of results and obtain an “Application for Admission” and an “Enrolment Form”. After completion of these forms, the student will be directed to an academic adviser.

UNIVERSITY SKILLS ASSESSMENT

All new first year students will be required to attend the University on Thursday and Friday, 27th and 28th February, 1969, for University Skills Assessment. Full-time attendance on both days will be required.

Further details will be posted to the student during the enrolment period.

MATRICULATION CEREMONY

A Matriculation Ceremony will be held during first term and as part of the proceedings new students, excepting those who have been admitted with provisional matriculation status, will be expected to sign the Matriculation Register.

ENROLMENT IN CORRECT SUBJECTS

Considerable inconvenience is caused to the University and to the student if he reads a subject in which he has not enrolled. It is essential for the student to determine before submitting his Enrolment Form, the subjects he will read for the year. Particular attention should be made to the inclusion of Honours courses where these are taken.

WITHDRAWAL FROM COURSE REGARDED AS FAILURE

Approval to withdraw from a course is not automatic. It should be noted that a student is regarded as having failed in a course if he enrols in it and does not pass the annual examinations — i.e. not sitting for the examination is regarded as not passing the examination (unless withdrawal has been approved).

A student is required to notify The Secretary of the University in writing of his withdrawal within seven (7) days of the date.
of withdrawal. With the exception of students in the Faculty of Arts and the Faculty of Economics and Commerce, no student will be allowed to withdraw without penalty after the sixth Monday of second term unless, in the opinion of the Dean of the Faculty, there is good reason why he should be permitted to do so.

In the Faculty of Arts and the Faculty of Economics and Commerce, a student who withdraws after the second Friday in second term from a subject in which he has enrolled, shall be deemed to have failed in that subject. However, such a student may apply to the Dean, who, after consultation with the Head of the Department concerned, may allow him to withdraw without penalty.

AMENDMENTS

The following matters are regarded as amendments to course programmes and are required to be documented:
1. complete withdrawal from course *
2. withdrawal from subject(s)
3. substituting subject(s)
4. transferring from full-time to part-time within degree
5. transferring from part-time to full-time within degree
6. transferring from one degree to another
7. transferring from one faculty to another
8. standing in degree course on account of subjects completed within this University †

NOTES
* The student is liable for fees up to the date on which his application to withdraw is received by the University.
† When requesting exemption in subject unit(s) or substituting unit(s) within a subject, no Variation Application is required, BUT the Head of the Department concerned must be formally notified in writing.

HOW TO DOCUMENT WITHDRAWALS AND AMENDMENTS

All withdrawals and amendments should be recorded on a Variation Application Form.

It is essential that these variations be completed before 31st March, 1969. Automatic approval is not given; the student must have valid and sufficient reasons for making the change and these reasons should be stated on the Variation Application Form.

Variation Application Forms (pink) are available from the Student Records Office.

CHANGE OF ADDRESS

Students are responsible for notifying the Student Records Office in writing of any change in their address as soon as possible. Failure to do this could lead to important correspondence or course information not reaching the student. The University cannot accept responsibility if official communications fail to reach a student who has not notified Student Records Office of a change of address.

The Transport Authorities may challenge a student whose address on his identity token is incorrect.

IDENTITY TOKENS

Each student wishing to obtain a travel concession, to borrow a book from the Library or to confirm his membership of the University of Newcastle Union is required to produce on demand the identity token which will be given to him.

The student should present his fee receipt to the Student Records Office on or after Monday, 10th March, 1969 and he will be given an identity token for 1969.

Students re-enrolling are permitted to use their 1968 identity tokens up to Friday, 7th March, 1969.

Loss of Identity Token

If a student loses his identity token, he should pay to the University Cashier, the sum of 50c., and present the receipt to the Student Records Office for the purpose of obtaining a replacement token. A delay of approximately ten days is involved in this procedure.

Return of Identity Token

Each student, who during the academic year withdraws completely from his course, will be required to hand his Identity Token to the Student Records Office before leaving the University.

Non-Degree Students and Identity Token

Each non-degree student, who does not elect to pay the General Services Fee, will be issued with an embossed plain white token. This token is to be produced each time a travel concession is requested. It must also be shown on request to prove status as a student of the University.

TRAVEL CONCESSIONS

The various transport authorities provide fare concessions for certain classes of students.

Application forms for these concessions may be obtained at the Student Records Section, Building "A," Shortland Site.

The Student's Identity Token has to be produced each time a concession is required.

OMNIBUS — Concessions are available to:

(a) students under 18 years of age irrespective of whether they are employed or receive income or remuneration.
(b) students between 18 and 30 years of age who are not in employment nor in receipt of any income or remuneration. Note: Income or remuneration includes allowances paid to Colombo Plan students, Public Service trainees, etc., but does not include allowances paid to holders of Commonwealth Scholarships, Teachers' College Scholarships or Scholarships granted by the State Bursary Endowment Board.
TRAIN —

(a) Periodical tickets are available during term time to full-time students not in employment nor in receipt of any remuneration.

(b) Daily concession fare tickets are available to part-time students, whether employed or otherwise, for the purpose of travelling to and from class held in connection with their course of instruction.

(c) Vacation travel concessions are available to students qualifying under (a) above.

AIRCRAFT —

Concession fares for travel overseas, inter-state and intra-state are available under the conditions ruling for the various operating companies.

FEES

GENERAL INFORMATION

COMPLETION OF ENROLMENT

Enrolment is completed by the payment of fees. Fees should be paid on or before Wednesday, 26th February, 1969. After that, a late fee will apply (see below). Fees will not be accepted after the 31st March unless The Secretary's approval to enrol is obtained in writing. This will only be given in exceptional circumstances.

Payment of fees by mail is encouraged. Money Orders should be made payable at the Newcastle University Post Office. Fees should be paid to the Cashier on the first floor of Building "A" Shortland site. The Cashier's office is open at the following times:

Monday to Friday 9.00 a.m. to 11.00 a.m.
1.00 p.m. to 4.30 p.m.

During enrolment periods the Cashier's hours are extended and details are published in the press and on University Noticeboards.

PAYMENT OF FEES BY TERM

Students may pay Course Fees by the term, in which case they are required to pay First Term Course Fees and the whole of the General Services Fee before Wednesday, 26th February, 1969. Students paying fees under this arrangement will receive accounts for Second and Third Term fees prior to the commencement of these terms. These fees must be paid within the first two weeks of each term, otherwise late fees will apply.

EXTENSION OF TIME IN WHICH TO PAY FEES

Students who are unable to pay fees by the prescribed date may apply in writing to the Vice-Principal for an extension of time to pay fees. Special forms for this purpose are available from the Student Records Office. Applications must state fully the reasons why fees cannot be paid and must be lodged before the date on which the late fee becomes payable.

SCHOLARSHIP HOLDERS AND SPONSORED STUDENTS

Students are required to submit authorised enrolment forms together with vouchers or other documentary evidence that fees are covered by a scholarship or will be paid by a sponsor, where this type of financial assistance is received. Where such documentary evidence is not available, students are expected to make payment by the due date to avoid late fees and apply for a refund of fees when the authority required is available.

DATES FOR PAYMENT OF FEES IN 1969

<table>
<thead>
<tr>
<th></th>
<th>FEES</th>
<th>LATE FEE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fees payable before or on</td>
<td>$6.00 payable on and after</td>
</tr>
<tr>
<td>FIRST TERM</td>
<td>Wednesday, 26th Feb.</td>
<td>Monday, 17th March</td>
</tr>
<tr>
<td>SECOND TERM</td>
<td>Friday, 20th June</td>
<td>Monday, 23rd June</td>
</tr>
<tr>
<td>THIRD TERM</td>
<td>Friday, 19th Sept.</td>
<td>Monday, 22nd Sept.</td>
</tr>
</tbody>
</table>
FAILURE TO PAY FEES

Any student who is indebted to the University and who fails to make a satisfactory settlement of his indebtedness upon receipt of due notice ceases to be entitled to membership and privileges of the University. Such a student is not permitted to register for a further term, to attend classes or examinations, or to be granted any official credentials. The student is not eligible to attend the annual examinations in any subject where any portion of his Course Fees for the year is outstanding by the end of the fourth week of third term. In very special cases the Vice-Principal may grant exemption from this disqualification upon receipt of a written statement setting out all relevant facts.

FEE ADJUSTMENTS

Should an application to withdraw from a course or a subject be approved, an adjustment of course fees may be made, based on the date the application is received by the University; fees accrue up to that date.

Where notification of withdrawal from a course is received by the Dean of the Faculty before the first day of First Term, a refund will be made of all Course Fees. Where a student for acceptable reasons notifies the termination of a course before the end of the fifth week of term, one-half of the Course Fees for the term may be refunded. If the student notifies termination of a course after the end of the fifth week of term, no refund will be made.

THE UNIVERSITY RESERVES THE RIGHT TO DEFER, UNTIL AFTER THE END OF THE SIXTH WEEK OF TERM, THE PROCESSING OF APPLICATIONS FOR FEE REFUNDS RECEIVED IN THE EARLY PART OF FIRST TERM.

The University Administration does not refund any portion of the General Services Fee. However, students withdrawing from courses may enquire of the Union, Sports’ Union and Students’ Association regarding refund possibilities.

DESIGNATION OF STUDENTS

A Full-Time Student is a student who enrols in more than half the subjects of a normal first year course and such a student remains classified as a full-time student until the written approval of the Dean of the Faculty is given that he be re-classified as a part-time student. This re-classification would be exceptional.

A Part-Time Student is either one who enrols in half or less than half of the subjects of a normal first year course or one who enrols in a part-time course. In subsequent years, the enrolment as a part-time student requires the approval of the Dean of the Faculty.

A Non-Degree Student is a student who is permitted to read one or more subjects of a first degree course. Such a person is not eligible to proceed to a degree and cannot enjoy the privileges of a matriculated student. A student enrolled in the Professional Accounting Studies course in the Faculty of Economics & Commerce is classified as a Non-Degree student reading one subject.

GENERAL SERVICES FEE

(a) Students Proceeding to a Degree or Diploma

All registered students must pay a General Services fee of $42.00 per annum which includes a Library Fee. In addition, students joining the University of Newcastle Union for the first time, are required to pay an entrance fee of $12.00. This fee must be paid by the prescribed time in First Term.

(b) Non-Degree Student

Payment of the General Services Fee by a non-degree student is optional.

A student cannot elect to pay portion of this fee.

UNDERGRADUATE COURSE FEES

Full-Time Courses:

- Faculties of Arts, Economics & Commerce .... $276 per annum
- All other Faculties .... .... .... .... .... $330 per annum

Port-Time Courses:

- All Faculties .... .... .... .... .... $165 per annum
- Non-Degree Subject: .... .... .... .... .... $90 per annum

The abovementioned fees are current at the time of publication and may be varied by the Council without notice.

OTHER FEES

1. Where an application to sit for examinations is accepted after the closing date .... .... .... .... .... $4
2. Deferred examinations, per subject .... .... .... .... .... $4
3. Examination under special supervision, per paper .... .... .... .... .... $8
4. Review of Examination result, per subject .... .... .... .... .... $6
5. Statement of Matriculation Status .... .... .... .... .... $6
6. Laboratory Kit (Chemistry), per kit .... .... .... .... .... $8

POSTGRADUATE DIPLOMA COURSE FEES

- Diploma in Education .... .... .... .... .... $276 p.a.
- Diploma in Industrial Engineering .... .... .... .... .... $165 p.a.

HIGHER DEGREE FEES

Course and Supervision Fee

This fee for Higher Degree candidates is assessed on a term basis; the period of registration being from the first day of the term to the Friday immediately preceding the first day of the following term. Candidates proceeding to a Higher Degree must enrol or re-enrol at the beginning of each academic year at the normal enrolment time. The usual late fees apply in respect of late enrolments.

Where a candidate withdraws during a term, no portion of the term fee will be refunded.
**General Services Fee**

Higher Degree candidates are required to pay the General Services Fee (see page 31). Where a Higher Degree candidate's enrolment is effective from first or second term, the General Services Fee covers a period of registration from the first day of the term to the Friday immediately preceding the first day of first term in the following academic year. Where a Higher Degree candidate enrols on or after the first day of third term, the General Services Fee paid will cover his liability in respect of this fee to December 31st of the subsequent year.

**Re-submission of Thesis**

A candidate required to re-submit a Thesis, will not be required to pay further fees, unless laboratory work is involved, in which case the appropriate course and supervision fee will be payable on a term basis.

**FEES FOR MASTER’S DEGREE**

<table>
<thead>
<tr>
<th>Description</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration Fee</td>
<td>$4</td>
</tr>
<tr>
<td>Course &amp; Supervision Fee (Full-time)</td>
<td>$114 p.a.</td>
</tr>
<tr>
<td>Course &amp; Supervision Fee (Part-time)</td>
<td>$57 p.a.</td>
</tr>
<tr>
<td>Final Examination and Graduation Fee</td>
<td>$30</td>
</tr>
</tbody>
</table>

**FEES FOR DOCTOR OF PHILOSOPHY DEGREE**

<table>
<thead>
<tr>
<th>Description</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualifying Examination Fee (if applicable*)</td>
<td>$12</td>
</tr>
<tr>
<td>Registration Fee</td>
<td>$4</td>
</tr>
<tr>
<td>Course &amp; Supervision Fee</td>
<td>$114 p.a.</td>
</tr>
<tr>
<td>Final Examination and Graduation Fee</td>
<td>$42</td>
</tr>
</tbody>
</table>

* This fee is payable where an examination is prescribed for the assessment of a student prior to his registration as a Higher Degree candidate.

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**GENERAL REQUIREMENTS**

The University tries to function with a minimum of formal regulations; it has, for instance, drawn up no code of conduct for students, beyond forbidding gambling in the precincts and smoking in lectures, examinations and the Library.

It is obvious, however, that there must be standard practice throughout the University in such diverse matters as examination procedures and car parking and an acceptance of certain requirements which are described in the following pages.

**ACADEMIC REQUIREMENTS**

The student is responsible for informing himself as to, and for complying with, University requirements, especially the requirements relating to admission and to the award of the degree for which he is reading.

**NOTICES**

Official University notices are displayed on the notice boards and students are expected to be acquainted with the contents of those announcements which concern them.

**NOTICE BOARDS**

**Examinations**

A notice board has been placed on the wall opposite the entrance to the Main Lecture Theatre (B.01) Shortland Site for the specific purpose of displaying examination timetables and notices concerning all matters pertaining to examinations. Students are specifically requested to be acquainted with the notices periodically displayed thereon.

**Student Matters Generally**

A notice board in the Student Records area is the display point for notices concerning enrolment matters, scholarships, University rules and travel concessions, etc.

**ATTENDANCE AT CLASSES**

Students are expected to be regular and punctual in attendance at all classes in the course or subject in which they are enrolled. All applications for exemption from attendance at lectures or practical classes must be made in writing to the Head of the appropriate Department. If term examinations have been missed this fact should be noted in the application. In the case of illness or of absence for some other unavoidable cause a student may be excused by the Head of the appropriate Department for non-attendance at classes for a period of not more than one month, or on the recommendation of the Head of the appropriate Department for any longer period. Applications for exemption from re-attendance at classes, either for lectures or practical work, may only be approved on the recommendation of the Head of the appropriate Department. The granting of an exemption from attendance does not carry with it exemption from payment of fees. Where a student has attended less than 80 per cent. of the possible classes, he may be refused permission to sit for the annual examination in that subject.
OWNERSHIP OF STUDENTS' WORK

Unless other arrangements have been agreed upon the University reserves the right to retain at its own discretion the original or one copy of any drawings, models, designs, plans and specifications, essays, theses, or other work executed by students as part of their courses, or submitted for any award or competition conducted by the University.

STUDENT IDENTIFICATION

Students are expected to carry their receipt for First Term enrolment as evidence that they are entitled to the rights and privileges afforded by the University.

Each student wishing to obtain a travel concession, to borrow a book from the Library or to confirm his membership of the University of Newcastle Union is required to produce on demand the identity token which will be given to him.

The student should present his fee receipt to the Student Records Office on or after Monday, 10th March, 1969 and he will be given an identity token for 1969.

Loss of Identity Token

If a student loses his identity token, he should pay to the University Cashier, the sum of 50c., and present the receipt to the Student Records Office for the purpose of obtaining a replacement token. A delay of approximately ten days is involved in this procedure.

Return of Identity Token

Each student, who during the academic year withdraws completely from his course, will be required to hand his Identity Token to the Student Records Office before leaving the University.

CHANGE OF ADDRESS

Students are responsible for notifying Student Records Office in writing of any change in their address as soon as possible. Failure to do this could lead to important correspondence or course information not reaching the student. The University cannot accept responsibility if official communications fail to reach a student who has not notified Student Records office of a change of address.

The Transport Authorities may challenge a student whose address on his identity token is incorrect.

GENERAL CONDUCT

Acceptance as a member of the University implies an undertaking on the part of the student to observe the by-laws and other requirements of the University. Students are expected to conduct themselves at all times in a seemly fashion. Smoking is not permitted during lectures, in examination rooms or in the University Library. Gambling is forbidden.

Members of the academic staff of the University, senior administrative officers, and other persons authorised for the purpose have authority, and it is their duty, to check and report on disorderly or improper conduct occurring in the University.

PARKING OF CARS

On the Tighe's Hill Site the authorities of the Newcastle Technical College are responsible for traffic control and parking, and their regulations, traffic signs, etc., must be obeyed.

At Shortland, all vehicles must be parked in a car park.

EXAMINATIONS

Examinations and other exercises may be held in any subject and at any time. In the assessment of a student's progress in a University course, consideration will be given to laboratory work and class exercises and to any term or other tests conducted throughout the year. The results of such examinations and class work may be incorporated with those of the annual examinations.

ANNUAL EXAMINATIONS

A student desiring to sit for an annual examination must lodge an application with the Secretary on the appropriate form by the prescribed date, 29th June, 1969.

A student who, because of religious convictions, would prefer not to sit for an examination on a particular day or particular day of the week should indicate this in writing when lodging his application to sit for the examination. While the University cannot guarantee to meet such requests it will be willing to co-operate where possible.

The cashier is authorised to receive application forms during the three weeks immediately following the prescribed closing date if they are accompanied by a late fee of $4.00. Applications submitted more than three weeks after the closing date will not be accepted except with the approval of the Secretary. Where an application is not accepted, the student concerned is not eligible to sit for the examination.

No student is eligible to attend the annual examination in any subject if any portion of fees or other charges due by him is outstanding by the end of the third week of third term.

The annual examinations take place in November-December. Timetables showing the time and place at which individual examinations will be held will be posted on the Examinations notice board near the Main Lecture Theatre. Misreading of the timetable will not under any circumstances be an acceptable excuse for failure to attend an examination.

Examinations are conducted in accordance with the following rules and procedure:

(a) Candidates are required to obey any instruction given by a Supervisor for the proper conduct of the examination.

(b) Candidates are expected to be in their places in the examination room not less than ten minutes before the time for commencement of the examination.

(c) No bag, writing paper, blotting paper, manuscript or book, other than a specified aid, is to be brought into the examination room.

(d) No candidate shall be admitted to an examination after thirty minutes from the time for the commencement of the examination.

(e) No candidate shall be permitted to leave the examination room before the expiry of thirty minutes from the commencement of the examination.
(f) No candidate shall be re-admitted to the examination room after he has left it unless during the full period of his absence he has been under approved supervision.

(g) A candidate shall not by any improper means obtain or endeavour to obtain assistance in his work, give or endeavour to give assistance to any other candidate, or commit any breach of good order.

(h) Smoking is not permitted during the course of an examination.

(i) A candidate who commits any infringement of the rules governing examinations is liable to disqualification at the particular examination, and if detected at the time, to immediate expulsion from the examination room, and is liable to such further penalty as may be determined.

FURTHER EXAMINATIONS

After completion of the written annual examination papers, a student may be called upon by an examiner to complete further written, practical or oral tests as part of the annual examination. It is therefore important that the Examinations Branch be advised of any change in address from that given on the Application for Admission to Examinations.

EXAMINATION RESULTS

The official examination results will be posted on the notice board in the Student Records Office area. It is planned to advise each student by mail of his examination results. A set of examination results will be offered to the newspapers for publication. No results will be given by telephone.

Examination results may be reviewed for a fee of $6.00 per subject, which is refundable in the event of an error being discovered. Applications for review must be submitted on the appropriate form together with the prescribed fee by the date notified in the publication of results.

SPECIAL EXAMINATIONS

Special examinations may be granted according to the conditions contained in By-law 5.9.3 which states:

5. When a candidate is prevented by illness or by any other serious cause from presenting himself for the annual examination the appropriate Faculty Board may order a special examination for that candidate in the subject or subjects in which he was unable to present himself. The result of a special examination may be graded.

6. When a candidate's studies during the academic year have been gravely hampered by illness or other serious cause, the appropriate Faculty Board upon application being made to the Secretary to the University before the commencing date of the examination supported by medical or other proper evidence may direct the examiners to take the circumstances into account in determining whether or not a special examination should be provided for the candidate in any subject in which he does not pass at the annual examination.

7. When a candidate at the annual examination is to a substantial degree affected by illness during the course of an examination in any subject the appropriate Faculty Board, upon application being made to the Secretary to the University within three days after such examination or within such further period as the Vice-Chancellor may consider reasonable in the circumstances supported by medical or other proper evidence, may direct the examiners in that subject to take the circumstances into account if the candidate does not pass therein in determining whether or not a special examination or test should be provided for him: provided that no such application shall be considered unless the candidate either during or immediately after such examination reports to the supervisor in charge the circumstances relied on in the application.

DEFERRED EXAMINATIONS

Deferred examinations may be granted in the Faculties of Applied Science, Architecture and Engineering to resolve a doubt. The examinations will be held in January-February and results will be published in the same manner as for the Annual Examinations.
ACADEMIC PROGRESS REQUIREMENTS

GENERAL

To assist those students who may be unsuited to university study or whose circumstances jeopardise success at study and to deal with those students whose lack of success has a detrimental effect on the work of the course, the University has enacted certain By-laws relating to continuation in a course. The relevant By-laws are set out below.

BY-LAWS

By-law 5.4.1 — Unsatisfactory Progress

1. The Head of a Department in any Faculty may determine that a student taking a subject or course offered by the Department shall be excluded from any examination for which the Department is responsible for any or all of the following reasons:—
   (a) Unsatisfactory attendance at lectures;
   (b) Failure to complete laboratory work;
   (c) Failure to complete written work or other assignments; or
   (d) Failure to complete field work.

2. The Faculty Board may review the academic progress of any student enrolled in the Faculty concerned who fails in, or is absent from, or is excluded under section 1 of this By-law from any examination and may determine:—
   (a) that the student be excluded from further study in a subject;
   (b) that the student may enrol in that Faculty only in such subject or subjects as the Faculty Board shall specify; or
   (c) that the case be referred to the Admissions Committee if, in the opinion of the Faculty Board, the student should be excluded from a degree course, from the Faculty or from the University.

3. The Admissions Committee, in considering a referral under sub-section (c) of section 2 and after giving the student an opportunity to be heard, may determine:—
   (a) that the student be excluded from a degree course or from the Faculty;
   (b) that the student shall be permitted to continue his course, subject to such conditions as the Admissions Committee may determine; or
   (c) that the case be referred to the Vice-Chancellor with the recommendation that the student be excluded from the University.

4. The Vice-Chancellor may, on the recommendation of the Admissions Committee, exclude from the University any student whose academic record in the opinion of the Vice-Chancellor and the Admissions Committee demonstrates the student's lack of fitness to pursue university studies.

By-law 5.4.2 — Show Cause

1. A student shall show cause why he should be allowed to repeat a subject in which he has failed more than once. Failure in a deferred examination as well as the annual examination counts for the purposes of this By-law as one examination.

2. (1) A full-time student shall show cause why he should be allowed to continue a course if all subjects of the first year of his course are not completed by the end of his second year of attendance.
   (2) A part-time student shall show cause why he should be allowed to continue a course if all subjects of the first two stages of his course are not completed by the end of his fourth year of attendance.

3. (1) A student who has a record of failure at another University shall show cause why he should be admitted to the University.
   (2) A student admitted to a course at the University following a record of failure at another University shall show cause, notwithstanding any other provision in this By-law, why he should be allowed to continue in that course if he is unsuccessful in the annual examinations in his first year of attendance at the University.

4. A student required to show cause shall have his application considered by the Admissions Committee which shall determine whether the cause shown is adequate to justify the student's being permitted to continue his course or to re-enrol as the case may be.

By-law 5.4.3 — Re-enrolment

1. Any student who has been excluded from a Faculty shall not be allowed to enrol in another Faculty without the permission of the Faculty Board concerned.

2. Any student excluded from a degree course or from a Faculty or from the University may apply after two academic years to the Admissions Committee for re-admission to any such Faculty or to the University. If the Admissions Committee is satisfied that the condition or circumstances of any such student have so changed that there is reasonable probability that he will make satisfactory progress in his studies it may authorise the re-admission of that student under such conditions as it may determine.

By-law 5.4.4 — Appeal Against Exclusion

1. A student who is refused permission to enrol under the provisions of section 1 of By-law 5.4.3 may appeal to the Senate.

2. A student who has been excluded from any degree course or from a Faculty or from the University may appeal to the Council.

PROCEDURES

The onus is on a student required to "show cause" to initiate action should he wish to re-enrol. He must interview the Dean of his Faculty in accordance with the time-table announced towards the end of the academic year.
THE LIBRARY

The Library, totalling approximately 130,000 volumes and made up of monographs, pamphlets, serials and microform sets, exists to acquire, preserve and make available for use all research materials needed by the staff and students of the University. By 1970, all departments now at Tighe's Hill will have been transferred to Shortland and all library service for the University will be given from the Shortland library. Library service for the Faculties of Architecture and Engineering, including Chemical Engineering, will, until these departments are transferred, be given through the joint Technical College-University library at Tighe's Hill.

In both libraries, there is an almost complete freedom of access to the collections, and students are encouraged and aided to learn how to use, as soon as possible, the library and its contents. On registering, as a reader, the student is provided with a brochure outlining the library's resources, its services, such as the copying service, its special facilities, such as the microprint reading room, and procedure for borrowing.

The Shortland Library, fittingly, occupies a central position on the site, next to the Union. Hours of opening are:

- Monday — Friday: 8.30 a.m. to 10.00 p.m. (long vacation excepted)
- Saturday: 9.00 a.m. to 5.00 p.m. (all vacations excepted)
- Sunday: 1.00 p.m. to 5.00 p.m. (all vacations excepted)

Long vacation: Monday, Wednesday, Friday: 9.00 a.m. to 5.00 p.m.
Tuesday and Thursday: 9.00 a.m. to 7.00 p.m.

The Library will be closed on public holidays.

The Tighe's Hill library is located on the first floor of the Clegg Building. Hours of opening are:

- Monday — Friday: 9.00 a.m. to 9.15 p.m. (all vacations excepted)

The Library is closed on public holidays.

UNIVERSITY SERVICES

STUDENT COUNSELLING UNIT

The Student Counsellors assist students — past, present and future — in a wide variety of matters. Most students, whatever their academic level, at one time or another need help in dealing with difficulties which arise during the course of their University lives.

Student Counselling is by now a thoroughly established and widely accepted part of University life throughout Australia, and at this University, approximately one-third of all students utilise it.

Students who have problems about their choice of course, or uncertainty about career plans; students who are worried about inadequate study methods or personal difficulties are invited to arrange an appointment with a Student Counsellor.

The S.C.U. is divided into three major divisions, although there is inevitably overlap between the sections. These are Personal Counselling, Study Skills Training and Research. Apart from individual counselling, courses in an increasing number of areas are run for groups of students.

A student should not feel that he or she must have a major problem before consulting a Counsellor. Many worries take only a few minutes to clear up, and frequently the Counsellor's function is simply to direct a bewildered student to the right source of information.

In 1968, an Appointments Service was established within the S.C.U., and students are invited to register. Students in their final year may expect to receive all available advance information about career opportunities, and all students may register for part-time, casual or vacation employment. Students in the first group will be interviewed and may seek Vocational Guidance if they so desire.

"Study at the University Level" — The S.C.U. produced a brief but comprehensive book on this subject in 1967, and this can be obtained at the Bookshop for 40 cents. Although it was produced specifically for the students of Newcastle University, and reflects the attitudes of several Heads of Departments here, it is already widely used in other Universities and tertiary institutions throughout Australia. A Revised Edition was published in November, 1967 as the first printing had sold out.

S.C.U. Staff —

Senior Student Counsellor: P. M. Whyte, B.A.(Melb.), M.A.Ps.S.
Student Counsellor: A. P. Loftus, B.A.(Melb.), M.A.Ps.S.
Student Counsellor: Miss J. A. Hollingdale, B.A., Dip.Psych.(Syd.), M.A.Ps.S.
Graduate Research Assistant: A. V. Turnbull, B.A.
Secretary: Mrs. J. Hoesli.
Stenographer: Miss V. Petersen.

Location —

The Secretary to the S.C.U. and two Counsellors are located in the Administration Building at Shortland (Room G75) (entrance at N.W. end of building). Study rooms are available here for students. The Unit also has a room in the Union Building Basement, and in the Main Building (1st Floor, Room 108) at Tighe's Hill.

It is generally most satisfactory for students to make appointments through the Secretary. As a Counsellor is on duty five nights each week, part-time students are in no way excluded from the available service.
CHAPLAINCY SERVICE

A Chaplaincy Service within the University of Newcastle for the benefit of students and members of staff is provided by the Christian Churches of Newcastle.

The service offers personal counselling and guidance, and also assistance in biblical and doctrinal studies. Opportunities for liturgical worship are also provided.

The Chaplains’ office is situated on the Ground Floor of the Main Administration Building at Shortland.

The Chaplains are in regular attendance at the University but they may also be contacted at their private addresses.

NAMES AND ADDRESSES OF CHAPLAINS

Anglican
The Reverend Canon E. H. V. Pitcher, M.A. (Syd’), Th.Schol., 83 Queen’s Road, NEW LAMBTON. Tel. 57 1875.

Baptist
The Reverend H. K. Watson, 133 Kemp Street, HAMILTON. Tel. 61 4048.

Methodist
The Reverend K. G. Bond, B.D. (Lond’), L.Th., 40 Tighe Street, WARATAH. Tel. 68 2358.

Presbyterian
The Reverend H. Barratt, B.A. (Syd’), St. Phillip’s Manse, NEWCASTLE. Tel. 2 2379.

Roman Catholic
The Reverend Father T. Warren, B.A. (Qld’), Redemptorist Monastery, MAYFIELD. Tel. 68 2347.

STUDENT LOAN FUND

The Council of the University has recently established a Student Loan Fund which is managed by a committee under the chairmanship of the Vice-Principal.

Loans may be made to an undergraduate where the committee is of the opinion that his academic performance is of sufficient merit and his financial circumstances warrant a loan.

The total outstanding accommodation to any one undergraduate shall not normally exceed $200 at any one time and an undergraduate granted a loan is required to enter into an agreement.

Repayment must commence not later than twelve months after graduation or when the borrower fails or withdraws from his course or on demand as required by the University. No interest is charged while the borrower is an undergraduate but interest at a rate of not less than 5% per annum on the balance owing from time to time is charged from the date of graduation or the date on which an undergraduate fails or withdraws from a course.

In special circumstances the Committee may grant a loan to a student other than an undergraduate.

Any student wishing to seek assistance from the Fund may apply in person to the Vice-Principal or through the President of the Students’ Representative Council or his nominee.
UNIVERSITY ORGANISATIONS

THE UNIVERSITY OF NEWCASTLE STUDENTS' ASSOCIATION

Included in the General Services Fee of the University is an amount payable to the Students' Association, a body to which all students of the University belong. The Students' Association is governed by the Students' Representative Council (SRC), which is elected each year in September to take office in the following April. The functions of the Students' Association are many and varied.

The SRC acts as the main liaison body between the student body and the University authorities. Complaints and requests from students may be handled by the Education and Welfare Committee, or by the SRC as a whole when brought to its attention by one of the Faculty or General Representatives. The Education and Welfare Committee is the part of the SRC most students come in contact with. The education side attempts to study the local and national needs of education and to bring these to the attention of the public and the government.

One of the major ways in which the income of the SRC is spent is in grants to affiliated clubs and societies (which include cultural, social, political and religious societies). To this end the Vice-President is the Clubs' and Societies Liaison Officer, and, with his assistant and the Clubs' and Societies' Committee, gives such help to these societies as they may seek from time to time.

The SRC is also responsible for publishing the student newspaper "Opus," the literary magazine "Nimrod" and the Orientation Handbook, which may be seen around the campus at the time of their publication. A weekly "Bulletin" is published to publicise activities of the SRC, the Union and affiliated clubs and societies.

Each year the SRC organises, with assistance from the University and the Union, Orientation Week and other activities designed to help new students adjust to university life. Early in July Autonomy Day is also organised by the SRC — of this nothing more be said than that it is the equivalent of Commem, Foundation Day, or similar activities at other universities.

As the Students' Association is a constituent member of the National Union of Australian University Students, students of the University may take part in the activities of this body. Some of these activities which affect students more directly are the several inter-varsity cultural festivals, travel to New Zealand and many countries in Asia, volunteer aid projects in Papua/New Guinea, raising money for aboriginal scholarships and World University Service, national campaigns on education, and the national student newspaper "U."

President: Giles Martin
Secretary: Michael Nelson

NEWCASTLE UNIVERSITY UNION

The objects of the Union are to provide a common meeting ground and social centre for men and women who are members of the University; to promote the education and the intellectual culture of its members by debates and otherwise and, generally, to secure the co-operation of University men and women in furthering the interests of the University.

The Union maintains a fine building at Shortland which provides common room facilities for its members; a cafeteria; a coffee room; a meeting room; a reading room; a stationery shop catering for all members' academic needs and the University Co-operative Bookshop. The offices of the Students' Representative Council and the Students' Counsellor are contained in the basement of the building. A common room is provided in the Main University building at Tighe's Hill and members are eligible to use the catering facilities of the Technical College Union.

Membership of the Union, obligatory for all registered students, is open to graduates, members of the University Council and the permanent staff of the University.

The conduct of the affairs of the Union is vested in the Board of Management composed of two members appointed by the University Council, two members elected by the graduates, six members elected by the Union members, two members appointed by the Students' Representative Council, two members elected by the Senior Common Room, and the Secretary/Manager. Elections for the Board of Management are held in April.

President: Mr. B. C. Humphries
Secretary/Manager: Mr. I. H. S. Irwin
THE UNIVERSITY OF NEWCASTLE SPORTS UNION

The Sports Union is a student organisation responsible for promotion and control of sporting activities within the University. As a student you are automatically a member of the Sports Union. There are nineteen affiliated clubs: Athletics, Badminton, Men's Basketball, Women's Basketball, Cricket, Fencing, Golf, Men's and Women's Hockey, Men's and Women's Rowing, Rugby, Sailing, Ski-ing, Soccer, Squash, Surfing, Swimming, Table Tennis, Tennis, Weightlifting, most of which participate in local competitions and send teams to Inter-Varsity contests each year. Inter-Faculty Contests conducted throughout the year aim to stimulate friendly rivalry among the various Faculties, and to encourage a higher student participation in sport. Each club has a student representative on the Sports Union Committee, which meets monthly. The Executive Committee consists of the President, Vice-President, Secretary, Treasurer, a representative of the University Council, and the Amenities Officer. The Sports Union's annual income is derived from portion of the General Services Fee and is used to meet the cost of equipment, affiliation fees, Inter-Varsity trips, etc.

For outstanding individual performance in sport, the University awards "Blues" each year at the Annual "Blues" Dinner.

The number of constituent clubs is increasing continually, and if you are interested in participating in any sport, you are urged to contact the Amenities Officer, Mr. Bradford, or one of the Sports Union Executive for further information. The Amenities/Sports Union office is located with the Post Office in the temporary building adjacent to the University Union.

President: Mr. G. McIntyre
Secretary: Mr. R. Hannah
Amenities Officer: Mr. H. Bradford

THE UNIVERSITY OF NEWCASTLE COMPANY

The University of Newcastle Company is the Citizen Military Force's Unit affiliated with your University. The Company was formed in 1957 as a Sub-Unit of the University of Technology Regiment which is now called The University of N.S.W. Regiment. The current strength of the Company is 150 and is rising.

The function of the Company is to train graduates and undergraduates for commissioned rank in the C.M.F. and the training, designed with this in view, is done on an Infantry basis and consists of:

(a) An Annual Camp for three weeks in February
(b) An optional camp of ten days in May
(c) Five weekend bivouacs a year
(d) Parades on Friday nights of two and a half hours duration.

The training programme is designed to fit in with vacations, examinations, and deferred examinations and there is practically no commitment in the third term. Leave is available from activities where a good reason exists.

Enlistment in the Company is voluntary and is open to all graduates or undergraduates who are 17 years of age or over.

Members of the University of Newcastle Company are eligible for the following benefits:

An opportunity to reach commissioned rank in 2-3 years.
Tax-free pay for all training undertaken.
Refund of travelling expenses.
An alternative to 2 years full-time National Service.
Opportunities for attendance at Regular Army courses and short time attachments to Army units in Malaysia, New Guinea or Vietnam.
Free meals and accommodation at camps and bivouacs.
Free Uniforms.

Enquiries regarding conditions of service, and enlistment procedure should be made at the Training Depot which is in King Street, Newcastle West (opposite Birdwood Park). Phone No. 612121.

OFFICERS AND STAFF

Officer Commanding — Maj. J. G. Raymond
Full-time Staff — WO2 M. Durie
S/Sgt. K. Carmichael
1. Definitions.

In these requirements, "the Faculty" means the Faculty of Engineering, "the Faculty Board" means the Faculty Board of the Faculty of Engineering, "the Dean" means the Dean of the Faculty of Engineering, and "the Department" means the Department responsible for the subject in which the candidate is enrolled.

2. Qualifications for the Degree of Bachelor of Engineering.

(i) In order to qualify for the award of the Degree of Bachelor of Engineering, a candidate shall complete normally by full-time study the subjects, and satisfy the industrial experience requirements as prescribed by the Faculty Board in one of the following courses:

Bachelor of Engineering in Chemical Engineering
Bachelor of Engineering in Civil Engineering
Bachelor of Engineering in Electrical Engineering
Bachelor of Engineering in Industrial Engineering
Bachelor of Engineering in Mechanical Engineering

or, with the permission of the Dean, one of the combined degree courses approved by the Faculty Board.

(ii) A candidate for the Bachelor of Science (Engineering) degree in the University may transfer to the full-time course with such advanced standing as may be approved by the Dean.

(iii) The degree of Bachelor of Engineering may be conferred either as a pass degree or a degree with honours.

(iv) There shall be two classes of Honours, namely Class I and Class II. Class II shall have two divisions, namely Division I and Division II.

(v) The most distinguished candidate in a course, at graduation with Honours, Class I may be awarded a University Medal.

3. Qualifications for the Degree of Bachelor of Science (Engineering).

(i) In order to qualify for the award of the Degree of Bachelor of Science (Engineering) a candidate shall complete normally by part-time study the subjects, and satisfy the industrial experience requirements, as prescribed by the Faculty Board in one of the following courses:
Bachelor of Science (Engineering) in Chemical Engineering
Bachelor of Science (Engineering) in Civil Engineering
Bachelor of Science (Engineering) in Electrical Engineering
Bachelor of Science (Engineering) in Industrial Engineering
Bachelor of Science (Engineering) in Mechanical Engineering

(ii) A candidate for the Bachelor of Engineering degree in the University may transfer to the part-time course with such advanced standing as may be approved by the Dean.

(iii) The degree of Bachelor of Science (Engineering) may be conferred either as a pass degree, or as a degree with merit.

(iv) The Faculty Board shall publish a schedule of subjects and industrial experience requirements prescribed for each of the courses listed in clauses 2(i) and 3(i) and a schedule of the prerequisites and corequisites prescribed for each subject offered by the Faculty in those courses.

4. Enrolment in Subjects, and Progression.

(i) Progression in courses is by subject provided that a candidate will be expected to follow the programme laid down by the Faculty Board for the course in which he is enrolled, unless he is otherwise authorised by the Dean.

(ii) A candidate may enrol in a subject only in accordance with the conditions laid down by the Faculty which offers the subject with respect to prerequisites and corequisites for that subject.

(iii) No candidate may enrol in any year for a combination of subjects which is incompatible with the time-table offered by the University for that year.

(iv) A candidate whose progress is unsatisfactory may be excluded from any examination, subject or course or may be permitted to continue his course subject to certain conditions, in accordance with By-laws 5.4.1 and 5.4.2.

(v) A candidate from another University or approved tertiary institution may be granted advanced standing in accordance with the By-laws of the University, in recognition of work completed in such University or institution.

(vi) To complete a subject qualifying towards a degree a candidate shall attend such lectures, tutorials, seminars, laboratory classes, field work and camps and submit such written work and pass such examinations as the Department may require.

(vii) A candidate may withdraw from a subject in which he has enrolled only by informing the Secretary of the University in writing.

(viii) A candidate who withdraws from a subject in which he has enrolled shall be deemed to have failed in that subject unless he has secured written permission from the Dean to withdraw without penalty.

5. Relaxation.

In order to provide for exceptional circumstances arising in particular cases, the Senate, on the recommendation of the Faculty Board, may relax any requirement provided that such relaxation shall be consistent with the By-laws.
2. An applicant for registration as a candidate for the Diploma shall complete the prescribed application form and lodge it with the Secretary at least one calendar month before the commencement of first term.

3. An applicant for registration as a candidate for the Diploma shall—
   (a) have satisfied all of the Requirements for admission to a degree in the University of Newcastle; or
   (b) have satisfied all of the Requirements for admission to a degree in another University recognised for this purpose; or
   (c) hold other qualifications approved by the Faculty Board for the purpose of registration in the course.

4. Notwithstanding the provisions of clause 3 above, the Faculty Board may require an applicant to complete such other prerequisite studies as it may prescribe or a candidate to complete such other concurrent studies as it may prescribe.

5. To complete a subject qualifying towards the diploma a candidate shall attend such lectures, tutorials, seminars, laboratory classes, field work and camps and submit such written work and pass such examinations as the Department may require.

6. A candidate may withdraw from a subject in which he has enrolled only by informing the Secretary of the University in writing.

7. A candidate who withdraws from a subject in which he has enrolled shall be deemed to have failed in that subject unless he has secured written permission from the Dean to withdraw without penalty.

8. To qualify for the Diploma a candidate shall, in not less than two years of part-time study, complete the subjects as prescribed for the course by the Faculty Board.

9. A candidate may not enrol in a Stage 2 subject without having completed all of the Stage 1 subjects except with the permission of the Dean.

10. In order to provide for exceptional circumstances arising in particular cases, the Senate, on the recommendation of the Faculty Board, may relax any requirements provided that such relaxation shall be consistent with the By-laws.

1. In these Requirements, unless the contrary intention appears, the "Faculty Board" means the Faculty Board of the Faculty of Engineering.

2. An applicant for registration as a candidate for the Diploma shall complete the prescribed application form and lodge it with the Secretary at least one calendar month before the commencement of first term.

3. An applicant for registration as a candidate for the Diploma shall—
   (a) have satisfied all of the Requirements for admission to a degree in the University of Newcastle; or
   (b) have satisfied all of the Requirements for admission to a degree in another University recognised for this purpose; or
   (c) hold other qualifications approved by the Faculty Board for the purpose of registration in the course.

4. Notwithstanding the provisions of clause 3 above, the Faculty Board may require an applicant to complete such other prerequisite studies as it may prescribe or a candidate to complete such other concurrent studies as it may prescribe.

5. To complete a subject qualifying towards the diploma a candidate shall attend such lectures, tutorials, seminars, laboratory classes, field work and camps and submit such written work and pass such examinations as the Department may require.

6. A candidate may withdraw from a subject in which he has enrolled only by informing the Secretary of the University in writing.

7. A candidate who withdraws from a subject in which he has enrolled shall be deemed to have failed in that subject unless he has secured written permission from the Dean to withdraw without penalty.

8. To qualify for the Diploma a candidate shall, in not less than two years of part-time study, complete the subjects as prescribed for the course by the Faculty Board.

9. A candidate may not enrol in a Stage 2 subject without having completed all of the Stage 1 subjects except with the permission of the Dean.

10. In order to provide for exceptional circumstances arising in particular cases, the Senate, on the recommendation of the Faculty Board, may relax any requirements provided that such relaxation shall be consistent with the By-laws.
12. A candidate shall submit three copies of his project report in a form according with the instructions of the Head of the Department, not later than three terms after the completion of the course of formal study.

13. It shall be understood that the University retains the three copies of the report and is free to allow the report to be consulted or borrowed. Subject to the provisions of the Copyright Act (1912-50) the University may issue the report in whole or in part in photostat or microfilm or other copying medium.

14. The University, at the request of an examiner, may require the candidate to answer any questions concerning his work.

15. No candidate shall be considered for the award of the degree until the lapse of three complete terms but not more than six complete terms, but not more than ten complete terms, in the case of a part-time student, from the date from which the registration becomes effective. Notwithstanding, the candidates who are admitted with standing to the degree may have this requirement relaxed by Senate on the recommendation of the Engineering Higher Degrees Committee.

16. In order to provide for exceptional circumstances arising in particular cases, the Senate, on the recommendation of the Faculty Board, may relax any requirement provided that such relaxation shall be consistent with the By-laws.

REQUIREMENTS FOR THE DEGREE OF MASTER OF ENGINEERING

1. An application to register as a candidate for the degree of Master shall be made on the prescribed form which shall be lodged with the Secretary at least one full calendar month before the commencement of the term in which the candidate desires to register.

2. A person may register for the degree of Master if—

(a) he is a graduate or graduand of the University of Newcastle or other approved University with Honours in the subject to be studied for that degree; or

(b) he is a graduate or graduand of the University of Newcastle or other approved University; or

(c) in exceptional cases he produces evidence of such academic and professional attainments as may be approved by the Senate, on the recommendation of the Faculty Board.

3. In the case of applicants desiring to register under provision 2(b) and (c), the Faculty Board may require the applicants to carry out such work and sit for such examinations as the Board may determine before registration as a candidate for the degree of Master is confirmed.

4. In every case, before permitting an applicant to register as a candidate, the Faculty Board shall be satisfied that adequate supervision and facilities are available.

5. An applicant approved by the Faculty Board shall register in one of the following categories:

(i) Student in full-time attendance at the University.

(ii) Student in part-time attendance at the University.

6. (i) Every candidate for the degree shall be required to submit a thesis embodying the results of an investigation or design, to take such examinations and to perform such other work as may be prescribed by the Faculty Board. The candidate may submit also for examination any work he has published, whether or not such work is related to the thesis.

(ii) The investigation or design and other work as provided in paragraph 6(i) shall be conducted under the direction of a supervisor appointed by the Faculty Board or under such conditions as the Faculty Board may determine.

(iii) A part-time candidate shall, except in special circumstances—

i. conduct the major proportion of the research or design work in the University; and

ii. take part in research seminars within the Department in which he is working.

(iv) Every candidate shall submit annually a report on his work to his supervisor for transmission to the Higher Degree Committee.

(v) Every candidate shall submit three copies of the thesis as provided under paragraph 6(i). All copies of the thesis shall be double-spaced typescript, shall include a summary of approximately 200 words, and a certificate signed by the candidate to the
effect that the work is his own and has not been submitted for a higher degree to any other University or institution. The ORIGINAL copy of the thesis for deposit in the Library shall be prepared and bound in a form approved by the University. The other two copies of the thesis shall be bound in such manner as allows their transmission to the examiners without possibility of their disarrangement.

(vi) It shall be understood that the University retains the three copies of the thesis and is free to allow the thesis to be consulted or borrowed. Subject to the provisions of the Copyright Act (1912-1950) the University may issue the thesis in whole or in part in photostat or microfilm or other copying medium.

7. No candidate shall be considered for the award of the degree until the lapse of six complete terms from the date from which the registration becomes effective, save that in the case of a candidate who has obtained in Newcastle the degree of Bachelor with Honours or who has had previous research experience, this period may, with the approval of the Faculty Board, be reduced by up to three terms.

8. For each candidate there shall be two examiners appointed by Senate, one of whom shall be an external examiner.

REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

1. The degree of Doctor of Philosophy may be awarded by the Council on the recommendation of the Senate to a candidate who has satisfied the following requirements.

2. A candidate for registration for the degree of Doctor of Philosophy shall:

   (i) have satisfied all of the requirements for admission to the degree of master or the degree of bachelor with first or second class honours in the University of Newcastle or a degree from another University recognised by the Senate as having equivalent standing; or

   (ii) have satisfied all of the requirements for admission to the degree of bachelor with third class honours or without honours in the University of Newcastle or a degree from another University recognised by the Senate as having equivalent standing, and have achieved by subsequent work and study a standard recognised by the Senate as equivalent to at least second class honours; or

   (iii) in exceptional cases submit such other evidence of general and professional qualifications as may be approved by the Senate.

3. The Senate may require a candidate, before he is permitted to register, to undergo such examination or carry out such work as it may prescribe.

4. A candidate for registration for a course of study leading to the degree of Ph.D. shall:

   (i) apply on the prescribed form at least one calendar month before the commencement of the term in which he desires to register; and

   (ii) submit with his application a certificate from the Head of the Department in which he proposes to study stating that the candidate is a fit person to undertake a course of study or research leading to the Ph.D. degree and that the Department is willing to undertake the responsibility of supervising the work of the candidate.

5. (i) A candidate shall, except in exceptional circumstances, to be determined by Senate, register as a full-time student.

   (ii) Notwithstanding the provisions of section (i) of this clause, a member of the full-time academic or teaching staff of the University may be registered as a candidate for the degree.

6. Subsequent to registration, the candidate shall pursue a course of advanced study and research for at least nine academic terms, save that any candidate who before registration was engaged upon research to the satisfaction of the Senate, may be exempted from three academic terms.

7. A candidate shall present himself for examination not later than fifteen academic terms from the date of his registration, unless special permission for an extension of time be granted by the Senate.

8. The course, other than field work, must be carried out in a Department of the University, under the direction of a supervisor appointed by the Senate, or under such conditions as the Senate may determine, save that a candidate may be granted special permission by the Senate to spend a period of not more than three academic terms in research at another institution approved by the Senate.
9. Not later than three academic terms after registration the candidate shall submit the subject of his thesis for approval by the Senate. After the subject has been approved it may not be changed except with the permission of the Senate.

10. A candidate may be required to attend a formal course of study appropriate to his work.

11. On completing his course of study every candidate shall submit a thesis which complies with the following requirements:—
(i) The greater proportion of the work described must have been completed subsequent to registration for the Ph.D. degree.
(ii) It must be a distinct contribution to the knowledge of the subject.
(iii) It must be written in English or in a language approved by the Senate and reach a satisfactory standard of literary presentation.

12. The thesis shall consist of the candidate's own account of his research. In special cases work done conjointly with other persons may be accepted, provided the Senate is satisfied on the candidate's part in the joint research.

13. Every candidate shall be required to submit with his thesis a short abstract of the thesis comprising not more than 300 words.

14. A candidate may not submit as the main content of his thesis any work or material which he has previously submitted for a university degree or other similar award.

15. The candidate shall give in writing three months' notice of his intention to submit his thesis and such notice shall be accompanied by the appropriate fee.

16. Four copies of the thesis shall be submitted together with a certificate from the supervisor that the candidate has completed the course of study prescribed in his case and that the thesis is fit for examination.

17. The thesis shall be in double-spaced typescript. The original copy for deposit in the Library shall be prepared and bound in a form approved by the University. The other three copies shall be bound in such manner as allows their transmission to the examiners without possibility of disarrangement.

18. It shall be understood that the University retains four copies of the thesis and is free to allow the thesis to be consulted or borrowed. Subject to the provisions of the Copyright Act (1912-1950) the University may issue the thesis in whole or in part in photostat or microfilm or other copying medium.

19. The candidate may also submit as separate supporting documents any work he has published, whether or not it bears on the subject of the thesis.

20. The Senate shall appoint three examiners of whom at least two shall not be members of the teaching staff of the University.

21. The examiners may require the candidate to answer, viva voce or in writing, any questions concerning the subject of his thesis or work.

22. The result of the examination shall be in accordance with the decision of a majority of the examiners.

23. A candidate permitted to re-submit his thesis for examination shall do so within a period of twelve months from the date on which he is advised of the result of the first examination.

REQUIREMENTS FOR THE DEGREE OF DOCTOR OF ENGINEERING

1. The degree of Doctor of Engineering may be awarded by the Council, on the recommendation of the Senate, for an original contribution or contributions of distinguished merit to the science and/or practice of engineering.

2. A candidate for the degree of Doctor of Engineering shall hold a degree of the University of Newcastle or a degree from another University recognised by the Senate as being equivalent or shall have been admitted to the status of such a degree.

3. The degree shall be awarded on published* work of the candidate although in special circumstances unpublished work may be considered provided that these circumstances are recognised as sufficient by the Senate.

4. Every candidate in submitting his published work and such unpublished work as he deems appropriate shall submit a short discourse describing the research embodied in his submission. The discourse shall make clear the extent of originality and the candidate's part in any collaborative work.

5. A candidate for the degree shall make an application in writing to the Secretary setting out a statement of his academic qualifications. With the application he shall submit:—
(a) Four copies of the work referred to in clause 4 of these Requirements.
(b) Four copies of any additional work, published or unpublished, which he may desire to submit in support of his application.
(c) A Statutory Declaration indicating those sections of the work, if any, which have been accepted previously in partial fulfilment of the requirements for a degree or diploma in any University.

6. The Senate shall appoint three examiners of whom at least two shall not be members of the teaching staff of the University.

7. The University may at the request of an examiner require the candidate to answer any questions concerning his work.

8. The result of the examination shall be in accordance with the decision of a majority of the examiners.

*In these requirements, the term "published work" shall mean printed in a periodical or as a pamphlet or as a book readily available to the public. The purpose of requiring publication is to ensure that the work submitted has been available for criticism by relevant experts, and examiners are given discretion to disregard any of the work submitted if, in their opinion, the work has not been so available for criticism.
Chemical Engineering is the "engineering of processes in which materials undergo chemical or physical change". As a discipline Chemical Engineering may claim to be among the most modern of the branches of Engineering, having developed mainly since about 1920. From their early concentration in the petroleum refining and heavy chemical industries, Chemical Engineers are now being recognized as "process engineers" in the widest sense and are engaged in the preparation and smelting of metaliferous ores, in power-production, in food-processing and ceramics and as fuel-engineers, as well as in the industries producing conventional "chemicals".

Currently there is a heavy demand for Chemical Engineers in the whole range of fields from research and development, through operations and administration to technical sales. A number of cadetships are available but a large proportion of firms recruit at graduate level and broad opportunities are available for students who read independently for a full-time course.

Three types of course are available:—

part-time for six years for Cadets in approved Chemical Engineering employment for the B.Sc.(Eng.).

full-time for four years for the B.E.

full-time for five years for the combined B.Sc./B.E., which may be taken with a science major in Chemistry (or alternatively Mathematics).

All courses are recognised as providing the academic qualifications for the Institution of Engineers, Australia and the Royal Australian Chemical Institute. The full-time courses qualify for the British Institution of Chemical Engineers.

All courses are broadly based on a foundation of Chemistry, Mathematics, Physics and general Engineering Science. In his professional subjects, the Chemical Engineer studies the application of scientific method and knowledge to the performance of chemical processes and chemical engineering equipment in such fields as fluid flow; heat transfer; diffusional processes; transport and separation of solid particles; fuels, combustion and furnaces. Electives are available in the final years of courses permitting students to widen their education or deepen their specialist ability by selection from a wide range of subjects in the whole university.

All students take part in a number of inspections of selected process plants both in the Hunter Valley and in Sydney, and generally at least one laboratory exercise is arranged at an industrial site. In addition full-time students are required to obtain at least twenty weeks of approved industrial experience during their long vacations.

There is a considerable demand for Chemical Engineers qualified in research or in specialized fields and both instructional and research postgraduate courses are available for work towards Masters and Ph.D. degrees.
CLASSIFICATIONS

(a) Classifying subjects are shown in Bold-faced type.
(b) Classification is determined by enrolment in the classifying subject.
(c) If a student enrols in more than one classifying subject, then the year or stage of the lower classifying subject applies.
(d) If the student enrols in no classifying subject, then he is classified in the year or stage of the highest classifying subject he has passed.

### BACHELOR OF ENGINEERING IN CHEMICAL ENGINEERING

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<thead>
<tr>
<th>Subject</th>
<th>Hours per week</th>
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<tr>
<td><strong>YEAR I</strong></td>
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<tr>
<td>CHEMISTRY I</td>
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<tr>
<td>Engineering I</td>
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### Bachelor of Science (Engineering) in Chemical Engineering

**Subject**

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<td>Chemistry I</td>
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<td>Mathematics I</td>
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<tr>
<td>Physics I</td>
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<td><strong>Stage 3</strong></td>
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<tr>
<td>Mathematics IIB Part 1</td>
<td>3</td>
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<td></td>
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<td><strong>Stage 4</strong></td>
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<td>9</td>
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</tbody>
</table>

**NOTE:**

(1) Three years approved industrial experience must be secured concurrently with the course.

(2) Design Project from Year IV may be taken as the elective.

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### Bachelor of Science/Bachelor of Engineering in Chemical Engineering

**Subject**

<table>
<thead>
<tr>
<th>Hours per week</th>
<th>28 weeks full-time course</th>
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<tr>
<td><strong>Year I</strong></td>
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<td>Physics I</td>
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<td></td>
<td>24</td>
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<td><strong>Year II</strong></td>
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<td>Chemical Engineering I A</td>
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<tr>
<td>Chemistry II</td>
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<td>and one (1) of</td>
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<tr>
<td>Geology I</td>
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<td>General Elective II</td>
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</table>

**NOTES:**

(*) Students intending to take Mathematics IIC in Year III will take Mathematics IIA in Year II.

(†) Alternatively students may take Mathematics IIA and Mathematics IIC in Year II, and Chemical Engineering IA and Mathematics IIIA in Year III.

Approved industrial experience may be obtained during any two of the long vacations following 2nd Year.
DESCRIPTION OF SUBJECT UNITS
DEPARTMENT OF CHEMICAL ENGINEERING

FIELD EXCURSIONS—Inspections of Chemical Engineering plants of particular technical interest or relevance to course material are an integral part of the Chemical Engineering subjects. Normally students are expected to take part in several half day or full day inspections of plants in the Newcastle area for Chemical Engineering I, Chemical Engineering IIA, Chemical Engineering IIB. In addition, two excursions to the Sydney area each of about three days duration are arranged in 3rd Year (Stages 5 & 6).

ENGINEERING I (GRAPHICS ME111, STATICS CE111, DYNAMICS ME131)

NOTE: Engineering Technology is not a required subject for Chemical Engineers but students are strongly recommended to take this subject if they feel competent to handle the extra study load.

CHEMICAL ENGINEERING I

Stage 4; Year 2—Pre-requisites—Maths. I, Engineering I, Physics I.
Pre- or Co-requisites—Maths II, Chemistry II.

A course of about 100 hours lectures and 100 hours tutorial and laboratory covering:

FLUID-STATICS AND DYNAMICS—Particularly related to the flow and metering of fluids in pipes with an introduction to boundary layer theory and dimensional analysis.

HEAT AND MASS TRANSFER—Introduction to conduction, convection and radiation and to diffusion phenomena.

INDUSTRIAL CHEMICAL PROCESSES—Carbonization, smelting, oil refining and heavy chemical industries studied in relation to the chemistry and the mass and energy balance of the process. Basic equipment items.

PROCESS CALCULATIONS (Applied Thermodynamics)—Engineering calculations of mass and energy balances; enthalpy changes on formation, reaction, solution and change of state; properties and behaviour of ideal and real gases; equilibrium relationships.

FUEL SCIENCE—Classification, sampling and testing of fuels; Combustion and gasification reactions and equipment; Thermal and economic evaluation of fuels and equipment.

LABORATORY (Approximately 40 hours)—Instrumental techniques; fuels; fluid-flow and heat-transfer.

ADDITIONAL FOR CHEMICAL ENGINEERING IA

DESIGN I—about 40 hours lectures and office and tutorial work. Process representation, process and engineering flow diagrams. Pumps and piping systems; simple beams, structures and unfired pressure vessels designed to code; Instrumentation.

CHEMICAL ENGINEERING I

Texts:


Efficient Use of Fuel 1958 H.M.S.O.

*“Perry” will be used as a reference throughout the whole course and students should purchase it at this stage.

Recommended References:

Fluid Mechanics and Heat Transfer, J. M. Kay 1957 C.U.P.


Fuels, Solid, Liquid & Gaseous, Brame & King 1965 Arnold

or

Introduction to the Study of Fuel, McCrae 1965 Elsevier


CHEMICAL ENGINEERING I A, DESIGN I

Text:

S.A.A. Codes—Pressure Vessels (C. I Part V) S.A.A.

Steel Structures (CAI) 1967 S.A.A.

Building Loads (350) S.A.A.
CHEMICAL ENGINEERING IIA

Stages 5 & 6; Year 3—Pre-requisite—Chemical Engineering I.

PART I

APPLIED THERMODYNAMICS II (approx. 30 hours)—Thermodynamics applied to problems of energy generation and cryogenics; to the derivation of properties of fluids and of phase equilibrium at high temperatures and pressures.

REACTION ENGINEERING PRINCIPLES I (approx. 30 hours)—Thermodynamics of reactions, reaction kinetics, Kinetics of reactors and reactor systems, mixing in reactors.

MASS TRANSFER PRINCIPLES (approx. 56 hours lectures and tutorials and 42 hours laboratory)
Equilibrium stage and continuous contact processes for leaching, absorption, extraction and distillation; stage efficiencies; hydraulic behaviour of equipment.

PROCESS STATISTICS (approx. 28 hours lectures and tutorials)
Statistical analysis of experimental and operating data; sampling theory; non-parametric statistics.

PART II

TRANSPORT PRINCIPLES II (approx. 42 hours lectures and tutorials)
Fluid flow in packed beds, drag on solid bodies. Heat and mass transfer in unsteady state conditions; Gas and flame radiation; Generalized transport theory for momentum, mass and heat transfer in laminar, turbulent and simple boundary layer conditions; correlations of transfer coefficients.

PARTICULATE AND THERMAL SYSTEMS (approx. 42 hours lectures and 42 hours laboratory)
Filtration, sedimentation, centrifuges, cyclones, gas cleaning; furnaces and kilns; breakage, sizing, separation and flow of particulate solids.

Texts:

Chemical Reaction Engineering,
Levenspiel, O. 1964 Wiley

Chemical Process Principles, Vol. II,


Chemical Engineering, Vol. II,
Coulson, J. M. & Richardson, J. F. 1967 Pergamon

Alternative

Unit Operations of Chemical Engineering

Mass Transfer Operations (2nd Ed.)
Treybal, R. E. 1968 McGraw-Hill

Recommended References:

Engineering Heat Transfer, Hsu, S. T. 1963 Van Nostrand


CHEMICAL ENGINEERING IIB

Stages 5 and 6; Year 3

PART I—(Pre-requisites Engineering I, Physics 1, Maths. II)

CE 202—MATERIALS AND STRUCTURES (Dept. of Civil Engineering).

EE 201—2—PRINCIPLES OF ELECTRICAL ENGINEERING.

PART II—Pre- (or co-) requisites Chemical Engineering IIA.

PROCESS ENGINEERING (approx. 43 hours lectures and tutorials).
The plant as an integrated unit; requirements and specifications of services (steam, air, water, gas, effluent). Selection of service equipment; piping and reticulation; buildings and foundations, siting.

DESIGN II, CHEMICAL EQUIPMENT DESIGN (approx. 48 hours lectures and tutorials)
Physical and detail design of heat exchangers, distillation and absorption towers, simple storage vessels; layout for instrumentation and ancillary equipment. Mechanical drives; materials handling equipment.

CHEMICAL PROCESS CONTROL I (approx. 14 hours lectures)
Relationship between measurement and control information display, plant response. Types of controllers, transfer functions, analogue computer.

ME 381 ENGINEERING ADMINISTRATION (Dept. of Mechanical Engineering).

Texts:

Project Engineering of Process Plants,
Rase, H. R. & Barrow, M. H. 1957 Wiley

Process Plant Economics,

Chemical Engineers Handbook, Perry 1950 McGraw-Hill


Automatic Process Control for Chemical Engineers, Ceagleske, N. H. 1959 Wiley

Mass Transfer Operations (2nd Ed.)
Treybal, R. E. 1968 McGraw-Hill

The Chemical Plant, Landau 1966 Reinhold
Texts:

- Costs & Economics of the Australian Process Industries, (2nd Ed.)
  Buchanan and Sinclair ... 1967 Wests
- Plant Design & Economics for Chemical Engineers,
  Peters, M. S. & Timmerhaus, K. ... 1968 McGraw-Hill
- Chemical Engineering Plant Design,
  Vilbrandt & Dryden (2nd Ed.) ... 1966 McGraw-Hill
- Process Plant Piping, Rase, H. R. ... Wiley
- Economic Analysis for Engineering and Managerial Decision Making, Barish ... 1962 McGraw-Hill

CHEMICAL ENGINEERING III

Year 4: Pre-requisites Chemical Engineering IIA and Chemical Engineering IIB.

CHEMICAL ENGINEERING SEMINAR. Regular two hour seminar sessions will be held during the year for discussion of literature reviews, chemical engineering practice and of research within the department. Each student will present not less than two half-hour papers in the course of the year.

RESEARCH PROJECT. An assigned task of experimental investigation or of design, construction and testing of experimental equipment, to be reported formally in a thesis.

AUTOMATIC CONTROL (ME 361 in Dept. of Mechanical Engineering) Approx. 56 hours lectures and laboratory.

(NOTE: Students who wish to take Advanced Automatic Control in Year 4 may, subject to approval by the Head of the Department, take ME 361 as a 3rd Year elective).

ADVANCED TOPICS IN CHEMICAL ENGINEERING III

Students will be required to complete not less than four of the following short courses normally of approximately two hours per week for fourteen weeks.

- COMBUSTION AND FURNACE DESIGN. The combustion of coal, gas and oil flames in large furnaces; aerodynamics of flames and aerodynamic modelling of furnaces; furnace heat transfer; deposits and fouling.
- HEAT TRANSFER III. More advanced topics in radiant heat transfer; heat transfer in packed beds.
- REACTION ENGINEERING II. Kinetics of multiple reactor systems; kinetics of gas solid and gas liquid reactions, catalysts. Heat transfer in reactors.
- TRANSPORT PRINCIPLES III. Studies of generalized transport theory for high fluxes and variable properties; further topics in boundary layer theory.
- MASS TRANSPORT III. Vapour-liquid stage operation for multicomponent systems; rigorous and short calculation procedures; extractive distillation; gas chromatograph theory; ion-exchange systems.

* These topics will be available to students with the appropriate backgrounds from other Departments and for students reading for a master's degree or postgraduate diploma.

PROCESS DESIGN. Process evaluation, development and selection—Theory and application of design variables—recycle process computations—Introduction to optimisation techniques, linear and dynamic programming, direct search techniques.

CHEMICAL PROCESS CONTROL. A laboratory-tutorial course on the control characteristics of process plant and equipment and industrial control systems.

POLYMER CHEMISTRY (a series of about 12 lectures in the Department of Chemistry on the production and properties of industrial polymers.)

DESIGN PROJECT

Preparation of a formal design report for a specified plant for chemical production, including process flow sheets, full mass and energy balances and the detailed design of one or more specified items of equipment.

INDUSTRIAL EXPERIENCE

Students will submit a report in first term of 3rd and 4th year covering their period of approved industrial experience during long vacations.

ELECTIVES

Electives may be taken in any Department of the University in which suitable courses are offered, subject to the approval of the Heads of the Department concerned and of Chemical Engineering, and to time-table restrictions.

ELECTIVE I (nominally 3 hours per week) represents a study load equivalent to about ½ of a normal 1st year subject or ⅓ of a normal second year subject.

ELECTIVE II (nominally 6 hours per week) represents a study load equivalent to a first year subject or ¼ of a third year pass subject in Faculties of Arts and Science.

The Head of the Department of Chemical Engineering should be consulted regarding units available.
Civil Engineering is the application of science to the improvement of the community's environment. It is concerned with the design and construction of water supply and conservation projects, hydro-electric development, roads, railways, bridges, tunnels, large buildings, irrigation, sewerage, and harbour and river development. The Civil Engineer "adapts the forces of nature for the use and convenience of mankind." His academic training includes the study of science and engineering practice. He must combine this with experience and judgment, and the knowledge and personality necessary to control large organisations of workers. This profession offers to a young man a considerable variety of types of work ranging from specialised research and investigations, through routine design and construction work to higher positions which are largely managerial and organisational in their nature.

The courses in Civil Engineering are arranged so that all students receive training in the basic principles of mathematics and science, and in the fundamentals of engineering applications of such work to surveying, hydraulics, foundation engineering, structural design, and constructional work in the field. Ancillary subjects from other branches of engineering are also included, such as electrical engineering and mechanical engineering.

During the course each full-time student is required to complete 20 weeks of industrial training, and to submit detailed reports on each training period. In the final year, the full-time student completes a project covering some aspect of supervised research, and delivers a seminar paper on some selected topic.
COURSE OUTLINES

DEPARTMENT OF CIVIL ENGINEERING

Note to Students Re-Enrolling in 1969

The course outlines indicate details of the revised Engineering courses in their final form.

Students who have partly completed their course should contact the Head of the Department for details of their transition programme, before they enrol.

CLASSIFICATIONS

(a) Classifying subjects are shown in Bold-faced type.
(b) Classification is determined by enrolment in the classifying subject.
(c) If a student enrols in more than one classifying subject, then the year or stage of the lower classifying subject applies.
(d) If the student enrols in no classifying subject, then he is classified in the year or stage of the highest classifying subject he has passed.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours per week</th>
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<tbody>
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<td><strong>YEAR I</strong></td>
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<tr>
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<td>Engineering I</td>
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<td>Engineering Technology</td>
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<td>MATHEMATICS I</td>
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<td>Physics I</td>
<td>6</td>
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<tr>
<td><strong>YEAR II</strong></td>
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<tr>
<td>MATERIALS &amp; STRUCTURES I</td>
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<td><strong>YEAR III</strong></td>
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<td>MATERIALS &amp; STRUCTURES III</td>
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</table>

*Plus 5-day Survey Camp.

A candidate for a degree normally shall complete periods of practical experience acceptable to the Faculty Board totalling 20 weeks, before 31st January in the year in which the degree is to be awarded.
BACHELOR OF SCIENCE (ENGINEERING) IN CIVIL ENGINEERING

(Applies to Stages 1, 2 and 3 in 1969)

Subject | Hours per week (28 weeks part-time course)
---|---
STAGE 1 |  
Engineering I | 6  
MATHEMATICS I | 6  
 | 12  
STAGE 2 |  
Chemistry IS | 3  
Engineering Technology | 3  
PHYSICS I | 6  
 | 12  
STAGE 3 |  
Civil Engineering A | 3  
MATERIALS & STRUCTURES A | 3\text{\textfrac{1}{2}}  
Mathematics IIB | 6  
 | 12\text{\textfrac{1}{2}}  
STAGE 4 |  
Civil Engineering B* | 7\text{\textfrac{1}{2}}  
MATERIALS & STRUCTURES B | 4\text{\textfrac{1}{2}}  
 | 12  
STAGE 5 |  
MATERIALS & STRUCTURES C | 5  
Materials & Structures D | 7  
 | 12  
STAGE 6 |  
Civil Engineering C | 9  
MATERIALS & STRUCTURES E | 3  
 | 12

*Plus 5-day Survey Camp.

A candidate for the degree normally shall complete periods of practical experience acceptable to the Faculty Board.

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BACHELOR OF SCIENCE/BACHELOR OF ENGINEERING IN CIVIL ENGINEERING

Subject | Hours per week (28 weeks full-time course)
---|---
YEAR I |  
Chemistry IS | 3  
Engineering I | 6  
Engineering Technology | 6  
MATHEMATICS I | 6  
Physics I | 6  
 | 27  
YEAR II |  
Civil Engineering IS | 3\text{\textfrac{1}{2}}  
MATERIALS & STRUCTURES I | 8\text{\textfrac{1}{2}}  
Mathematics IIA | 6  
Mathematics IIC | 6  
 | 24  
YEAR III† |  
Applied Mathematics III | 6  
Geology I | 6  
MATHEMATICS IIC | 6  
 | 18  
YEAR IV |  
Civil Engineering IIA* | 10\text{\textfrac{1}{2}}  
Elective I | 3  
MATERIALS & STRUCTURES II | 9  
 | 22\text{\textfrac{1}{2}}  
YEAR V |  
Civil Engineering IIIA* | 11\text{\textfrac{1}{2}}  
Elective II | 3  
MATERIALS & STRUCTURES III | 9  
 | 23\text{\textfrac{1}{2}}

* Plus 5-day Survey Camp.

Students may select Physics II and Physics III in lieu of Mathematics II—Applied and Mathematics III—Applied.

† Applies in 1969 only. From 1970 onwards for Applied Mathematics III substitute Mathematics IIIA and for Mathematics IIC substitute Mathematics IIB.
<table>
<thead>
<tr>
<th>Subject and Courses</th>
<th>Hours per week</th>
<th>Prerequisites</th>
<th>Year Stage</th>
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<tbody>
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<td>ME111 Graphics</td>
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<td>Eng. I</td>
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<td>CE111 Statics</td>
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<td><strong>Engineering Technology</strong></td>
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<td>Eng. I</td>
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<td>CE221 Properties of Materials I</td>
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<td>Eng. I, Maths I</td>
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<td>CE222 Concrete Technology</td>
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<td><strong>Materials &amp; Structures III</strong></td>
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<th>Subjects and Courses</th>
<th>Hours per week</th>
<th>Prerequisites</th>
<th>Year Stage</th>
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<tr>
<td><strong>Civil Engineering I</strong></td>
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<td>EE201-2 Principles of Electrical Engineering</td>
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<td>CE332 Fluid Mechanics II</td>
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<tr>
<td>CE342 Surveying II</td>
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<tr>
<td>ME382J Engineering Economics</td>
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<td>CE434 Water Resources Engineering I</td>
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<tr>
<td>CE435 Water Resources Engineering II</td>
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<td></td>
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</tr>
<tr>
<td>CE425 Earth &amp; Rock Engineering</td>
<td></td>
<td></td>
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<tr>
<td>CE452 Transportation Engineering</td>
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<td>CE425 Earth &amp; Rock Engineering</td>
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78
Subjects and Courses

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<thead>
<tr>
<th>Course</th>
<th>Hours per week</th>
<th>Prerequisites</th>
<th>Year</th>
<th>Stage</th>
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<tr>
<td>CE241 Surveying I</td>
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Civil Engineering C 9 Civ. Eng. B 6

Free selection from—

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<th>Year</th>
<th>Stage</th>
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<tr>
<td>CE435 Water Resources Engineering II</td>
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<tr>
<td>CE343 Surveying IIA</td>
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<tr>
<td>CE452 Transportation Engineering</td>
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<td>ME382J Engineering Economics</td>
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<td>ME381J Engineering Administration</td>
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<tr>
<td>CE425 Earth &amp; Rock Engineering</td>
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<tr>
<td>CE414B Structural Analysis II</td>
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<tr>
<td>ME212A Design IA</td>
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</tbody>
</table>

ELECTIVES I & II

(Each) III & IV

3

These electives, normally in years III and IV of the Bachelor of Engineering course, may consist of elective units offered within the Faculty or of subjects or part-subjects offered by other Faculties, subject to the approvals of the Heads of the Department of Civil Engineering and of any other Department responsible for the subject or part-subject.

DESCRIPTION OF SUBJECT UNITS

DEPARTMENT OF CIVIL ENGINEERING

Subjects offered in the Faculty of Engineering, as listed in the course outlines, are made up of subject units drawn from the following, and both subject content and unit content may be varied from time to time.

Each subject unit has an identification number with prefixed letters indicating the Department responsible for the unit, CE for Civil Engineering, EE for Electrical Engineering, and ME for Mechanical Engineering. The first numeral generally indicates the Year of the full-time course in which the unit is normally taken; the second numeral indicates the field of study; the third numeral indicates the level, or sequence in the field. A suffix letter J indicates that the unit is a joint offering of more than one department.

The number on the right indicates the total hours of lectures, laboratory, design and tutorial. As a guide to private study and preparation, students should allow, on the average about 1.5 hours for each hour of lectures and one hour for each hour of laboratory, design or tutorial. The note Arr. indicates that the unit is an elective for which the hours are fixed by arrangement.

CIVIL ENGINEERING

<table>
<thead>
<tr>
<th>Indicating Numerals</th>
<th>Field of Study</th>
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<tbody>
<tr>
<td>CE-0-</td>
<td>Structures (Service courses)</td>
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<td>CE-1-</td>
<td>Structures</td>
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<td>CE-2-</td>
<td>Materials</td>
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<tr>
<td>CE-3-</td>
<td>Fluid Mechanics, Water Resources</td>
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<td>CE-4-</td>
<td>Surveying</td>
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<tr>
<td>CE-5-</td>
<td>Civil Engineering practice</td>
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</table>

CE202 MATERIALS AND STRUCTURES

Uniaxial loading, states of stress and strain; strain relationships; internal forces, internal stresses; deflexion of beams, torsion, buckling; structure of metals, ceramics and plastics; behaviour under static and dynamic loading; deterioration of engineering materials.

CE303 STRUCTURAL DESIGN

Design of steel and reinforced concrete structures for students not following the Civil Engineering course.

CE104 STRUCTURES I FOR ARCHITECTS

A course in statics applied to structures. Equilibrium of two-dimensional force systems, funicular polygon; shear force, axial force, bending moment; pin-jointed frames; analytical and graphical treatment; three-dimensional systems.

CE205 STRUCTURES II FOR ARCHITECTS

Uniaxial loading, states of stress and strain; strain relationships; internal forces, internal stresses, deflexion of beams, torsion and buckling.
<table>
<thead>
<tr>
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<th>Course Name</th>
<th>Hours</th>
</tr>
</thead>
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<tr>
<td>CE306</td>
<td>STRUCTURES III FOR ARCHITECTS</td>
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<tr>
<td></td>
<td>Principles of structural design, loadings, use</td>
<td></td>
</tr>
<tr>
<td></td>
<td>of codes; steel design, riveted, bolted and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>welded joints, columns (Perry-Roberston formula)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>beams, plated beams, plate web girders, roof</td>
<td></td>
</tr>
<tr>
<td></td>
<td>trusses; reinforced concrete design, simple</td>
<td></td>
</tr>
<tr>
<td></td>
<td>beams, doubly reinforced beams, tee-beams,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>one-way slabs, axially loaded columns,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>eccentrically loaded columns by charts, column</td>
<td></td>
</tr>
<tr>
<td></td>
<td>footings.</td>
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<tr>
<td>CE407</td>
<td>STRUCTURES IV FOR ARCHITECTS</td>
<td>56</td>
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<tr>
<td></td>
<td>Types of multistory frames and methods of</td>
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<tr>
<td></td>
<td>bracing; introduction to analysis of</td>
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</tr>
<tr>
<td></td>
<td>indeterminate frames using moment distribution</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and frame tables. Approximations used for</td>
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<tr>
<td></td>
<td>preliminary design; introduction to plastic</td>
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<tr>
<td></td>
<td>analysis of frames; soil mechanics problems</td>
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<tr>
<td></td>
<td>in foundations—retaining walls; description of</td>
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</tr>
<tr>
<td></td>
<td>behaviour of two-way and flat slabs</td>
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<tr>
<td></td>
<td>including ribbed slabs; introduction to</td>
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<tr>
<td></td>
<td>prestressed concrete, prestress losses;</td>
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<tr>
<td></td>
<td>ultimate load behaviour of reinforced and</td>
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</tr>
<tr>
<td></td>
<td>prestressed beams; design by load balancing;</td>
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<tr>
<td></td>
<td>elementary theory of shells and folded plates.</td>
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<td>CE111</td>
<td>STATICS</td>
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<tr>
<td></td>
<td>Two-dimensional force systems; equilibrium,</td>
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<tr>
<td></td>
<td>funicular polygon; rigid bars, shear force,</td>
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<tr>
<td></td>
<td>axial force, bending moment; pin-jointed frames,</td>
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<td></td>
<td>analytical and graphical treatment;</td>
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<tr>
<td></td>
<td>equilibrium of three-dimensional force systems.</td>
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<tr>
<td>CE212</td>
<td>MECHANICS OF SOLIDS I</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td>Uniaxial loading, states of stress and strain,</td>
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<tr>
<td></td>
<td>stress and strain relationships; internal</td>
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<td>forces, internal stresses, deflexion of beams,</td>
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<tr>
<td></td>
<td>torsion, buckling.</td>
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<tr>
<td>CE313</td>
<td>STRUCTURAL ANALYSIS AND DESIGN I</td>
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<tr>
<td></td>
<td>Analysis of elastic statically determinate and</td>
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</tr>
<tr>
<td></td>
<td>indeterminate systems by classical methods;</td>
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</tr>
<tr>
<td></td>
<td>torsion; basic design of steel and reinforced</td>
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<tr>
<td></td>
<td>concrete structures; timber design.</td>
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<tr>
<td>CE414</td>
<td>STRUCTURAL ANALYSIS AND DESIGN II</td>
<td>168</td>
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<tr>
<td></td>
<td>Elastic analysis; instability of frames.</td>
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<tr>
<td></td>
<td>Introduction to matrix analysis; plastic</td>
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<tr>
<td></td>
<td>analysis. Advanced reinforced concrete design—</td>
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<tr>
<td></td>
<td>special structures; design of prestressed</td>
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<tr>
<td></td>
<td>concrete structures. Laboratory tests of</td>
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<tr>
<td></td>
<td>prestressed and reinforced concrete beams.</td>
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<tr>
<td></td>
<td>Architectural aspects of structural design.</td>
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<td>CE414A</td>
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<td>STRUCTURAL DESIGN II</td>
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<tr>
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<td>CE415</td>
<td>STRUCTURAL ANALYSIS AND DESIGN ELECTIVE</td>
<td>Arr.</td>
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<tr>
<td></td>
<td>Studies in advanced aspects of analysis and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>design of structures.</td>
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</tbody>
</table>

**CE416 ENGINEERING CONSTRUCTION**
Concrete plant and equipment, compressed air drilling and tunnel equipment, earthmoving plant, hoisting and conveying equipment, pumping and pile-driving plant. Construction methods; earthworks, foundations, coffer-dams, caissons, piling, steel, timber and concrete construction. Bridges, wharves, dams, pipelines and multi-storeyed buildings. Civil Engineering administration; contracts, tenders, contract documents, estimates, quantities, specifications, costing, financial comparison of projects, management and organisation.

**CE220 BUILDING SCIENCE II FOR ARCHITECTS**
General materials technology; introductory course of lectures and laboratory work on the load-deformation characteristics of structural materials; concrete technology.

**CE221 PROPERTIES OF MATERIALS I**
A course of lectures and laboratory work on the basic structure of metals ceramics and organic solids; behaviour of materials under static and dynamic loads; deterioration of engineering materials.

**CE222 CONCRETE TECHNOLOGY**
Materials in concrete; concrete mix design; properties of hardened and plastic concrete, manufacturing and field control; special concretes; lectures and laboratory work.

**CE223J ENGINEERING GEOLOGY**
A course of lectures, laboratory work and field excursions on the principles of geology and their application to civil engineering problems.

**CE324 SOIL MECHANICS**
Index properties, classification of solids; permeability, capillarity, seepage and flow nets; stresses in soils; settlement and consolidation; compaction, shear strength and failure criteria; stability of retaining walls, slopes and footings.

**CE425 EARTH AND ROCK ENGINEERING**
Site investigation, design of spread footings, strip and combined footings, raft foundations, piled foundations, design of embankments, cuttings, earth and rockfill dams, introductory rock mechanics.

**CE426 CIVIL ENGINEERING MATERIALS ELECTIVE**
Studies in advanced aspects of structural materials, soils and/or concrete.

**CE332 FLUID MECHANICS II**
Similitude; flow nets, boundary layers; closed conduit flow; pipe networks; unsteady flow; waterhammer, hydraulic machinery, open channel hydraulics, backwater curves.

**CE433 FLUID MECHANICS ELECTIVE**
Advanced aspects of fluid mechanics, hydrodynamics, wave motion, sediment transportation, hydraulic models, hydraulic structures.
CE434  WATER RESOURCES ENGINEERING I  42

CE435  WATER RESOURCES ENGINEERING II  42

CE340  SURVEYING FOR ARCHITECTS  30
Introduction, chaining methods of measurement, corrections, chain surveys; level, differential levelling, booking; contours, volumes of earth-works; theodolite, methods of reading angles, applications in buildings; traversing, setting out.

CE241  SURVEYING I  84
A course of lectures, field work and a survey camp, basic measurement techniques and instruments, tacheometry, plane tabling, contours, areas, volumes, curves, traversing, setting out, grading, levelling and survey calculations.

CE342  SURVEYING II  70
Minor control surveys using triangulation, trilateration, trigonometric heighting, spherical trigonometry, astronomy, map projections, barometry, photogrammetry, adjustment theory and survey calculations; survey camp.

CE343  SURVEYING IIA  42
A course of lectures and field work covering selected topics from CE342, without survey camp.

CE344  SURVEYING ELECTIVE  Arc.
Advanced aspects of surveying; astronomy, geodesy and photogrammetry.

CE350J  SEMINAR  28
Preparation and presentation by students of lectures and discussions on a range of topics of historical, social and technological significance.

CE451  PROJECT  84
Literature review, analytical and/or experimental investigation, or design of one or more civil engineering problems.

CE452  TRANSPORTATION ENGINEERING  42
Elements of planning, design and engineering of transportation facilities; including estimates of demand, data collection, route and terminal design and control. Highway location and design and construction; pavements, drainage, economic aspects. Railway engineering; elements of flight transportation.

POSTGRADUATE COURSE FOR 1969

CE521  ADVANCED STRUCTURAL ANALYSIS AND DESIGN
This course is oriented towards analysis and design in structural steel and will cover topics in matrix analysis, plastic analysis and instability theory.

CE523  ADVANCED HYDRAULICS
After a grounding in theoretical hydrodynamics, this course will cover topics in advanced hydraulics that are relevant to civil engineering design problems, mainly in the field of steady and unsteady open channel flow, pipe systems, and the design and performance of hydraulic structures.
DEPARTMENT OF ELECTRICAL ENGINEERING

Electrical Engineering is a rapidly expanding branch of engineering. It includes such fields as computer and information science, the theory and design of automatic control systems, electronics, and the study of electrical power generation and distribution.

In preparation for a career in any branch of Electrical Engineering, the student must acquire a knowledge of the basic sciences of Mathematics and Physics. Electrical Engineering, perhaps more than most other branches of engineering, is closely linked with the pure sciences and requires a scientific outlook and approach for the proper understanding of the problems involved.

During the early stages of the undergraduate courses, students concentrate on acquiring a knowledge of the basic science subjects of mathematics, physics and chemistry, together with an introduction to engineering. Then students are introduced to the basic electrical engineering subjects, including electric circuit theory, electric power engineering and electronics. Their knowledge is broadened by service subjects from mechanical and civil engineering. Advanced students study specialised subjects on power, control or electronics in their final year. Final year students may also broaden their knowledge by taking courses such as Industrial Law, Production Control, Economics or Accounting.

Towards the end of his final year, the full-time undergraduate prepares a report covering some aspect of a supervised project, and delivers a seminar paper on a selected topic.

Postgraduate students are prepared for the degrees of Master of Engineering Science and Doctor of Philosophy. Their work includes formal lecture courses, seminars and research in both practical and theoretical aspects of their specialisations.
COURSE OUTLINES

DEPARTMENT OF ELECTRICAL ENGINEERING

Note to Students

The course outlines indicate details of the revised engineering courses in their final form.

Students who have partly completed their courses should contact the Head of the Department for details of their transition program, before they enrol.

CLASSIFICATIONS

(a) Classifying subjects are shown in Bold-faced type.
(b) Classification is determined by enrolment in the classifying subject.
(c) If a student enrols in more than one classifying subject, then the year or stage of the lower classifying subject applies.
(d) If the student enrols in no classifying subject, then he is classified in the year or stage of the highest classifying subject he has passed.

BACHELOR OF ENGINEERING IN ELECTRICAL ENGINEERING

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours per Week</th>
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<td>CHEMISTRY</td>
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<tr>
<td>Engineering Technology</td>
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<td>Engineering I</td>
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<td>MATHEMATICS I</td>
<td>6</td>
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<td>Physics I</td>
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<td>3</td>
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<td>Electrical Engineering IIB</td>
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<td>MATHEMATICS IIB</td>
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<td>Physics II*</td>
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<td>ELECTRICAL ENGINEERING IIC</td>
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<td>Electrical Engineering IIB</td>
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<td>Electrical Engineering IIC</td>
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<td>Elective I</td>
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<td>ELECTRICAL ENGINEERING IVA</td>
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<td>YEAR IV</td>
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During the course each full-time student should complete periods of practical experience acceptable to the Faculty Board totally 20 weeks before 31st January in the year in which the degree is to be awarded.

* Takes account of Laboratory concession of 3 hours Laboratory work per week.
**BACHELOR OF SCIENCE (ENGINEERING) IN ELECTRICAL ENGINEERING**

<table>
<thead>
<tr>
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<td>Engineering I</td>
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<td>MATHEMATICS I</td>
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<td>Chemistry IS</td>
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<td>Engineering Technology</td>
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<td>PHYSICS I</td>
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<td>ELECTRICAL ENGINEERING P VIA</td>
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</table>

During the course each part-time student should complete periods of practical experience acceptable to the Faculty Board totalling three years before 31st January in the year in which the degree is to be awarded.

**BACHELOR OF SCIENCE/BACHELOR OF ENGINEERING IN ELECTRICAL ENGINEERING**

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours per week</th>
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<tr>
<td></td>
<td>28 weeks full-time</td>
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<td>Chemistry IS</td>
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<td>Physics I</td>
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<td><strong>YEAR II</strong></td>
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<tr>
<td>MATHEMATICS IIA</td>
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<td>Physics II*</td>
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<td>Mathematics IIC</td>
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<td>EE231/251L Electric Circuits and Measurements Laboratory</td>
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<td><strong>YEAR III</strong></td>
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<td></td>
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<td>OR</td>
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<td>(b) Mathematics IIC</td>
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<tr>
<td>Applied Mathematics III</td>
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<tr>
<td>Selected Labs. and lectures from PHYSICS III</td>
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<td></td>
<td>18</td>
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<td><strong>YEAR IV</strong></td>
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<td>Electrical Engineering IIIB</td>
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<td>CE202 Materials &amp; Structures</td>
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<td></td>
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</table>

(Subjects GE391, EE321, EE351 from the above units shall be replaced by technical electives.)

* Takes account of Laboratory concession of 3 hours Laboratory work per week.
### SUBJECTS OF INSTRUCTION

**DEPARTMENT OF ELECTRICAL ENGINEERING**

**NOTE:** The subjects, Chemistry IS, Physics I & II, Mathematics I, II & Mathematics for Electrical Engineers are not shown.

<table>
<thead>
<tr>
<th>Subjects and Courses</th>
<th>Hours per week</th>
<th>Prerequisites</th>
<th>Year</th>
<th>Stage</th>
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<tr>
<td><strong>Engineering I</strong></td>
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<tr>
<td>ME111 Graphics</td>
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<td>CE111 Statics</td>
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<td>ME131 Dynamics</td>
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<tr>
<td><strong>Engineering Technology</strong></td>
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<tr>
<td>ME121 Workshop practice</td>
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<td>EE101 Principles of Electrical Engineering</td>
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<td>EE231 Circuit Theory</td>
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<td>Maths. I, Physics I &amp; Engineering Technology</td>
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<td>EE251L Measurements Lab.</td>
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<td>II</td>
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<td>Engineering I</td>
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<td>MF271 Thermodynamics</td>
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<td>EE332 Circuit Theory</td>
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<tr>
<td>EE342</td>
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<td>or</td>
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<tr>
<td>ME361 Automatic Control</td>
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<tr>
<td>GE391 Mathematics for Electrical Engineers</td>
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<td><strong>Electrical Engineering IIIB</strong></td>
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<tr>
<td>EE321 Electronic Active Elements</td>
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<td>Electrical Engineering IIA (may be co-requisite) &amp; Physics II</td>
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<td>III</td>
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<tr>
<td>EE301 Machinery</td>
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<td>Electrical Engineering IIA (may be co-requisite)</td>
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<tr>
<td>EE302L Machinery Lab.</td>
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<tr>
<td>EE311 Power Systems</td>
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<tr>
<td>Technical Elective*</td>
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<td>Same as Electrical Engineering IIA</td>
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<td>Maths. I, Phys. I, Engineering Technology</td>
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<td>III</td>
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<td>CE202 Materials &amp; Structures</td>
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<td>Engineering I</td>
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<td>Technical Electives</td>
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<td>Subjects and Courses</td>
<td>Hours per week</td>
<td>Prerequisites</td>
<td>Year Stage</td>
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<tr>
<td><strong>Electrical Engineering IVA</strong></td>
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<td>CE350J Seminar</td>
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<td>EE451 Seminar</td>
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<td>EE460 Project/Directed reading</td>
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<td>EE403L Machinery Lab.</td>
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<tr>
<td>EE402 Advanced topics in Heavy current Electrical Engineering</td>
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<tr>
<td>EE411 Power Systems</td>
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<tr>
<td>EE421 Electronics</td>
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<tr>
<td>EE423L Electronics Lab.</td>
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<tr>
<td>EE422 Electronics</td>
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<tr>
<td>EE424L Electronics Lab.</td>
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<tr>
<td>EE431 Introduction to Network Synthesis</td>
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<tr>
<td>EE441 and EE442 Modern Control</td>
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<tr>
<td>EE444 and EE445 Communications</td>
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<td>Elec. Eng. P IIIA</td>
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<td>EE331 Circuit Theory</td>
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<td>ME271 Thermodynamics</td>
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<tr>
<td><strong>Electrical Engineering P VA</strong></td>
<td>4+</td>
<td>Elec. Eng. P IIIA (may be co-requisite)</td>
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<tr>
<td>EE301 Machinery</td>
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<tr>
<td>EE302L Machinery Lab.</td>
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<tr>
<td>EE342 Automatic Control (enrol in Course ME361)</td>
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<th>Subjects and Courses</th>
<th>Hours per week</th>
<th>Prerequisites</th>
<th>Year Stage</th>
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<td><strong>Electrical Engineering P VB</strong></td>
<td>4+</td>
<td>Elec. Eng. P IIIA</td>
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<td>EE322 Active Circuits</td>
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<tr>
<td>EE323L Electronics Lab. Technical Elective*</td>
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<th>Subjects and Courses</th>
<th>Hours per week</th>
<th>Prerequisites</th>
<th>Year Stage</th>
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<tr>
<td><strong>Electrical Engineering P VIA</strong></td>
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<td>Elec. Eng. P IVA and one or more of the following whichever is applicable</td>
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<td>EE401 Machinery</td>
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<td>EE403L Machinery Lab.</td>
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<tr>
<td>EE402 Advanced topics in Heavy current Electrical Engineering</td>
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<tr>
<td>EE411 Power Systems</td>
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<tr>
<td>EE421 Electronics</td>
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<tr>
<td>EE423L Electronics Lab.</td>
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<tr>
<td>EE422 Electronics</td>
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<tr>
<td>EE424L Electronics Lab.</td>
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<tr>
<td>EE431 Introduction to Network Synthesis</td>
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<tr>
<td>EE441 Modern Control</td>
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<table>
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<th>Hours per week</th>
<th>Prerequisites</th>
<th>Year Stage</th>
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<tr>
<td>EE531 State, Space Network Synthesis</td>
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<tr>
<td>EE541 Modern Control</td>
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<td>EE542 Modern Control</td>
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<td>EE543 Optimal Control</td>
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<td>EE551 Decision Theory</td>
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<tr>
<td>EE561 Linear Systems</td>
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<tr>
<td>EE571 Math. Found. of Systems Engineering</td>
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</table>
ELECTIVES I & II 3 hours per week (each)

These electives may consist of elective units offered within the Faculty or of subjects or part-subjects offered by other Faculties, subject to the approvals of the Heads of the Department of Electrical Engineering and of any other Department responsible for the subject or part-subject. The titles of subjects chosen for these Electives must be shown on the Enrollment Form.

NOTES:

(1) *Technical Electives may be chosen from courses offered within the Faculty of Engineering subject to the approvals of the Head of the Department of Electrical Engineering and any other Department responsible for the subject or part-subject. The titles of the subjects chosen for these electives must be shown on the Enrollment Form.

(2) Those students who enrol for the Degree of Bachelor of Science (Engineering) but in later stages may wish to transfer to Bachelor of Engineering Degree should consult the Head of the Department in the choice of courses for Technical Electives and Electives I & II.

(3) A list of subjects from which Electives I and II and Technical Electives may be chosen will be exhibited on the notice board of the Department of Electrical Engineering during the period of enrolment.

DEPARTMENT OF ELECTRICAL ENGINEERING

Subjects offered in the Faculty of Engineering, as listed in the course outlines, are made up of subject units drawn from the following. Both subject content and unit may be varied from time to time without prior notification.

Each subject unit has an identification number with prefixed letters indicating the Department responsible for the unit, CE for Civil Engineering, EE for Electrical Engineering and ME for Mechanical Engineering. The first numeral indicates the year of the full-time course in which the unit is normally taken; the second numeral indicates the field of study, the third numeral the level or sequence in the field. A suffix letter (J) indicates that the course is offered jointly by several departments.

The number on the right indicates the total hours of lectures, laboratory, design and tutorial. As a guide to private study and preparation, students should allow on the average about 1½ hours for each hour of lectures and one hour for each hour of laboratory, design or tutorial attendance.

The note (Arr.) indicates that the unit is elective for which the hours are fixed by arrangement.

<table>
<thead>
<tr>
<th>Indicating Numerals</th>
<th>Field of Study</th>
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<td>EE-10- or EE-20-</td>
<td>General Electrical Engineering</td>
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<td>EE-0-</td>
<td>Electrical Machines</td>
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<td>EE-1-</td>
<td>Electrical Power Systems</td>
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<td>EE-2-</td>
<td>Electronics</td>
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<td>EE-3-</td>
<td>Electrical Circuit Theory</td>
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<td>EE-4-</td>
<td>Control or Communication Systems</td>
</tr>
<tr>
<td>EE-5-</td>
<td>Seminar/Field Theory</td>
</tr>
<tr>
<td>EE-6-</td>
<td>Project/Directed Reading</td>
</tr>
</tbody>
</table>

EE101 PRINCIPLES OF ELECTRICAL ENGINEERING 30

The system concept in electrical engineering; relay communication systems, components of satellite relays, typical control systems, instrumentation systems. System building blocks, signal wave forms, signal processing for information transmission, amplitude modulation and other forms of modulation. Electro-mechanical devices.


Prescribed Text:

Reference Text:
EE201  PRINCIPLES OF ELECTRICAL ENGINEERING
Electronic devices and linear models; electronic amplifiers, oscillators, and logic circuits; feedback in amplifiers; analogue computer modules.
Prescribed Text:

EE202  PRINCIPLES OF ELECTRICAL ENGINEERING
Sources of electrical energy; magnetic fields and circuits; transformers; electromechanical devices; characteristics of electrical machinery; instrumentation and control.
Prescribed Text:

EE231  CIRCUIT THEORY
Independent network equations; circuits with two-storage elements; power and energy in a.c. circuits; network theorems; Laplace transformation in circuit analysis; mutually coupled circuits and transformers; three-phase circuits.
Review of electrostatics; force between charged plates; electric field in non-homogeneous dielectrics.
Review of electromagnetism: force between magnetized bodies; magnetic circuit calculations; losses in magnetic materials and their separation; permanent magnets.
Prescribed Text:

EE251L ELECTRICAL MEASUREMENTS LABORATORY
Units and standards; error analysis; bridges and impedance measurement; frequency measurement.

EE301  MACHINERY
Power transformers; D.C. Machine; Induction motors; synchronous machines; 3-phase Commutator Machines.
Prescribed Text:
Reference Texts:

EE302L  MACHINERY LAB.
A course of seven or eight experiments in heavy current electrical engineering dealing with the power transformer, d.c. machines, induction motor, synchronous machines, including tutorial problems based on the experiments.
Prescribed Text:
Reference Texts:

EE311  POWER SYSTEMS
Line parameters (L & C); mechanical characteristics; representation power systems; symmetrical components; unsymmetrical faults; circle diagrams; voltage control; high voltage D.C. transmission.
Prescribed Text:
Reference Texts:
Westinghouse Transmission & Distribution Reference Book.
Waddicor: Principles of Electric Power Transmission. 5th Ed.
Cotton: Transmission & Distribution of Electrical Energy. 2nd Ed.

EE321  ELECTRONIC ACTIVE ELEMENTS
Physics of semiconductor devices; physics of thermionic devices; characteristics of semiconductor and thermionic devices commonly used in electronic systems.
Prescribed Text:

EE322  ACTIVE CIRCUITS
Introduction to Active Circuits. Basic electronic amplifiers; applications of feedback, negative and positive; power supplies for electronic equipment; elements of pulse circuitry.
Prescribed Text:
R. Ralph Benedict: Electronics for Scientists and Engineers. Prentice Hall.
EE331 CIRCUIT THEORY
Review of time and frequency domain analysis through Fourier series and resonant circuits; network topology; two-port networks; network functions; poles and zeros and their use in network analysis; frequency response plots; singularity functions; impulse response and its use in general network analysis; super-position integral; state-space equations of electric networks.

Prescribed Text:

Reference Text:
P. H. Roe: Networks and Systems. Addison and Wesley.

EE332 CIRCUIT THEORY
Terminated two-port networks; matching, attenuators and equalizers; constant-k filters. Transmission lines: transient travelling waves; steady-state analysis of lossless and lossy transmission lines; radio-frequency and power-frequency lines; impedance charts and matching with stubs; distortion; loading.

Prescribed Text:
Potter and Fich: Theory of Networks and Lines. Prentice-Hall.

Reference Text:
Ware and Reed: Communication Circuits. Wiley.

EE342 AUTOMATIC CONTROL (Also see ME361)

Text: to be determined.

EE351 FIELD THEORY
Maxwell's equations, Wave propagation in unguided and guided configuration, Elementary Antenna Theory.

Prescribed Text:

Reference Text:

EE360 PROJECT/DIRECTED READING
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.

EE401 MACHINERY
Electromechanical Energy Conversion: Basic Principles and application to basic rotating machines. Idealized machines—dynamic equations, transfer functions and block diagrams—application to d.c. machines, induction motors, synchronous machines.

Prescribed Text:

EE402 ADVANCED TOPICS IN HEAVY CURRENT ELECTRICAL ENGINEERING
The work of EE401 in more detail and applied to realistic machines. Engineering considerations underlying machine applications. Additional topics as determined by instructor.

Prescribed Text:

EE403L MACHINERY LAB.
A course of seven or eight more advanced experiments in heavy current electrical engineering dealing with synchronous machines, the induction motor, a.c. commutator machines, including tutorial problems based on the experiments.
More advanced work on power transformers; load-flow studies; economic operation of power systems; power system stability; voltage surges—travelling waves, effects of termination; protection against over-voltages; protection—circuit breakers and relay systems.

**Prescribed Text:**

**Reference Texts:**

**EE421 ELECTRONICS**
D.C. amplifiers, stability of feedback amplifiers, modulation, noise.

**Prescribed Text:**
R. Ralph Benedict: *Electronics for Scientists and Engineers.* Prentice Hall.

**Reference Text:**
*S.E.E.C. Series. Volumes 1 to 7.*

**EE422 ELECTRONICS**
Pulse and Digital Circuits; high frequency linear circuits; microelectronics; thyristor, ignitron and allied circuitry.

**Prescribed Text:**

**EE423L ELECTRONICS LABORATORY**
Circuit development projects individually assigned.

**EE424L ELECTRONICS LABORATORY**
As for EE423L.

**EE431 INTRODUCTION TO NETWORK SYNTHESIS**
Outline of basic principles of lossless and lossy driving point synthesis; active R.C. synthesis.

**Prescribed Text:**

**Reference Text:**

**EE441 MODERN CONTROL**
Advanced classical design methods. Linear continuous and discrete-time systems from the state-variable viewpoint.

**Prescribed Text:**

**Reference Text:**

**EE442 MODERN CONTROL**
Nonlinear systems. Introduction to optimal control. Computer control of systems.

**Prescribed Text:**

**Reference Text:**

**EE444 COMMUNICATION SYSTEMS**
Modulation; random signal theory; basic information theory; noise; communication systems.

**Prescribed Text:**

**EE445 STATISTICAL COMMUNICATIONS**
Probability theory; generalised harmonic analysis of random time functions; correlation functions; power density spectra; detection of signals in noise; optimal filtering and prediction; errors in optimum systems.

**Prescribed Text:**
Essentially the Mechanical Engineer is concerned with the creative use of materials, motion and energy. He is usually associated with some aspect of the production and use of machinery. The courses in Mechanical Engineering develop from basic subjects, through those of an applied nature to reach the professional level in such areas as design, thermodynamics, fluid mechanics, automatic control and engineering management.

Course work is organised into lectures and tutorial classes, together with laboratory work to introduce students to the practical problems of equipment. Courses of study currently available in the Department are:

(i) BACHELOR OF ENGINEERING DEGREE COURSE IN MECHANICAL ENGINEERING. The course comprises four years of full time study. Students are required to gain as much industrial experience as possible by working in industry during all long vacations.

(ii) BACHELOR OF SCIENCE (Eng.) DEGREE COURSE IN MECHANICAL ENGINEERING, comprising six years of part-time study, during the whole of which time the student is normally employed in a suitable industry. A minimum of three years of concurrent industrial experience is required. Generally the student attends University one full day per week and two or three evenings.

(iii) BACHELOR OF ENGINEERING DEGREE COURSE IN INDUSTRIAL ENGINEERING, comprising four years of full time study. Years I and II of this course are similar to the full-time degree course in mechanical engineering; in the later years the course is oriented towards the study of production techniques and their control and the application of scientific principles to administration and engineering management. The course is thus designed for those engineers who wish to make their career in the planning, supervision and administration of industrial undertakings. As in the full-time mechanical engineering course, students are required to gain industrial experience by working in an appropriate industry during long vacations.

(iv) BACHELOR OF SCIENCE (Eng.) DEGREE COURSE IN INDUSTRIAL ENGINEERING, comprising six years of part-time study and, as in (ii) above, a minimum of three years of suitable industrial experience gained concurrently.

Both part-time courses, (ii) and (iv) above, are co-ordinated with their respective full-time degree courses, so that students may apply for transfer from one course to the other.

(v) BACHELOR OF SCIENCE/BACHELOR OF ENGINEERING DEGREE COURSE IN MECHANICAL ENGINEERING, comprising five years of full time study in the Faculties of Science and Engineering. Students are required to gain as much industrial experience as possible by working in industry during all long vacations. Students will be eligible for the award of the Degree of Bachelor of Science after satisfying the requirements of the first three years of the course.

(vi) BACHELOR OF SCIENCE/BACHELOR OF ENGINEERING DEGREE COURSE IN INDUSTRIAL ENGINEERING, comprising five years of full time study in the Faculties of Science and Engineering. Students are required to gain as much industrial experience as possible by working in industry during all long vacations. Students will be eligible for the award of the Degree of Bachelor of Science after satisfying the requirements of the first three years of the course.
POST-GRADUATE DIPLOMA IN INDUSTRIAL ENGINEERING. This is a two-year part-time course for graduates in any branch of Engineering or Applied Science with appropriate experience, or for persons otherwise acceptably qualified. The successful completion of the course leads to the award of a post-graduate diploma in Industrial Engineering. Those wishing to enrol in this course should write to the Head of the Department of Mechanical Engineering for further details.

MASTER OF ENGINEERING SCIENCE COURSE. During 1969 a group of graduate subjects, which comprise part of the formal Master of Engineering Science Course, will be offered. Details of subjects to be offered are entered in departmental sections of the Handbook.

Note to Students Re-enrolling in 1969

The course outlines indicate details of the revised Engineering courses in their final form.

Students who have partly completed their course should contact the Head of the Department (before they enrol), for details of their programme during the transition period.

CLASSIFICATIONS

(a) Classifying subjects are shown in Bold-faced type.
(b) Classification is determined by enrolment in the classifying subject.
(c) If a student enrols in more than one classifying subject, then the year or stage of the lower classifying subject applies.
(d) If the student enrols in no classifying subject, then he is classified in the year or stage of the highest classifying subject he has passed.

INDUSTRIAL TRAINING

Students reading for a full-time Bachelor of Engineering degree are normally required to complete periods of practical experience totalling twenty (20) weeks or more, of a type acceptable to the Faculty Board. Students who transfer from part-time to full-time courses or vice versa will be advised individually of their practical training requirements.

Students reading for a part-time Bachelor of Science (Engineering) degree must complete three years of practical experience before the 31st January in the year in which the degree is to be awarded.
### Bachelor of Engineering in Mechanical Engineering

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*Electives to be chosen with the approval of the Head of the Department.

### Bachelor of Science (Engineering) in Mechanical Engineering

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### BACHELOR OF ENGINEERING IN INDUSTRIAL ENGINEERING

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### BACHELOR OF SCIENCE (ENGINEERING) IN INDUSTRIAL ENGINEERING

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110 111
### BACHELOR OF SCIENCE/BACHELOR OF ENGINEERING IN MECHANICAL ENGINEERING

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<td>Physics I</td>
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<td><strong>YEAR II</strong></td>
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* Takes account of Laboratory concession of 3 hours Lab. work/week.

** Approval may be given for Physics III to be taken in lieu of Mathematics IIIA.

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### BACHELOR OF SCIENCE/BACHELOR OF ENGINEERING IN INDUSTRIAL ENGINEERING

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<td>Project</td>
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* Takes account of laboratory concession of 3 hours Laboratory work per week.
ELECTIVE PROGRAMME

<table>
<thead>
<tr>
<th>Elective I</th>
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</tbody>
</table>

Three electives are to be chosen from the respective groups. The third elective can be chosen from Group A, Group B, or Group C.

Elective programmes for full-time Mechanical Engineering students must be approved by the Head of the Department.

**ELECTIVE GROUP**

**A**
- English I
- French I*
- German I*
- Greek I
- History I
- Latin I
- Philosophy I
- Psychology I

**B**
- Design III
- Energy III
- Systems Analysis
- Operational Research
- Industrial Design

**C**
- Accounting I
- Education IIA
- Economics I
- Geography I
- Geology I
- Elective Mathematics
- Physics II
- Any subject or subjects of satisfactory level in the Faculty of Engineering
- Any subject or subjects of satisfactory level in the Faculty of Applied Science or Faculty of Architecture

* Require Higher School Certificate pass or equivalent, except for special courses in Greek I and Latin I.

† This course is intended for students with no previous knowledge of German.

POSTGRADUATE STUDY

POSTGRADUATE DIPLOMA IN INDUSTRIAL ENGINEERING

<table>
<thead>
<tr>
<th>STAGE 1</th>
<th>Hours per week</th>
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<tbody>
<tr>
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<td>Industrial Engineering I-D</td>
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<tr>
<th>STAGE 2</th>
<th>Hours per week</th>
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<tr>
<td>Industrial Engineering II-D</td>
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<tr>
<td>Industrial Management</td>
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</table>

7

MASTER OF ENGINEERING SCIENCE (M. Eng. Sc.)

During 1969 a formal course leading to a Master of Engineering Science (M. Eng. Sc.) degree will be available and the following graduate subjects may be offered in 1969.

ME503G Design of Experiments in Engineering Research
ME588G Operational Research and Decision Theory
## SUBJECTS OF INSTRUCTION

### DEPARTMENT OF MECHANICAL ENGINEERING

<table>
<thead>
<tr>
<th>Subjects and Courses</th>
<th>Hours per week</th>
<th>Prerequisites</th>
<th>Year</th>
<th>Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Engineering I</strong></td>
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<tr>
<td>ME111 Graphics</td>
<td>6</td>
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<tr>
<td>CE111 Statics</td>
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</tr>
<tr>
<td>ME131 Dynamics</td>
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<tr>
<td><strong>Engineering Technology</strong></td>
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<tr>
<td>ME121 Workshop Practice</td>
<td>3</td>
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<td><strong>Mechanics of Materials I</strong></td>
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<tr>
<td>ME222 Process Technology I</td>
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<tr>
<td><strong>Energy I</strong></td>
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<tr>
<td>ME251 Fluid Mechanics I</td>
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<td>Maths. I, Eng. I</td>
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<td>ME271 Thermodynamics I</td>
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<td>EE201/2 Principles of Electrical</td>
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<td><strong>Design I</strong></td>
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<td><strong>Energy II</strong></td>
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<td>ME361 Automatic Control I</td>
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<td><strong>Systems Analysis</strong></td>
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<td>ME485 Tool Design</td>
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<td>ME486 Industrial Design</td>
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<td><strong>Operational Research</strong></td>
<td>5</td>
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<tr>
<td>ME487 Fundamentals of Operational Research</td>
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<td>ME488 Industrial Applications of O.R. Methods</td>
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</table>
DESCRIPTION OF SUBJECT UNITS

DEPARTMENT OF MECHANICAL ENGINEERING

Subjects offered in the Faculty of Engineering, as listed in the course outlines, are made up of subject units drawn from the following, and both subject content and unit content may be varied from time to time without prior notification.

Each subject unit has an identification number with prefixed letters indicating the Department responsible for the unit, CE for Civil Engineering, EE for Electrical Engineering, and ME for Mechanical Engineering. The first numeral generally indicates the Year of the full-time course in which the unit is normally taken; the second numeral indicates the field of study, the third numeral indicates the level, or sequence in the field. A suffix letter J indicates that the course is offered jointly by several departments.

The number on the right indicates the total hours of lectures, laboratory, design and tutorial. As a guide to private study and preparation, students should allow, on the average about 1½ hours for each hour of lectures and one hour for each hour of laboratory, design or tutorial attendance. The note Arr. indicates that the unit is elective for which the hours are fixed by arrangement.

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<thead>
<tr>
<th>Number Code</th>
<th>Field</th>
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<td>ME-1-</td>
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<td>Mechanical Engineering Practice</td>
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<td>Thermodynamics</td>
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<td>ME-8-</td>
<td>Industrial Engineering</td>
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<td>ME-9-</td>
<td>Project and Seminar</td>
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ME111 GRAPHICS

A study of communication and analysis by pictorial means.

Graphical Presentation and Analysis of Data
Vector diagrams, charts, graphs, plotting and curve fitting. Log-log plotting. Graphical differentiation and integration.

Projection
A detailed study of the methods of projection covering: sketching; orthogonal projection of points, lines, planes and solids; lengths of lines, angles and intersections between lines, planes and contoured surfaces; orthographic projection, dimensioning and sectioning; isometric projection; perspective projection.

Development and Presentation of a Design
Flow diagrams. Circuit diagrams; orthographic and isometric drawings of complete designs. Simple projects in conceptual design.

ME131 DYNAMICS

A Study of Force and Motion
The forces involved in motion; gravity, dry friction, viscous friction, rolling friction. The "free body" and control volume techniques. Internal and external forces and equilibrium.

Newton's laws of motion applied to point masses, rigid bodies and connected bodies moving in straight line or curved paths, or in simple rotation. Reference frames and relative motion; inertial frames, accelerating frames and rotating frames, Coriolis acceleration with illustrations.

Momentum and impulse, both linear and angular, related to point masses, rigid bodies and fluids.

Energy and the conservation principle applied to mechanical work, strain energy, kinetic energy, potential energy and friction "losses," in the context of point masses, rigid bodies and simple cases of fluid flow.

ME121 WORKSHOP PRACTICE

A study of the basic methods and processes in the Engineering trades with instruction and practice in the following:

Fitting and machining, welding processes, boilermaking, blacksmithing, patternmaking and foundry work, and die and press work.

ME222 PROCESS TECHNOLOGY I


ME251 FLUID MECHANICS I

Fluid properties and definitions. Fluid statics:

Statics of moving systems, forces on surfaces, buoyant forces, stability of floating and submerged bodies. Fluid flow concepts:

Types of flow, continuity equation, Euler's equation of motion along a streamline, Bernoulli equation, energy equation. Linear momentum equation. The moment of momentum equation. Linear and angular momentum applications. Introduction to dimensional analysis. Viscous effects:

Fluid resistance, laminar and turbulent flow, flow in pipes and conduits. Fluid measurement.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>ME372</td>
<td>TURBOMACHINERY</td>
<td>42</td>
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<tr>
<td></td>
<td>Basic equations for interactions between fluids and moving vanes. Applications to radial flow pumps and fans, and the development of similarity relationships and descriptions of performance. Similar applications to axial flow pumps and fans, turbo-compressors, water turbines, steam turbines and gas turbines. Study of cavitation as it affects machines handling liquids.</td>
<td></td>
</tr>
<tr>
<td>ME372</td>
<td>HEAT TRANSFER I</td>
<td>42</td>
</tr>
<tr>
<td>ME361</td>
<td>AUTOMATIC CONTROL I</td>
<td>56</td>
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<tr>
<td>ME301</td>
<td>ENGINEERING COMPUTATIONS</td>
<td>56</td>
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<tr>
<td>ME333</td>
<td>DYNAMICS OF MACHINES II</td>
<td>28</td>
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<tr>
<td>ME313</td>
<td>MECHANICAL ENGINEERING DESIGN</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td>Design of reciprocating machine elements, flywheels and high-speed rotors. Creative design of special purpose machinery or mechanisms.</td>
<td></td>
</tr>
</tbody>
</table>
ME481 ENGINEERING ADMINISTRATION
42
The historical development of the theory and practice of
organisation and administration in industrial enterprises.
Nature and types of organisation. Communications. The
Management team. The Industrial Engineer. Industrial
Law.

ME482 ENGINEERING ECONOMICS
42
Economic criteria for engineering decision making
Fixed and variable costs
Equivalent annual costs of plant and equipment
Cost data for decision making
Purchase and replacement economics
Discounted cash flow
Net present value
Cost/benefit analysis
Quantitative methods for decision making
Operational research.

ME391 TECHNICAL SEMINAR
28

ME381 METHODS ENGINEERING
56
The integration of man, machines and materials to
achieve maximum efficiency of operation. The critical
Ergonomics. Activity sampling.

ME453 FLUID MECHANICS III
56
Lectures and laboratory work dealing with a selection
from the following topics:
Applications of hydrodynamics
Hydraulic transients
Fractional analysis applications
Cavitation studies
Topics in turbomachinery
One-dimensional compressible flow.

ME473 THERMODYNAMICS II
42
Lectures and laboratory work dealing with a selection
from the following topics:
Advanced heat transfer
Thermodynamic relations
Statistical thermodynamics
Irreversible thermodynamics
Direct energy conversion
Refrigeration and air conditioning

ME474 HEAT TRANSFER II
42
Development of the completely general form of the
continuity, momentum and energy equations. Application
and solution for various physical situations. Turbulent
flow heat transfer. Some advanced conduction and
radiation heat transfer studies.

ME483 QUALITY ENGINEERING
56
Sampling plans, by attributes, by measurement. Operating
characteristic curves, control charts. Design of experi-
ments. Analysis of variance.

ME484 DESIGN FOR PRODUCTION
56
The application of economics, methods engineering
ergonomics and mechanical engineering to the develop-
ment and design of a product. Its production (particu-
larly in quantity), distribution and marketing.
Operation methods; metrology, tools, jigs and fixtures,
assembly and inspection procedures. Plant facilities.

ME492 SENIOR TECHNICAL SEMINAR
42

ME496 PROJECT
98

ME403 OPTIMISATION OF SYSTEMS
98
An introduction to optimisation of static and dynamic
problems with industrial application.

ME414 MECHANICAL ENGINEERING DESIGN II
84
Design in specialized field such as: Mechanical Power
Transmission, Crane and Hoist Equipment, Thermal
Unit Components.

ME444 PROPERTIES OF MATERIALS III
28
Dislocation mechanics and fracture mechanics.
Use of composite materials.
Development of filament and whisker reinforcement
techniques.
Influence of residual stresses in design. Dynamics,
thermal, electrical, magnetic and radiation effects.

ME445 MECHANICS OF SOLIDS III
28
An introduction to the theory of plates and shells with
extensions to thick pressure vessels and creep effects.
Application of numerical (approximate) methods.

ME485 TOOL DESIGN
56
The design of tools, jigs and fixtures for various material
forming and machining processes. The relative economics
of jigs, fixtures and special tooling.

ME486 INDUSTRIAL DESIGN
56
The creative process and the factors influencing it—
detailed study of the problems associated with product
design. The integration of analysis, synthesis and
evaluation of product design. Studio assignment associ-
ated with the design.

ME487 FUNDAMENTALS OF OPERATIONAL RESEARCH
125
The formulation, optimisation and application of mathem-
atical models. The development of decision rules.
ME488 INDUSTRIAL APPLICATIONS OF OPERATIONAL RESEARCH METHODS
Industrial case studies. The application of operational research methods to industrial situations.

ME503G DESIGN OF EXPERIMENTS FOR ENGINEERING RESEARCH
A systematic approach to the analysis and design of experiments and the interpretation of experimental results. 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.

ME515G ADVANCED DESIGN CONCEPTS IN MECHANICAL ENGINEERING
Optimal Design of Mechanical Components. Design for Obsolescence.

ME535G VIBRATION AND NOISE PROBLEMS IN INDUSTRY
The course presents a systematic study of both noise and vibration problems which are of common occurrence in Industrial Plants and structures. The course is divided into two parts, as follows:

ME546G ELASTICITY, PLASTICITY AND APPLICATIONS

ME588G OPERATIONAL RESEARCH AND DECISION PROBLEMS THEORY
ME581D METHODS ENGINEERING
The design of manufacturing facilities, including the product, equipment selection, plant location and layout. The use of human and physical resources, including motion and time study, incentives, work sampling, machine interference; an introduction to ergonomics.

ME582D INDUSTRIAL COMPUTATIONS

ME681D INDUSTRIAL LAW
The elements of the law of contract and tort as applied to industrial law. An outline of the N.S.W. and Commonwealth Arbitration systems, including reference to award making and interpretation and industrial disputes; Workers' Compensation.

ME682D CASES IN INDUSTRIAL MANAGEMENT
Studies in organisational and executive action requirements of specific industrial situation, using the case study methods.

ME683D ENGINEERING ECONOMICS
The structure of the Australian economy. The theory of firm selection of processes and equipments. Decision theory. The application of engineering economic analysis to industrial operations and engineering projects.

ME684D OPERATIONAL RESEARCH
The formulation and optimisation of Mathematical models. The development of decision rules. The application of Operational Research methods to Industrial situations.

ELECTIVE PROGRAMME

GROUP A

ENGLISH I
(3 hours lectures, 1 hour tutorial per week)
English I is planned as an introductory course. Students who complete it should be equipped to read more widely and intelligently on their own and to undertake the more specialised studies of English II. The course comprises the following sections:
1. Modern Novel
2. Modern Poetry
3. Modern Drama
4. English Language Studies

The literature sections are designed as an introduction to the major forms of English literature. Although the set texts are all from the modern period, they will be studied to some extent historically as well as critically, and will also be used as a basis for examining certain general problems in literary and critical theory.

Students are recommended to read Legouis and Cazamian's History of English Literature (Dent).

FRENCH I
(i) The history and literature of nineteenth century France: an introductory study based on the reading of prescribed texts
(one lecture and one tutorial group weekly)
(ii) Translation and explanation of prescribed texts, with an introduction to French versification
(one lecture weekly)
(iii) Exercises in translation from English into French, with some unseen translation from French into English
(one lecture weekly)

The writing of three short essays in French
(iv) Phonetics
(one lecture weekly)

Reading aloud, conversation, dictation
(one hour weekly in Language Laboratory)

GERMAN I*
(5 hours per week)
This course is intended for students with no previous knowledge of German.
Language (Grammar, Oral practice, translation)
Analysis of selected Modern German Texts (Terms 2 and 3)

GERMAN I
(4 hours per week)
This course is intended for students with a pass in German at the Higher School Certificate or the equivalent.
Language (Grammar, Oral practice, Translation)
Analysis of selected Modern German Texts.
Course common to both I* and I (1 hour per week)
Introduction to Literary Criticism.
GREEK I
Two alternative courses requiring a similar standard of achievement but providing scope for wider reading for those with matriculation Greek, and grammatical training for those without it. Each course needs 4 hours per week.

HISTORY I
History of European Civilization (3 hours per week)
A survey course, designed to give students some knowledge of the main issues involved in the development of modern society, and to introduce them to some of the problems and techniques of historical interpretation with which they will be concerned in later courses. The course will be presented in three units; "The Problems of Political Organisation", "The Dominant Intellectual, Cultural and Religious Themes", and "The Problem of Livelihood." Each unit will be treated as a separate whole, and will occupy roughly one term; each will cover the whole period from the Ancient World to the present day, although no attempt will be made to present a chronological narrative. The emphasis throughout will be upon significant issues, movements and ideas rather than upon mere dates and events.

LATIN I
Two alternative courses requiring a similar standard of achievement but providing scope for wider reading for those with matriculation Latin, and grammatical training for those without it. Each course needs 5 hours per week.

PHILOSOPHY I
Section 1—Introduction to Philosophy
(1 hour weekly for lectures, 1 hour weekly for seminars)
This course is an introduction to Philosophy, through lectures on aspects of the thought of Plato and Descartes. The first part is concerned with Plato's theory of education, political authority, the nature of the soul and its immortality, and universals. The second part is concerned with Descartes' quest for infallible knowledge, and his attempts to provide the foundations of science, to prove the existence of God and the immaterial character of the soul.

Section 2—Logic and Scientific Method
(1 hour weekly)
This course assumes no prior acquaintance with logic, and comprises a study of traditional formal logic and a consideration of some logical features of scientific enquiry. It is intended to introduce students to a formal study of arguments and scientific method, and thus to provide further equipment for examining and evaluating arguments met with not only in other sections of the philosophy course, but generally.

PSYCHOLOGY I
A course of four lectures and one one-hour practical session per week.

The final examination consists of two three-hour papers plus an assessment of the practical work carried out by the student throughout the year.

The course which is a general introduction to psychology, includes learning theory, motivation; developmental psychology, physiological psychology, comparative psychology, theory of measurement, and descriptive statistics and statistical analysis of data.

GROUP B (See page 114)

GROUP C

ACCOUNTING I
A theoretical analysis of the accounting function in the social structure; accounting as an information system including the classification, recording and verification of financial data with emphasis on control techniques; automatic processing of accounting data and the computer; analysis and interpretation of financial statements; management uses of accounting information; various budgetary controls; an introduction to business finance; a brief survey of the law and practice of the taxation of income derived from Australian sources.

EDUCATION IIA
An introduction to education as a function of society. The course will include a study of the history of education in Western Europe and major philosophical contributions, and an examination of the relations between social organisation and education in the United Kingdom, the United States, Australia, and other selected countries.

(3 hours, 1 hour tutorial)

ECONOMICS I
(i) Microeconomics
This subject deals with the theory of value and distribution. The course begins with a brief introductory account of the major problems of economics and the methods of economic analysis. It then reviews the theory of individual and market demand. After an analysis of the production function and costs of production, it examines the theory of firms' price and output policies in different market situations, paying attention to the results of both theoretical and empirical studies. The final section is concerned with the analysis of pricing and employment of factor services.

(3 hours lectures and tutorials per week)

(ii) Elementary Economic Statistics
This is an introductory course beginning with an examination of the place of, and need for, statistics in a modern society and the collection, classification and presentation of statistical data. Methods of describing statistical data, including measures of central tendency and measures of dispersion, are then dealt with.

Other topics covered are simple linear regression and correlation, the analysis of time series, including trend and seasonal variation, and the computation of index numbers. There is also an introduction to the theory of probability and to sampling and sampling errors.

(iii) Applied Economics
This course examines a number of economic topics of current importance in the Australian economy. Areas of study include the following: the structure and use of national accounts, with reference to post-war Australia; post-war government economic objectives and policy; the relative performance of major producing sectors and their problems; the environment of Australian manufacturing industry-tariff protection and foreign investment; patterns of Australia's foreign trade; productivity in industry; case-studies of major Australian industries; the transport sector; wage-bargaining and trade unions; the Australian capital market. Most of these topics are complementary to reading done in economic theory.
GEOGRAPHY I

6 hours per week (2 hours lectures, 1 hour tutorial, 3 hours of practical work). Four days of field work are an integral part of the course. A final examination of two papers each of three hours.

The three strands to this course are designed to introduce students to the earth as the home of man and to basic techniques required for this study.

(a) Practical Geography

The practical class of 3 hours per week is designed to enable students to gain proficiency in, and an understanding of, the tools of geographical analysis. It contains three sections:

(i) An introduction to the mechanics of reading and interpreting topographic maps. An integral part of this section is a one-day excursion designed to develop a basic frame of geographic reference and elementary field work skills.

(ii) The cartographic representation of quantitative data in distribution maps and diagrams.

(iii) An introduction to the statistical organisation and interpretation of quantitative data.

(b) A study of the processes resulting in and the integration of landforms, climate, soil and vegetation. Two days of field investigation are associated with this aspect of the course.

(c) A study of the evolution and patterns of world population and settlement. One day of field investigation is included in this part of the course.

GEOLOGY I

A course of three lectures and three laboratory hours per week for three terms, together with four days field work, to be examined by two papers, each of three hours duration. The course covers Material, Physical and Historical Geology. Brief outlines are as follows:

Material Geology

Introductory crystallography, mineralogy and petrology; classification of rocks; economic mineral deposits.

Physical Geology

Erosion cycle; agents of erosion; diastrophism; structural geology; geomorphology.

Historical Geology

Introductory palaeontology and stratigraphy; brief geological history of New South Wales.

MATHEMATICS IIC *

PHYSICS II *

* See under Subjects Taught by Faculty of Science (Page 141).
ME222  PROCESS TECHNOLOGY I
Reference Texts:
Manufacturing Processes & Materials for Engineers
...... Doyle, L. E., Morris, J. L., Leach, J. L., Schrader, G. P.
(Prentice-Hall)
Materials, Properties & Manufacturing
Processes ...... ...... ...... ...... ...... Datsko, J.
(Wiley)
Processes & Materials in Manufacturing ...... Campbell, J. S.
(McGraw-Hill)
Prescribed Text:
Materials & Processes in Manufacturing DeGarmo, E. P.
(Macmillan)

ME251  FLUID MECHANICS I
Reference Text:
Fluid Mechanics with Engineering Applications
...... ...... Dougherty, R. L. & Franzini, J. B.
(McGraw-Hill)
Prescribed Text:
Fluid Mechanics ...... ...... ...... ...... ...... V. L. Streeter
(4th Edn.—McGraw-Hill)

ME271  THERMODYNAMICS I
Prescribed Text:
Fundamentals of Classical Thermodynamics
...... ...... G. J. Van Wylen & R. E. Sonntag
(John Wiley)

ME231  DYNAMICS OF MACHINES I
Reference Texts:
Dynamics of Machinery ...... ...... ...... A. R. C. Holowenko
(Wiley)
Cam design, Design & Accuracy ...... ...... Rothbart, H. A.
(Wiley)
Prescribed Text:
Kinematics & Dynamics of
Plane Mechanisms ...... ...... ...... Hirschhorn, J.
(McGraw-Hill)

ME341  PROPERTIES OF MATERIALS
Reference Texts:
Strength & Structure of Engg. Materials
...... ...... Polakowski, N. H. & Ripling, E. M.
(Prentice-Hall of Aust.)
Elements of Materials Science ...... ...... Van Vlask
(Addison-Wesley)
Prescribed Texts:
Engineering Materials Science ...... ...... C. W. Richards
(Addison-Wesley)
Mechanical Behaviour of Materials ...... McClintock & Argon
(Addison-Wesley)

ME323  MECHANICAL TECHNOLOGY
Reference Texts:
Processes & Materials in Manufacturing ...... Campbell, J. S.
(McGraw-Hill)
Material Properties & Manufacturing Processes ...... Datsko, J.
(John Wiley)
Manufacturing Processes & Materials for Engineers
Doyle, L. E., Morris, J. L., Leach, J. L., Schrader, G. F.
(Prentice-Hall)
Prescribed Text:
Materials & Processes in Manufacturing ...... DeGarmo, E. P.
(Macmillan)

ME343  MECHANICS OF SOLIDS II
Reference Texts:
Introduction to Mechanics of Solids ...... ...... Popov
(Prentice-Hall)
Introduction to Mechanics of
Deformable Solids ...... ...... Drucker, D. C.
(McGraw-Hill)
Prescribed Texts:
Mechanics of Materials ...... ...... Shanley, F. R.
(McGraw-Hill)
Mechanics of Materials
Higdon, A., Ohlsen, E. H., Styles, B. B. & Neese, J. A.
(Wiley)

ME352  TURBOMACHINERY
Reference Texts:
Theory of Turbomachines ...... ...... Csanady
(McGraw-Hill)
Pumps, Fans & Compressors ...... Kovats, A. & Desmur, G.
(Blackie)

ME372  HEAT TRANSFER I
Reference Texts:
Heat Transfer, Vols. 1 & 2 ...... ...... Jakob, M.
(Wiley)
Heat Transmission ...... ...... McAdams, W. H.
(McGraw-Hill)
Prescribed Text:
Heat Transfer ...... ...... Holman, J. P.
(McGraw-Hill)

ME361  AUTOMATIC CONTROL I
Reference Texts:
Control Systems Components ...... Gibson, J. E. & Tuteur, F. P.
(McGraw-Hill)

Prescribed Text:
Automatic Control Engineering — Raven, F. H. (2nd Edn.—McGraw-Hill)

ME301 ENGINEERING COMPUTATIONS
Reference Text:
Introduction to Numerical Analysis — Hildebrand, F. G.
Prescribed Text:
Numerical Methods & Fortran Programming — McCracken, D. P. & Dorn, W. S. (Wiley International)

ME313 MECHANICAL ENGINEERING DESIGN
Reference Texts:
Diesel Engine Design — Walshaw (Newnes)
Diesel Engine Design — Purday (Constable)
Advanced Mechanics of Materials — Seely & Smith (Wiley)
Handbook of Stress & Strength — Lipson & Juvinall (Macmillan)

ME333 DYNAMICS OF MACHINES II
Reference Texts:
Vibrations—Theoretical Methods — Yu Chen (Addison-Wesley)
Vibration Problems in Engineering — Timoshenko, S. & Young, D. H. (Von Nostrand)
Mechanical Vibrations — Seta, W. W. (Schaum)
Prescribed Texts:
Mechanical Vibrations — Church, A. H. (John Wiley)
OR
Dynamics of Machinery — Phelan, R. M. (McGraw-Hill)

ME481 ENGINEERING ADMINISTRATION
AND
ME482 ENGINEERING ECONOMICS
Reference Texts:
Organisations Structure & Behaviour — Litterer, J. A. (Wiley)

An Introduction to Management Science — D. Teichroew (McGraw-Hill)
Management Theory & Practice — Dale, F. (McGraw-Hill)
Mathematics in Management — A. Battersby (Pelican)
Principles of Engineering Economy — E. L. Grant & W. G. Ireson (Ronald)
The Finance of Analysis of Capital Projects — A. J. Merritt & A. Sykes (Longmans)
Economic Analysis — Parish, N. N. (McGraw-Hill)
Managing the Industrial Concern — H. G. Hodges & R. J. Ziegler (Houghton Mifflin)
Concepts in Management Science — D. J. Clough (Prentice-Hall)

ME401 OPERATIONAL RESEARCH I
Reference Texts:
Operations Research, Methods & Problems — Saseini, M., Yuspan, A. & Friedman, L. (Wiley)

ME462 AUTOMATIC CONTROL II
Reference Text:
Linear Systems — Schwarz & Friedland (McGraw-Hill)
Prescribed Text:
Control System Theory — Olli, I, Elgerg (McGraw-Hill) 1967
ME453 FLUID MECHANICS
Reference Texts:
Applied Hydrodynamics ..... H. R. Vallentine (Butterworth)
Hydro-electric Engineering Practice ..... Brown, J. H. Vol. 2 (Blackie)

ME473 THERMODYNAMICS
Reference Texts:
Conduction Heat Transfer ..... Schneider, P. J. (Addison-Wesley)
Convective Heat & Mass Transfer ..... Kays, W. M. (Dover)
Prescribed Text:
Fluid Dynamics & Heat Transfer (McGraw-Hill)

ACCOUNTING & FINANCIAL STUDIES
Reference Text:
A Managerial Emphasis ..... Horngren, C. T. Cost Accounting (Prentice-Hall)

MANAGEMENT STUDIES
Reference Texts:
*Management, Theory & Practice ..... Dale, E. (McGraw-Hill)
*The Quantitative Approach to Managerial Decisions ..... Hein, L. W. (Prentice-Hall)
*Essential books which students should possess. A full reading list is provided by the Lecturer and is published in the Faculty of Economics & Commerce Handbook.

ME51D METHODS ENGINEERING
(See ME381)

ME52D INDUSTRIAL COMPUTATIONS
Reference Texts:

ME61D INDUSTRIAL LAW
Reference Text:
The Employer, the Employee & The Law ..... Sykes, E. I. (Law Book Company)

ME62D CASE STUDIES IN INDUSTRIAL MANAGEMENT
Reference Texts:
Selected Case Problems in Industrial Management ..... Holden, P. E. & Shallenberger, F. K. (Prentice-Hall)
The World of Work ..... Dubin, R. (Prentice-Hall)
Formal Organisation ..... Blank, P. M. & Scott, W. R. (Routledge & Keegan)
Appraisal of Management ..... Martinell, I. (Harper Bros.)
Managerial Psychology ..... Leavitt, H. J. (Chicago University Press)
Organisations: Structure & Behaviour ..... Litterer, J. (Wiley)

ME63D ENGINEERING ECONOMICS
Reference Texts:
Principles of Engineering Economy ..... Grant, E. L. & Ireson, E. G. (Ronald)
Economics ..... P. A. Samuelson (McGraw-Hill)

ME64D OPERATIONAL RESEARCH
Reference Text:

ME44G PROPERTIES OF MATERIALS III
Reference Texts:
Mechanical Behaviour of Materials ..... McClintock & Ergon (Addison-Wesley)
Engineering Materials Science ..... Richards (Wadsworth)
Modern Composite Materials ..... Brontman & Koock (Addison-Wesley)
ME445G MECHANICS OF SOLIDS III
Reference Texts:
Theory of Plates and Shells
... Timoshenko & Wainowsky-Krieger
(McGraw-Hill)
Stress Analysis ... Zienkiewicz & Holister
(Wiley)

ME544G ELASTICITY, PLASTICITY & APPLICATIONS
Reference Texts:
Stress Analysis ... Zienkiewicz & Holister
(Wiley)
Applied Elasticity ... Wang
(McGraw-Hill)
The Mathematical Theory of Plasticity ... R. Hill
(Oxford)
Advanced Mechanics of Materials ... Ford
(Longmans)

ME503G DESIGN OF EXPERIMENTS FOR ENGINEERING RESEARCH
Reference Texts:
Introduction to Scientific Research ... Bright-Wilson
Experimental Statistics ... Handbook 91
(U.S. National Bureau of Standards)
Mathematics Handbook for Scientists & Engineers ... Korn & Korn
(McGraw-Hill)
Methods of Correlation Analysis & Regression Analysis ... Ezekiel & Fox
(Wiley)
Physical Measurements and Analysis ... Cook & Rabinowicz

SUBJECTS
TAUGHT BY
THE FACULTY OF SCIENCE

CHEMISTRY I
A subject comprising about 90 lectures and 90 hours of tutorial and laboratory classes covering the following topics:

Inorganic Chemistry (30 lectures)
Atomic structure; chemical bonds; shapes of molecules; simple crystal structures; radiochemistry and geochemistry; chemistry of the elements, H to Ne, and some other related elements.

Physical Chemistry (30 lectures)
Chemical equilibria and energetics; ionic equilibria; chemical kinetics.

Organic Chemistry (30 lectures)
The place of organic chemistry; isolation, purification; characterization of organic compounds; structural principles; nomenclature; reactions of mono-functional compounds.

The annual examination will consist of two papers, each of three hours duration.

CHEMISTRY IS (for Civil, Electrical and Mechanical Engineering Students)
A subject comprising about 60 lectures and 30 hours of tutorials, computational classes and student participation demonstrations on selected principles of chemistry developed against an engineering background. The central theme is the contribution of chemistry to the control and exploitation of man's environment with special reference to energy and material resources. Among the topics included are the following:
The chemical nature of natural resources; chemical energetics in relation to combustion; ionic and phase equilibria against a background of water usage, treatment and beneficiation; electrochemistry in relation to corrosion and related phenomena; structural chemistry of engineering materials; organic chemistry with special reference to petrochemistry, polymers, fuels and lubricants.

The annual examination will consist of one paper of three hours duration.

CHEMISTRY II

A subject comprising about 90 lectures and 180 hours of tutorial and laboratory classes covering the following topics.

Inorganic Chemistry (30 lectures)

Principles of physical methods; maximum symmetry of electron pair theory; co-ordination chemistry; chemistry of the elements of the first transition series; crystal chemistry.

Physical Chemistry (30 lectures)

Thermodynamics; solutions; phase equilibria; kinetics and photochemistry.

Organic Chemistry (30 lectures)

Polyfunctional compounds including amino acids, proteins and carbohydrates; condensation reactions; aromatic compounds; reaction mechanisms; elementary aspects of spectroscopic determination of molecular structure.

The annual examination will consist of two papers, each of three hours duration.

ENGINEERING GEOLOGY (for students in Engineering)

A course of one lecture and two laboratory hours per week for 14 weeks together with two days field work.

The course introduces the principles of geology and their applications to engineering problems.

MATHEMATICS I

A subject of four lectures and two tutorial hours per week for three terms comprising the following topics: differential and integral calculus and their applications; special functions; sequences and series; coordinate geometry; differential equations; groups, fields, linear algebra, vector spaces, matrices and determinants; introduction to computing and numerical mathematics.

GROUP II MATHEMATICS TOPICS

A selection is available from the following topics:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
<th>Prescribed Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Real Analysis</td>
<td>A. J. White, <em>Real Analysis</em> (Addison-Wesley) 1968</td>
</tr>
<tr>
<td>B</td>
<td>Complex Analysis</td>
<td>W. Kaplan, <em>Advanced Calculus</em> (Addison-Wesley) 1959</td>
</tr>
<tr>
<td>C</td>
<td>Calculus and Vector Calculus</td>
<td>As for B.</td>
</tr>
<tr>
<td>G</td>
<td>Fourier series, partial differential equations and special functions</td>
<td>As for B.</td>
</tr>
</tbody>
</table>

MATHEMATICS IIA

(See Faculty of Science Handbook).
MATHEMATICS IIB

A course of four lectures and two tutorial hours per week for three terms, consisting of the following topics for students in the Departments of

Chemical Engineering, Topics C, D, E, H
Civil Engineering, " C, D, E, H
Electrical Engineering, " B, C, D, E
Mechanical Engineering, " C, D, E, H

MATHEMATICS IIC

(See Faculty of Science Handbook).

ADDITIONAL MATHEMATICS

The Group II topics A and D comprise the subject GE391—

MATHEMATICS FOR ELECTRICAL ENGINEERS in the Faculty of Engineering. Electrical engineers in their third full-time year are required to study both these topics.

Certain selections from the above Group II topics also form part of the subject ELECTIVE MATHEMATICS in the Faculty of Engineering. Students may elect to take the following Group II topics in their third full-time year. Students in the Departments of

Chemical Engineering, Topics B, G,
Civil Engineering B, G,
Mechanical Engineering, A, B, G.

PURE MATHEMATICS III

(See Faculty of Science Handbook).

APPLIED MATHEMATICS III

(See Faculty of Science Handbook).

PHYSICS I

This course assumes a knowledge of Physics at least up to the 6th year High School core material. Physics taken as part of the School science course to a 2S standard or better will be of a considerable help in understanding the subject.

The course will comprise some 17 lectures on mechanics; 17 lectures on wave motion; 20 lectures on electromagnetism; 17 lectures on thermal physics; 5 lectures on waves and particles; and 6 lectures on the elementary physics of astronomy. There will also be 3 hours of laboratory and tutorial work per week.

A mid year 3 hour examination will be held on the first half of the work. A student passing will sit one further 3 hour paper at the end of the year, but a student failing at mid year will sit two 3 hour papers at the end of the year.

(A detailed syllabus for Physics I and Physics II will be issued early in the year.)

PHYSICS II

A course of three lectures and six laboratory hours per week, examined by two three-hour papers. The following topics will be covered:

Mechanics
Thermal Physics
Quantum Physics
Electromagnetism
Electromagnetic Field Theory
Physical Optics.

PHYSICS II (for students in the Department of Electrical Engineering)

This will be identical with Physics II for the B.Sc. course except that there will be three hours of laboratory work per week.

A pass in Physics II by an Electrical Engineering student will qualify as a prerequisite for Physics III.

PHYSICS III

A course of about 120 hours lectures and 240 hours laboratory work in the following; examined by three three-hour papers.

Electricity and Magnetism.
Electronics and Electricity in Gases.
Statistical Mechanics.
Nuclear Physics.
Quantum Mechanics.
Spectroscopy.
Plasma Physics.
Solid State.
Relativity and Electromagnetic Theory.
FACULTY OF ENGINEERING
PROVISIONAL TIMETABLE FOR 1969

ROOM LOCATION

TIGHE'S HILL CAMPUS
E — ENGINEERING BUILDING
CB — CLEGG BUILDING (CIRCULAR BLOCK)
M — MAIN UNIVERSITY BUILDING
T — TECHNICAL COLLEGE WORKSHOPS

SHORTLAND CAMPUS
A — ARTS/ADMINISTRATION BUILDING
B — MAIN LECTURE THEATRE
C — GEOLOGY BUILDING
D — PHYSICS BUILDING
H — SCIENCE LECTURE THEATRE
G — GROUND FLOOR
LG — LOWER GROUND FLOOR

NOTE:
° indicates first 14 weeks of the Academic year only
°° indicates last 14 weeks of the Academic year only
† indicates first 16 weeks of the Academic year only
‡‡ indicates last 12 weeks of the Academic year only

Chemistry, Geology and Physics Laboratory periods will be allocated by the Science Laboratory Allocations Committee and allocated times cannot be varied without their consent.

† Temporary accommodation may be arranged for classes routed to H-01 pending completion of the Science Building, as indicated by Notice Boards at Shortland.

COMBINED B.E./B. Sc. COURSE

Refer to the Engineering Timetable for Engineering Faculty subjects and to the Faculty of Science Handbook for Science Faculty subjects.

FULL-TIME COURSE (B.E.)

YEAR I

CHEMICAL ENGINEERING

CIVIL ENGINEERING

ELECTRICAL ENGINEERING

MECHANICAL AND INDUSTRIAL ENGINEERING

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours per week</th>
<th>Time of Class</th>
<th>Room No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics I</td>
<td>6</td>
<td>Tu. 12-1, W. 12-1</td>
<td>H-01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Th. 9-10, Lab. to be arranged</td>
<td>H-01</td>
</tr>
<tr>
<td>Chemistry I</td>
<td>6</td>
<td>Tu. 10-11, W. 10-11</td>
<td>H-01</td>
</tr>
<tr>
<td>(Chem. Eng. only)</td>
<td></td>
<td>Th. 2-5, Lab. Fr. 11-12</td>
<td>H-01</td>
</tr>
<tr>
<td>Chemistry IS</td>
<td>3</td>
<td>Tu. 10-11</td>
<td>DG08</td>
</tr>
<tr>
<td>(ALL except Chem. Eng.)</td>
<td></td>
<td>Th. 2-3, Th. 3-4</td>
<td>H-01</td>
</tr>
<tr>
<td>Mathematics I</td>
<td>6</td>
<td>Tu. 9-10, W. 9-10, F 9-11</td>
<td>H-01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Two tutorial periods each of one hour duration to be arranged</td>
<td></td>
</tr>
<tr>
<td>ME111</td>
<td>3</td>
<td>M. 9-12</td>
<td>E41</td>
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NOTE: It is desirable that Chemical Engineering students attend ME121
## YEAR II

### CHEMICAL ENGINEERING

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### MECHANICAL AND INDUSTRIAL ENGINEERING

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### MECHANICAL AND INDUSTRIAL ENGINEERING

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MECHANICAL AND INDUSTRIAL ENGINEERING

GROUP B ELECTIVES—AVAILABLE IN 1969

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<td>ME474</td>
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DESIGN III

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FOR GROUP A AND GROUP C ELECTIVES REFER TO THE APPROPRIATE FACULTY HANDBOOK
### STAGE 1

**CHEMICAL ENGINEERING**

**CIVIL ENGINEERING**

**ELECTRICAL ENGINEERING**

**MECHANICAL AND INDUSTRIAL ENGINEERING**

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<td>Tu. 7-9, Fr. 6-8 or Fr. 9-11</td>
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*One tutorial period of two hours duration as arranged*

### STAGE 2

**CHEMICAL ENGINEERING**

**CIVIL ENGINEERING**

**ELECTRICAL ENGINEERING**

**MECHANICAL AND INDUSTRIAL ENGINEERING**

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## Stage 3

### Chemical Engineering

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### CHEMICAL ENGINEERING

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### CIVIL ENGINEERING

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### ELECTRICAL ENGINEERING

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### MECHANICAL AND INDUSTRIAL ENGINEERING

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## STAGE 5

### CHEMICAL ENGINEERING

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### CIVIL ENGINEERING

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### ELECTRICAL ENGINEERING

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### MECHANICAL AND INDUSTRIAL ENGINEERING

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<td>*Tu. 6.30-8.30</td>
<td>E48</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Th. 2.30-4.30 or W. 5-7</td>
<td>E33 or E48</td>
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<tr>
<td>CE350J General Studies Seminar</td>
<td>2</td>
<td>Fr. 7-9</td>
<td>CB6</td>
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**CHEMICAL ENGINEERING**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours per week</th>
<th>Time of Class</th>
<th>Room No.</th>
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<tbody>
<tr>
<td>Chemical Eng. IIA/2</td>
<td>4</td>
<td>Tu. 9-12</td>
<td>S30</td>
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<tr>
<td>Chemical Eng. IIB/2</td>
<td>5½</td>
<td>M. 5:30-7:30, Tu. 12-1</td>
<td>S30</td>
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**CIVIL ENGINEERING**

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<th>Room No.</th>
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<tbody>
<tr>
<td>CE434 Water Resources Eng. I</td>
<td>1</td>
<td>M. 2-5</td>
<td>E48</td>
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<tr>
<td>CE435 Water Resources Eng. II</td>
<td>3</td>
<td>M. 2-5</td>
<td>E48</td>
</tr>
<tr>
<td>CE342 Surveying II</td>
<td>2½</td>
<td>M. 9-11.30</td>
<td>E47</td>
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<tr>
<td>CE425 Earth &amp; Rock Eng.</td>
<td>3</td>
<td>M. 11.30-1, 6-7.30</td>
<td>E48</td>
</tr>
<tr>
<td>CE452 Transportation Eng.</td>
<td>3</td>
<td>M. 11.30-1, 6-7.30</td>
<td>E48</td>
</tr>
<tr>
<td>CE416 Eng. Construction</td>
<td>3</td>
<td>Th. 6-9</td>
<td>E47</td>
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**ELECTRICAL ENGINEERING**

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<th>Room No.</th>
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<tbody>
<tr>
<td>EE401 Machinery</td>
<td>3</td>
<td>*Tu. 10.30-12.00, Th. 10.30-12.00</td>
<td>M238</td>
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<tr>
<td>EE403L Machinery Lab.</td>
<td>3</td>
<td>*Fri. 2.00-5.00</td>
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<tr>
<td>EE421 Electronics</td>
<td>3</td>
<td>*Tu. 9.00-10.30, Th. 9.00-10.30</td>
<td>M235</td>
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<tr>
<td>EE423L Electronics Lab.</td>
<td>3</td>
<td>*Tu. 1.00-4.00</td>
<td>M233</td>
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<tr>
<td>EE441 Modern Control</td>
<td>2½</td>
<td>*M. 3.00-4.15, Th. 3.00-4.15</td>
<td>M203</td>
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<tr>
<td>EE402 Advanced Topics in Heavy Current Electrical Eng.</td>
<td>3</td>
<td>**Tu. 10.30-12.00, Th. 10.30-12.00</td>
<td>M238</td>
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<tr>
<td>EE411 Power Systems</td>
<td>3</td>
<td>**M. 4.30-7.30</td>
<td>M238</td>
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<tr>
<td>EE422 Electronics</td>
<td>3</td>
<td>*Tu. 9.00-10.30, Th. 9.00-10.30</td>
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<td>EE424L Electronics Lab.</td>
<td>3</td>
<td>*Tu. 1.00-4.00</td>
<td>M233</td>
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<td>EE431 Introduction to Network Synthesis</td>
<td>3</td>
<td>**M. 10.30-12.00, Fri. 10.30-12.00</td>
<td>M203</td>
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**MECHANICAL AND INDUSTRIAL ENGINEERING**

<table>
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<th>Room No.</th>
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<tbody>
<tr>
<td>ME352 Turbomachinery</td>
<td>3</td>
<td>*Th. 3-6</td>
<td>E33</td>
</tr>
<tr>
<td>ME372 Heat Transfer</td>
<td>3</td>
<td>*Th. 4.30-6.00, Tu. 5-6.30</td>
<td>E33</td>
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<tr>
<td>ME301 Eng. Computations</td>
<td>2</td>
<td>W. 5-7</td>
<td>E48</td>
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<tr>
<td>ME333 Dynamics of Machines II</td>
<td>2</td>
<td>Th. 9-11</td>
<td>E33</td>
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<tr>
<td>ME361 Auto Control I</td>
<td>4</td>
<td>*Tu. 6.30-8.30, Th. 2.30-4.30 or W. 5-7</td>
<td>E48</td>
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<tr>
<td>ME313 Mechanical Eng. Design</td>
<td>3</td>
<td>Th. 11-12.30, Th. 1-2.30</td>
<td>E33</td>
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<tr>
<td>ME391 Technical Seminar</td>
<td>1½</td>
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### POSTGRADUATE COURSE

#### ELECTRICAL ENGINEERING

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<tr>
<th>Course Code</th>
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<tr>
<td>EE531</td>
<td>State Space Network Synthesis</td>
<td>1</td>
<td>Tu. 3.15-4.15</td>
<td>M203</td>
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<tr>
<td>EE541</td>
<td>Modern Control</td>
<td>2½</td>
<td>M. 3.00-4.15</td>
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<td>EE543</td>
<td>Optimal Control</td>
<td>2½</td>
<td>M. 4.15-5.30</td>
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<tr>
<td>EE551</td>
<td>Decision Theory</td>
<td>2½</td>
<td>Tu. 4.15-5.30</td>
<td>M203</td>
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<td>Fri. 4.15-5.30</td>
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<tr>
<td>EE542</td>
<td>Modern Control</td>
<td>2½</td>
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<td>EE571</td>
<td>Math. Found. of Systems Eng.</td>
<td>2½</td>
<td>M. 4.05-5.30</td>
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<tr>
<td>EE561</td>
<td>Linear Systems</td>
<td>2½</td>
<td>Tu. 4.15-5.30</td>
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<td>Fri. 4.15-5.30</td>
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**NOTE:**
- * indicates first 14 weeks of the Academic year only
- ** indicates last 14 weeks of the Academic year only
- † indicates first 16 weeks of the Academic year only
- †† indicates last 12 weeks of the Academic year only

### POSTGRADUATE DIPLOMA IN INDUSTRIAL ENGINEERING

#### STAGE 1

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>ME581D</td>
<td>Methods Eng.</td>
<td>2</td>
<td>Tu. 5.30-7.30</td>
<td>E43</td>
</tr>
<tr>
<td>ME582D</td>
<td>Industrial Computations</td>
<td>1½</td>
<td>Tu. 7.30-9.00</td>
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#### STAGE 2

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<tbody>
<tr>
<td>ME682D</td>
<td>Case Studies in Industrial Management</td>
<td>1½</td>
<td>Tu. 8.90-3.00</td>
<td>E44</td>
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<tr>
<td>ME683D</td>
<td>Eng. Economics</td>
<td>2½</td>
<td>Tu. 5.30-8.00</td>
<td>E44</td>
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<td>ME684D</td>
<td>Operational Research</td>
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<td>M. 5-6</td>
<td>E43</td>
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**MASTER OF ENGINEERING SCIENCE**

*(Timetable to be arranged)*