FACULTY OF APPLIED SCIENCE

HANDBOOK
1967

THE UNIVERSITY OF NEWCASTLE
NEW SOUTH WALES
Postal Address:

THE UNIVERSITY OF NEWCASTLE, NEW SOUTH WALES

Telephone Numbers:

SHORTLAND CAMPUS

Administration
Faculties of:
- Arts
- Economics and Commerce
- Science (Departments of Geology, Mathematics and Physics)
Library

TIGHE'S HILL CAMPUS

Faculties of:
- Applied Science
- Architecture
- Engineering
- Science (Department of Chemistry)
Library

68 0401

61 0461

Consult the Calendar for:

Academic Dress
University of Newcastle Act. 1964
By-laws
The Council
The Senate
Officers and Former Officers of the University
Prizes and Scholarships
University Medallists
Lists of Graduates and Diplomates
Publications and Research Interests
## PRINCIPAL DATES — 1967

<table>
<thead>
<tr>
<th>Term</th>
<th>Lectures</th>
<th>Vacation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Term</strong></td>
<td>February 27th to May 13th.</td>
<td>May 15th to June 3rd.</td>
</tr>
<tr>
<td><strong>Second Term</strong></td>
<td>June 5th to August 12th.</td>
<td>August 14th to September 2nd.</td>
</tr>
<tr>
<td><strong>Third Term</strong></td>
<td>September 4th to November 3rd.</td>
<td></td>
</tr>
<tr>
<td><strong>Annual Examination</strong></td>
<td>November 4th to November 25th.</td>
<td></td>
</tr>
<tr>
<td><strong>Vacation</strong></td>
<td>Commences November 27th.</td>
<td></td>
</tr>
</tbody>
</table>

### JANUARY
- **Deferred Examinations:** All courses Monday, 23rd to Saturday, 4th February.
- Monday, 30th: Australia Day — Public Holiday.

### FEBRUARY
- Friday, 10th: Last day for lodgement of all enrolment applications.
- Wednesday, 22nd: Orientation commences.
- Monday, 27th: First Term Lectures begin.

### MARCH
- Friday, 24th to Tuesday, 28th: Easter Vacation.

### APRIL
- Tuesday, 25th: Anzac Day — Public Holiday.

### MAY
- Monday, 13th to Saturday, June 3rd: Vacation (3 weeks).

### JUNE
- Monday, 5th: Second Term Lectures begin.
- Monday, 12th: Public Holiday.
- Thursday, 29th: Last day for acceptance of applications for examinations — 24 week courses.

### AUGUST
- Friday, 11th: Last day for acceptance of applications for examinations — 30 week courses.
- Monday, 14th to Saturday, September 2nd: Vacation (3 weeks).

### SEPTEMBER
- Monday, 4th: Third Term Lectures begin.

### OCTOBER
- Monday, 2nd: Public Holiday.

### NOVEMBER
- Friday, 3rd: Third Term Lectures end.
- Saturday, 4th: Annual Examinations begin — 30 week courses.
- Saturday, 25th: Annual Examinations end.

### 1968

### JANUARY
- Monday, 28th to Saturday, 4th: Deferred examinations — all courses.

### FEBRUARY
- To be advised: Closing date for lodgement of all enrolment applications.
- Monday, 26th: First Term Lectures begin.
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May I introduce students to the Faculty of Applied Science and this Handbook by saying briefly what we are, what we offer to students and what students can obtain for themselves from the University.

Applied Science, like the older Professional branches of Engineering, is concerned with the application of scientific knowledge and method "for the benefit of mankind" - to paraphrase an old definition of Engineering.

This is a challenging task in which many of us find the most satisfying professions, involving us in both the clear precise world of the scientist and the lively complexity of industrial production. The disciplines offer a wide range of careers from scientific research and engineering design, to operational management, supervision of construction or technical sales. To achieve professional standing requires a great deal of work - the basic fundamentals of chemistry and physics must be mastered, mathematics must be practised until it becomes a useful tool and then the specific science of the particular applied field is studied (in Newcastle Chemical Engineering, Industrial Chemistry or Metallurgy). Finally we commence at the University the continuing task of learning the art of applying these facts and methods to the intricate, and often perforce empirical, practice of industrial construction and production. This art requires knowledge of men as well as of things. Your required industrial experience may well be of most value in getting to know the men you will later direct.

The University offers you the opportunity to pursue these disciplines. The bases are compulsory courses of lectures to delineate the fields of study and explain new concepts, and laboratory courses in which you may learn the techniques of investigation. Equally important are the library and your privilege of individual approach to any of the academic staff who will gladly make time to assist any student with real problems.

You may possibly secure a degree by mere attendance at lectures and at laboratory work and by strenuous study. To achieve a professional outlook you will need a much wider view. The University offers you not only the formal opportunities listed in this Handbook, but also a range of activities in all aspects of living - specialist lectures, sport, music, social life, politics and the fundamental study of religious faith. Whether you use the opportunities offered is entirely up to you.

Further opportunities open to the field of advanced study. Certainly there is a demand for good general practitioners; graduates with a Bachelor's Degree have sufficient basic training to go on in the practice of their profession. The heights to which they rise will depend on personality, ability and application. There is, however, also a pressing need for people with particular intellectual abilities to go on and train to their limit for work in research establishments or Universities. The normal method of training for such work is by a number of years of post-graduate study and research, culminating in a Ph.D. For financial support during such study there are scholarships and demonstrator positions available both here and overseas. May I advise any student who secures good results early in his course to "look wide" and start enquiring and planning for post-graduate training.

The full formal course requirements for the departments of the Faculty - Chemical Engineering, Industrial Chemistry and Metallurgy - are listed in this Handbook. It will be noted that the first year subjects and some of the second year subjects are taken in the Faculties of Science and Engineering and further details are available in the appropriate Faculty Handbooks. Any student with any questions regarding subjects to be taken should, in the first place, consult the Student Advisers in this Faculty, whose names are shown on the staff list. Students with any difficulties of any sort should not hesitate to approach the Student Counsellors or the Chaplains (at Shortland).
OFFICERS OF THE UNIVERSITY

VISITOR
His Excellency The Governor

CHANCELLOR
The Honourable Sir ALISTER MAXWELL McMULLIN, K.C.M.G.,
President of the Senate

DEPUTY CHANCELLOR
GEORGE ALFRED EDWARDS, B.A., B.Sc.(Oxon.),
A.M.I.Chem.E., A.R.I.C.

VICE-CHANCELLOR AND PRINCIPAL
Professor JAMES JOHNSTON AUCHMUTY, M.A., Ph.D.(Dub.),

VICE-PRINCIPAL
Professor BRINLEY NEWTON-JOHN, M.A.(Cantab.)

FACULTY OF APPLIED SCIENCE

Dean:
Professor I. McC. Stewart.

Sub-Dean:
Mr. C. G. H. Cooke.

Chemical Engineering and Industrial Chemistry

Professor:
I. McC. Stewart, M.E.(Q'ld.), S.M.(M.I.T.), F.Inst.F.,
M.I.E.(Aust.), Professor of Chemical Engineering
(Head of Department)

Senior Lecturers:
W. G. Kirchner, M.Sc., Ph.D.(N.S.W.), A.S.T.C.,
L. A. Summers, B.Sc., Ph.D.(Glas.), A.R.A.C.I.

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.)

Metallurgy

Professor:
E. O. Hall, M.Sc.(N.Z.), Ph.D.(Cantab.), F.Inst.P.,
M.Aus.I.M.M., F.I.M.,(Lond.), F.A.I.P.
Professor of Metallurgy (Head of Department)

Senior Lecturers:
C. G. H. Cooke, M.Sc.(N.S.W.), A.S.T.C., A.I.M.(Lond.)
M.Aus.I.M.M.
R. D. Holliday, B.A., Ph.D.(Cantab.)
J. E. McLennan, M.Sc.(N.S.W.), A.S.T.C., A.I.M.(Lond.)

Lecturers:
G. B. Johnston, M.Sc.(N.S.W.), A.S.T.C., A.I.M.(Lond.)
N. A. Molloy, B.E.(Q'ld.), A.Aus.I.M.M., A.I.M.(Lond.)

Professional Officers:
J. A. Grahame, A.S.T.C.
D. D. Todd, M.Sc.(N.S.W.), A.S.T.C., A.R.A.C.I.

STUDENT ADVISERS
Dr. W. G. Kirchner (Chemical Engineering)
Mr. C. G. H. Cooke (Metallurgy)
ADMINISTRATIVE STAFF

Vice-Chancellor and Principal

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

Senior Student Counsellor
S. G. Alley, B.A.(Syd.), A.S.T.C., M.A.Ps.S.

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

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.

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

Graduate Assistants
Joan Bale, B.A.(N.S.W.)
Nell Emuel, B.A.(N.S.W.)
H. Floyer, B.Ec.(Syd.)
Glennie Jones, B.A.(N.S.W.)

University Planner
Associate Professor E. C. Parker, A.S.T.C., F.R.A.I.A.

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

THE 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
Marianne E. Flood, B.A.(Syd.), Dip.Lib.(N.S.W.)
Two appointments pending

Library Assistants
B. Mitcheson, A.L.A.A.
Winifred Murdoch, B.Sc.(N.E.)
L. Faidigo
P. Davies
M. Swerus
Two appointments pending

Librarian's Secretary
Marcia C. Meyjes

Typists
Joyce Kiefer
Colleen Flynn

Attendants
P. Moroney
J. Vanson
UNIVERSITY OF NEWCASTLE

The University of Newcastle has existed in its own right for two years, yet it is not the youngest of the Australian Universities, for there are three universities junior to it. This expansion of higher education in Australia is due to the somewhat belated recognition that if this country is to maintain its place in the modern world, let alone progress, it will need many more scientists, teachers, architects, engineers, administrators, economists, linguists, and specialists and technologists of all kinds. To supply these, and above all to produce a thoughtful educated society, is a function of the Universities.

The University began in 1952, modestly, on the site of the Newcastle Technical College, as a College of the New South Wales University of Technology. Of the first enrolment of 370, only five students were starting degree courses—the others were seeking a diploma or were converting their diplomas into degrees. The courses offered were those given in the University of Technology, but public pressure soon brought about the introduction of Arts courses, in which 95 students enrolled in 1954. Since the University of Technology had no Faculty of Arts, the supervision of these courses was entrusted to the University of New England and a happy relationship was established which lasted until 1959, by which time the University of Technology had become the University of New South Wales.

Student numbers have grown steadily from the original band of 370 to 1726 in 1965, the year in which autonomy was granted and 2,023 in 1966. Academic staffing has kept pace numerically with this expansion, but it was only very recently that any significant increase in the number of professors took place. Up to 1961, we had one. By 1962 we had two. At the beginning of this year there will be twenty two.

Graduates from Newcastle who took their degrees from the Universities of New South Wales and New England now number about 900. In 1966 the University of Newcastle conferred degrees for the first time on its own authority when 138 candidates were admitted to degrees.

Most students will spend their University life on the new campus at Shortland; some students will not be able to complete their degrees there, because the University had insufficient money to move all the Faculties at the same time. But for some years it is expected that new buildings will be erected on the Shortland campus for Applied Science, Engineering, Chemistry, Architecture, the Library and the Great Hall.

It is confidently expected that this physical growth will be accompanied by an increasing emphasis on honours and post-graduate studies.

THE ORGANISATION OF THE UNIVERSITY

The governing body of the University is the Council, which has the responsibility for making all major decisions on policy.

The Council consists of 23 members including representatives of the undergraduates, the graduates, the non-academic and the academic staff of the University and Convocation. Its Chairman is the Chancellor of the University, Senator The Honourable Sir Alister McMullin, K.C.M.G.

The Chief Executive Officer of the Council is the Vice-Chancellor and Principal, Professor J. J. Auchmuty, M.A., Ph.D., M.R.I.A., F.R.Hist.S., F.I.A.L., who sees to the implementation of the Council decisions and has the general oversight of the administration of the University. In this work he is assisted by Professor B. Newton-John, M.A., the Vice-Principal.

The Chief Academic Body in the University is the Senate, which is composed of the professors and one non-professorial representative from each faculty. It meets under the Chairmanship of the Vice-Chancellor and presents to Council the results of its deliberations on all matters affecting the academic life of the University—matriculation requirements, course structures, the appointment of examiners, the conditions for the award of post-graduate degrees and diplomas and similar matters. The Senate has inter alia a Personnel and Finance Committee which is an advisory committee to the Vice-Chancellor, and an Admissions Committee, which deals with all applications for entry which do not satisfy formal matriculation requirements.

The other major academic bodies are the Faculty Boards of which we have six (Applied Science, Architecture, Arts, Economics and Commerce, Engineering, Science). Each Faculty Board consists of all the tenured academic staff of the Departments composing the Faculty together with representatives of other Faculties and is chaired by the Dean of the Faculty, a professor elected by the Faculty Members. It is the Faculty Board that is responsible for the teaching, research activities and examinations within the Faculty. Once courses have been approved by the Board, it is the business of the individual Departments to teach and examine them.

Most Departments invite an External Examiner, usually a Professor from another University, to co-operate in the assessment of examination results, particularly those of honour candidates, thus ensuring that this University's standards are known in the other Australian Universities.

THE FACULTIES

Courses are offered in six Faculties, each of which is composed of one or more departments.

FACULTY OF APPLIED SCIENCE

Dean: Professor I. McC. Stewart

Chemical Engineering and Industrial Chemistry

Metallurgy

FACULTY OF ARCHITECTURE

Dean: Professor F. Romberg

Professor F. Romberg, Dipl.Arch.(E.T.H. Zurich), F.R.A.I.A.
FACULTY OF ARTS
Dean: Professor J. A. Keats

Classics
Professor R. G. Tanner, M.A.(Melb. and Cantab.)

Education
Head of Department G. H. Duncan, M.A.(Syd.), B.Ed.(Melb.), M.A.C.E.

English
Professor K. G. W. Cross, M.A., Ph.D.(Dub.)

French
Professor K. H. Hartley, M.A.(Syd.), D. de l'U(Paris)

Geography
Professor A. D. Tweedie, M.A.(N.Z.)

German
Professor D. G. Mowatt, B.A., Ph.D.(Lond.)

History
Professor G. A. Cranfield, B.A., Ph.D.(Cantab.)

Philosophy
Professor A. M. Ritchie, M.A.(Syd.), Ph.D.(Lond.)

Psychology

FACULTY OF ECONOMICS AND COMMERCE
Dean: Professor W. P. Hogan

Commerce
Professor M. O. Jager, B.Com.(Melb.), A.A.S.A., A.C.A.A.

Economics
Professor W. P. Hogan, M.A.(N.Z.), Ph.D. (A.N.U.)

FACULTY OF ENGINEERING
Dean: Professor H. R. Vallentine

Civil Engineering
Professor H. R. Vallentine, B.E.(Syd.), M.Sc.(Iowa), A.S.T.C., A.M.I.E.(Aust.), M.ASCE.

Electrical Engineering
Professor B. D. O. Anderson, B.Sc., B.E.(Syd.), Ph.D.(Stanford)

Mechanical Engineering
Professor Appointment pending.

FACULTY OF SCIENCE
Dean: Professor C. D. Ellyett

Chemistry
Professor J. A. Allen, M.Sc.(Q'ld.), Ph.D.(Bristol), F.R.A.C.I.

Geology
Professor Beryl Nashar, B.Sc., Dip.Ed.(Syd.), Ph.D.(Tas.)

Mathematics
Professor I. D. Macdonald, M.A.(Aberd.), Ph.D.(Manc.)

Physics
REQUIREMENTS FOR ADMISSION

Candidates may qualify for entry to undergraduate courses by complying with the matriculation requirements set out hereunder at the New South Wales Leaving Certificate Examination, or the University of Sydney Matriculation Examination.

The New South Wales Leaving Certificate Examination is usually held in November and entries must be lodged with the Department of Education during July.

The Matriculation Examination is held in February and applications must be lodged at the University of Sydney during the first ten days of January except by candidates who have taken the Leaving Certificate Examination in the previous November. The closing date for such candidates will be announced when the Leaving Certificate results are published.

MATRICULATION REQUIREMENTS

(To operate from 1st January, 1961, to 31st March, 1967.)

1. (i) A candidate for any first degree of the University shall satisfy the conditions for admission set out in section 2 (ii) below before entering upon any course for such degree.

Compliance with these conditions does not in itself entitle a student to enter upon a course.

(ii) A person who has satisfied the conditions for admission 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. (i) For the purpose of matriculation, approved subjects are grouped as follows:—

A. English.

B. Latin, Greek, French, German, Italian, Hebrew, Chinese, Japanese, Russian, Dutch, Geography, Ancient History, Modern History, Economics;

C. Mathematics I, Mathematics II, Mathematics III.


E. Accountancy, Art, Descriptive Geometry and Drawing, Music, Theory, and Practice of Music.

(ii) The conditions for admission to any undergraduate course leading to a degree are that a candidate must have passed the New South Wales Leaving Certificate Examination conducted by the Department of Education or the University of Sydney Matriculation Examination, in a least five approved subjects at the one examination;

Provided that:—

(I) either (a) the five subjects include English and at least one subject from each of the Groups B and C but include not more than one subject from Group E, except that candidates may qualify for admission to the Faculty of Arts only, by passing in one subject from group D in lieu of the subject from Group C, or (b) the five subjects include English, and at least one subject from either Group B or Group C, but include not more than one subject from Group E, and provided further that the five passes include either one first-class Honours and two A's or two Honours of which one is first-class; and

(ii) (a) neither Physics nor Chemistry is offered with the combined subject Physics and Chemistry;

(b) neither Botany nor Zoology is offered with Biology;

(c) neither Botany nor Zoology nor Biology is offered with Physiology;

(d) neither Mathematics I nor Mathematics II nor Mathematics III is offered with General Mathematics;

(e) neither Mathematics I nor Mathematics II is offered with Mathematics III; and

(f) Mathematics I or Mathematics II may be counted as an approved subject only if the candidate presented himself for examination in both Mathematics I and Mathematics II.

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 shall not have the privileges of a matriculated student and shall not be eligible to proceed to a degree.
### FULL-TIME COURSES

<table>
<thead>
<tr>
<th>FACULTY</th>
<th>COURSE</th>
<th>DEGREE</th>
<th>DURATION — YEARS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pass</td>
</tr>
<tr>
<td>Applied Science</td>
<td>Chemical Engineering</td>
<td>B.E.</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Industrial Chemistry</td>
<td>B.Sc.</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Metallurgy</td>
<td>B.Sc.</td>
<td>4</td>
</tr>
<tr>
<td>Architecture</td>
<td>Architecture</td>
<td>B.Arch.</td>
<td>5</td>
</tr>
<tr>
<td>Arts</td>
<td>Arts</td>
<td>B.A.</td>
<td>3</td>
</tr>
<tr>
<td>Economics and Commerce</td>
<td>Commerce</td>
<td>B.Com.</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Economics</td>
<td>B.Com.</td>
<td>3</td>
</tr>
<tr>
<td>Engineering</td>
<td>Civil Engineering</td>
<td>B.E.</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Civil Engineering</td>
<td>B.E./B.Sc.</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Electrical Engineering</td>
<td>B.E.</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Electrical Engineering</td>
<td>B.E./B.Sc.</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Mechanical Engineering</td>
<td>B.E.</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Mechanical Engineering</td>
<td>B.E./B.Sc.</td>
<td>5</td>
</tr>
<tr>
<td>Science</td>
<td>Science</td>
<td>B.Sc.</td>
<td>3</td>
</tr>
</tbody>
</table>

All students must enrol initially in the Full-Time course and on completion of the first year may apply to transfer to the Part-Time Course.

### PART-TIME COURSES

<table>
<thead>
<tr>
<th>FACULTY</th>
<th>COURSE</th>
<th>DEGREE</th>
<th>DURATION — YEARS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pass</td>
</tr>
<tr>
<td>Applied Science</td>
<td>Chemical Engineering</td>
<td>B.Sc. (Tech.)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Industrial Chemistry</td>
<td>B.Sc. (Tech.)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Metallurgy</td>
<td>B.Sc. (Tech.)</td>
<td>6</td>
</tr>
<tr>
<td>Architecture</td>
<td>Architecture</td>
<td>B.Arch.</td>
<td>5</td>
</tr>
<tr>
<td>Arts</td>
<td>Arts</td>
<td>B.A.</td>
<td>6–6+</td>
</tr>
<tr>
<td>Economics and Commerce</td>
<td>Commerce</td>
<td>B.Com.</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Economics</td>
<td>B.Com.</td>
<td>5</td>
</tr>
<tr>
<td>Engineering</td>
<td>Civil Engineering</td>
<td>B.Sc. (Tech.)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Electrical Engineering</td>
<td>B.Sc. (Tech.)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Mechanical Engineering</td>
<td>B.Sc. (Tech.)</td>
<td>6</td>
</tr>
<tr>
<td>Science</td>
<td>Science</td>
<td>B.Sc.</td>
<td>5–7+</td>
</tr>
</tbody>
</table>

* All students must enrol initially in the Full-Time course and on completion of the first year may apply to transfer to the Part-Time Course.

+ Progression is by subject; duration of course is dependent on choice of subjects.
POST GRADUATE AWARDS

It is well to consider at the outset of your University career the desirability of undertaking an honours course.

A good honours degree, valuable in itself and a most useful qualification in any professional field, is essential to gain a post-graduate award which will enable the recipient to read for a higher degree.

Particulars of post-graduate awards available at the University are published in the Calendar.

PROCEDURES

HOW TO ENROL

All documents relating to enrolment are obtainable from the Student Records Office, Room No. 158, Building "A", Shortland site.

1. (i) PERSONS ENROLLING IN AN UNDERGRADUATE COURSE AT THE UNIVERSITY OF NEWCASTLE FOR THE FIRST TIME.

Two forms, as under, are required to be completed by each intending student and lodged with the Student Records Office before the 10th February, 1967.

(a) Application for Admission.

(b) Enrolment Application.

(ii) PERSONS RE-ENROLLING IN UNDERGRADUATE COURSES.

Undergraduates re-enrolling will be required to complete an Enrolment Application and lodge it with the Student Records Office before the 10th February, 1967. A student in this category whose Enrolment Application is not received by the Student Records Office before 5.00 p.m. on Friday, 10th February, 1967, will become liable to pay a late fee.

(iii) CANDIDATES FOR POST-GRADUATE DIPLOMA COURSES

(a) Candidates for the Diploma in Education.

These people should complete the Post-Graduate Diploma Application Form and lodge it with The Principal, Newcastle Teachers' College, before the 10th February, 1967.

(b) Candidates for the Post-Graduate Diploma in Industrial Engineering.

These people should complete the Post-Graduate Diploma Application Form and lodge it with the Student Records Office before the 10th February, 1967.

(iv) CANDIDATES FOR THE DEGREE OF MASTER OR DOCTOR OF PHILOSOPHY.

Candidates re-enrolling.

These persons will be required to complete the Higher Degree Enrolment Form and lodge it with the Student Records Office before the 10th February, 1967.

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 10th February, 1967.

2. NOTIFICATION OF ACCEPTANCE.

(i) All Undergraduates.

Each student will be required to call at Room No. 150, Building "A", Shortland site, to collect his/her approved Enrolment Application. The approved Enrolment Applications will be available for collection on and after Wednesday, 22nd February, 1967. Wednesday, 22nd February, 1967, is the Opening Day of Orientation Week.

(ii) All Post-Graduate Candidates.

The approved Enrolment Application will be posted to the address nominated by the candidate on his Enrolment Form.

3. NOTIFICATION OF AMENDMENT, CALL FOR INTERVIEW OR REJECTION.

In cases where an enrolment may be authorised subject to certain amendments, the student concerned may be advised by post or may be requested to call for an interview. Where it is considered desirable or where the student has so requested, an appointment will be made for the student to discuss his enrolment application. The student whose enrolment cannot be accepted will be notified in writing.

4. STUDENTS NEEDING ACADEMIC ADVICE BEFORE ENROLLING.

The student who is uncertain which subjects he should read, after referring to the information available in the appropriate Faculty Handbook, should consult the Dean of the Faculty during the period 6th—10th February, 1967. An appointment may be made by phoning the Dean's secretary. The Deans of various faculties are listed on page 17.

5. LATE ENROLMENTS.

(i) Students who are unable to lodge their Application for Enrolment by the prescribed date, shall make written application to the Vice-Principal for an extension of time. This application must be received by the Vice-Principal on or before 10th February, 1967, otherwise the University reserves the right not to accept the student's application.

(ii) No enrolments will be accepted after 31st March of each academic year without the approval of the Vice-Principal 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 Application with the Student Records Office after the publication of the examination results and before Thursday, 23rd February, 1967.

(iv) Show Cause Students.

A student given permission to re-enrol will be required to lodge, with the Student Records Office, an Enrolment Application within seven (7) calendar days of the despatch to him of a letter advising permission to re-enrol.

(v) Sydney University Matriculation Examination.

Students relying on this examination for matriculation will be required to lodge an Application for Admission and an Enrolment
Application with the Student Records Office within seven (7) calendar days of the publication of results.

6. 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. These students should lodge with this University, before 1st December, 1966, an Application for Admission and an Enrolment Application, supported by a statement as above and documentary evidence of their educational qualifications.

7. PRECAUTIONS WHEN Completing ENROLMENT DOCUMENTS.

(i) Students should answer all questions unless otherwise instructed.
(ii) The description of subjects should correspond exactly with the information shown in the Faculty Handbooks.
(iii) The student should ensure that he has inserted his standing in the course in accordance with the instructions set out in the Faculty Handbook, e.g. Year II, Stage 4.
(iv) The student should check the timetable for the courses selected to ensure that there are no clashes.
(v) It is important that the student check his proposed programme to ensure that he has:
   (a) completed pre-requisite subjects,
   (b) satisfied the sequence requirements.
(vi) Amendments to Enrolments.

All amendments to enrolments must be completed by lodging, before 31st March, 1967, with the Dean of the Faculty, a Variation Form indicating the change required.

Changes are not automatically approved; the reasons therefore must be given.

8. AMENDMENTS.

The following matters are regarded as amendments to course programmes and require documentation.
(i) To change from one course to another.
(ii) To substitute one subject for another.
(iii) A change in the method of completion of course, e.g. full-time to part-time.
(iv) Permission to include five first year subjects in Arts Degree course.
(v) Approval to withdraw from a subject or course.
(vi) Leave of absence from course.
(vii) Any other course change.

9. 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 Application, the subjects he will read for the year. Particular attention should be made to the inclusion of the Honours segments where these are taken.

10. 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 (unless withdrawal has been approved) is regarded as not passing the examinations.

After the sixth Monday of Second Term a student will not be allowed to withdraw without penalty unless, in the opinion of the Dean of the Faculty, there is good reason why he should be permitted to do so.

**PAYMENT OF FEES**

Completion of Enrolment.

Enrolment is completed by the payment of fees. Fees should be paid before or during the first two weeks of First Term. After that, a late fee is incurred (see below). Fees will not be accepted after the 31st March except with the written approval of the Secretary, which will be given only in exceptional circumstances.

IT IS RECOMMENDED that wherever possible payment of fees be made through the post, by cheque, money order, or postal note. (Money orders should be made payable at Newcastle University Post Office). Payment in person may be made to the Cashier who is located opposite the Student Records Office in Building "A", Shortland Site. The cashier's ordinary hours of opening are as follows:—

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 office will be open for additional hours, which will be published on the notice boards.

Payment of Fees by Term.

A student may pay course fees by the term, in which case payment must be made within the first two weeks of each term.

Scholarship Holders and Sponsored Students.

The student whose fees are met from a scholarship or some other form of financial assistance is required to submit an authorised enrolment application together with a voucher or other documentary evidence from the sponsor accepting liability for his fees, together with payment of fees not included in such authority, to the Cashier by the due date. Where such documentary evidence is not available, the student is expected to make payment by the due date and to apply for a refund of fees paid when he is in a position to lodge such document.

Extension of Time.

The student who is unable to pay fees by the prescribed date may apply in writing to the Secretary for an extension of time. This application must state fully the reasons why fees cannot be paid and must be lodged before the date on which the late fee becomes payable.

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 third week of Third Term.

In very special cases the Vice-Principal may grant exemption from the disqualification referred to in the two preceding paragraphs upon receipt of a written statement setting out all relevant circumstances.
DATES FOR PAYMENT OF FEES IN 1967.

First Term.
Fees due: Monday, 27th February to Friday, 10th March.
Late fee of $6 applicable: Monday, 13th March to Friday, 31st March.
Late fee of $10 applicable, if permission given by the Secretary for the enrolment to be accepted after 31st March.

Second Term.
Fees due: Monday, 5th June to Friday, 16th June.
Late fee of $6 applicable: Monday, 19th June to Friday, 30th June.
Late fee of $10 applicable, if permission given by the Secretary for fees to be accepted after 1st July.

Third Term.
Fees due: Monday, 4th September to Friday, 15th September.
Late fee of $6 applicable: Monday, 18th September to Friday, 22nd September.
Late fee of $10 applicable, if permission given by the Secretary for fees to be accepted after September 22nd.

EXTENSION OF TIME TO PAY FEES
A student whose written application for an extension of time in which to pay fees has been approved by the Secretary (see above) may be granted a maximum period of ONE MONTH after the closing date for payment of fees. The closing dates are:
First Term: Friday, 10th March.
Second Term: Friday, 16th June.
Third Term: Friday, 15th September.

UNDERGRADUATE COURSE FEES
The fees quoted below are current at the time of publication and may be varied by the Council without notice.

It will be noted that the fee schedule applicable to students who enrolled for the first time in 1966 and in later years differs from that obtaining beforehand.

Full-time registered students in the Faculties of Arts, Economics and Commerce .... $276 per annum
Full-time registered students in all other Faculties $330 per annum
Part-time registered students in all Faculties $165 per annum

Notes (a) A full-time student is a student who enrolls in more than half the subjects of a normal first year course and such a student remains classified as a full-time student except on the written approval of the Dean of his Faculty that he be reclassified as a part-time student — this re-classification would be exceptional.

(b) A part-time student is either one who enrolls in half or less than half the subjects of a normal first year course or one who enrolls in a part-time course. In subsequent years the enrolment as a part-time student requires the approval of the Dean of the Faculty.

‘Non-degree’ Students. (Fee under review).
‘Non-degree’ students, are those permitted to read one or more subjects in a first degree course without counting them as qualifying for a degree. Such students, whether enrolling for the first time or re-enrolling are required to pay a course fee of $90 p.a. for each subject.

The General Services Fee.
From 1966 onwards all registered students will pay a combined General Services Fee of $42 p.a. payable in First Term with the Course Fees. In addition students joining the University Union for the first time will be required to pay an entrance fee of $12.

HIGHER DEGREE FEES
(Under review)

Master’s Degree.
Course and Supervision Fee (Full-Time) .... $96 per annum
Course and Supervision Fee (Part-Time) .... $48 per annum
General Services Fee, which includes an annual contribution of $10 to the University Library .... $36 per annum

Doctor of Philosophy.
Qualifying Examination Fee (if applicable) .... $10 per annum
Course and Supervision Fee .... $96 per annum
General Services Fee, which includes an annual contribution of $10 to the University Library .... $36 per annum

Note: The above fees will apply to candidates who registered for the first time in 1966 or who register in later years. Fees for candidates who were enrolled in 1965 will be as set out on page 38 of the 1965 Handbook.

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 .... $6
4. Review of Examination result, per subject .... $6

Adjustment of Fees.
Should an application to withdraw from a course or subject be approved, an adjustment of fees may be made, relative to the date on which the application was submitted. Up to that date, fees accrue. 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, no refund will be made.

IN RESPECT OF APPLICATIONS TO WITHDRAW FROM A COURSE OR SUBJECT WHICH ARE RECEIVED IN THE EARLY PART OF FIRST TERM, THE UNIVERSITY RESERVES THE RIGHT NOT TO MAKE ANY REFUND OF MONEYS UNTIL AFTER THE END OF THE SIXTH WEEK OF TERM.

EXAMINATIONS

General.
Examinations and other exercises may be held in any subject and at any time at the discretion of the lecturer or other competent authority, and the results of such examinations may be incorporated with those of the annual examinations in such subjects.

A student desiring to sit for an annual examination must lodge an application with the Secretary on the appropriate form by the prescribed date.
The annual examinations take place in November-December for students in 30 week courses, and in September for students in 24
Special Examinations.

Students should also note that an examiner may call them in after completion of the written papers in the annual examination 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 the one given on the Application for Admission to Examinations. The prescribed dates by which applications to sit for examinations are to be lodged are:

(a) Annual examinations for 24-week courses—30th June.
(b) Annual examinations for 30-week courses—11th August.
(c) Annual examinations for other courses—14 weeks prior to date of first examination.

No student is eligible to attend the annual examination in any subject if any portion of fees due by the student is outstanding by the end of the third week of Third Term.

The Cashier is authorised to receive application forms during the three weeks immediately following the prescribed closing dates if they are accompanied by a late fee of $4. Applications submitted more than three weeks after the closing date will not be accepted except in very exceptional circumstances and with the approval of the Secretary. Where an application is not accepted the student concerned is not eligible to sit for the examination.

Special Examinations.

Special Examinations may be awarded under certain conditions. The relevant sections of the University's By-laws are set out below.

By-law 5.9.3

5. When a candidate is prevented by illness or by other serious cause from presenting himself for the annual examination the appropriate Faculty Board may order a special examination for the 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 seriously hampered by illness or other serious cause, 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 to help resolve a doubt as to whether a student has reached the required standard in a subject.

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

(a) Candidates are required to obey any instruction given by a proc­
tor 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 commence­
ment.
(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 of the beginning of the examination.
(e) No candidate shall be permitted to leave the examination room
before the expiry of thirty minutes from the time the examination
begins.
(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 endeav­
our 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 examinations.
(i) A candidate who commits any infringement of the rules govern­
ing examinations is liable to disqualification at the particular ex­
amination, and if detected at the time, to immediate expulsion
from the examination room, and is liable to such further penalty
as may be determined.

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.

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 examination in that subject.

Ownership of Students' Work.
Unless other arrangements have been agreed on 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.

Students desiring certification of documents for obtaining travel and other concessions should present such documents to the Student Records Office.

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 for official communications fail to reach a student who has not notified Student Records Office of a change of address.

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 manner. 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.

PROGRESS IN THE COURSE AND EXAMINATION FAILURE
The University is vitally concerned to see that all students take full advantage of the opportunities that they receive as persons privileged to attend a University. However, 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, certain By-laws have been enacted to give guidance to and deal with these students. They are:

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 any 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 subsection (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.

By-law 5.4.3—Remedial Work.
1. The Head of a Department in any Faculty may determine that a student shall complete remedial work in any subject in which he has failed more than once. It must be noted that this By-law is not intended to provide the student with an additional attempt at passing the subject at the next examination.

By-law 5.4.4—Withdrawal from Course Regarded as Failure.
Students withdrawing from any course of study are regarded as having failed the course.

See also 'Withdrawal from Course Regarded as Failure'—Page 26.
7. (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 a reasonable probability that he will make satisfactory progress in his studies it may authorize 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.

COUNSELLING SERVICE

The Counselling Service assists students, prospective and enrolled, in a variety of ways. Most students, whatever their academic achievements, at one time or another need help in dealing with difficulties which arise during the course of their University lives. Although a somewhat new service in Universities, its existence is justified by the fact that at this University about one third of all students utilise it. Whether or not students do use the counselling service is entirely a matter for their own decision.

Students who have problems about their choice of course, or a change in their career plans, students who are worried about inadequate study methods or who are perturbed by personal difficulties, by nervous states and anxiety are invited to arrange an appointment with a Student Counsellor.

On request the Counsellors will conduct courses for the improvement of reading skills and tests of ability and personality.

“Study at the Tertiary Level” — the Counselling Department has produced a booklet specifically for students of this University, and this will be on sale at a nominal cost early in 1967.

Student Counsellors—S. G. Alley, B.A.(Syd.), A.S.T.C., M.A.Ps.S. (Top floor of Main Building at Shortland).

Tighe’s Hill: One of the Student Counsellors will be available for interviews in the Main Building (1st floor) on Thursday, 2 p.m.—8 p.m.

THE LIBRARY

The Library exists to acquire, preserve and make available for use books and other materials needed by the staff and students of the University. The Library will be housed ultimately, when the whole of the University has been transferred to the Shortland site, in a separate building being built next to the Union. Now, totalling approximately 110,000 volumes and made up of monographs, pamphlets, serials and microform sets, it is accommodated in temporary quarters at both Shortland and Tighe’s Hill. Facilities for the reproduction of articles or sections of books are available as are microcard and microfilm readers.

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 pamphlet outlining the resources of the library and procedure for borrowing.
The Shortland Library occupies the lower two floors of the northern end of the Arts-Administration Building. Hours of opening are:

Monday — Friday  8.30 a.m. to 9.30 p.m. (long vacation excepted)
Saturday      9.30 a.m. to 12.30 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 Tighes Hill library is located with the Technical College library on the first floor of the Clegg Building.

Hours of opening are:

Monday — Friday  9.00 a.m. to 9.30 p.m. (all vacations excepted)
Vacations:  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 is closed on public holidays.

TRAVEL CONCESSIONS

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

Application forms for these concessions may be obtained at the Students' Records Section, Main Building, Shortland.

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 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.

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 1937 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 100 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 is designed with this in view.

The training 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) An optional camp of two weeks in December.
(d) Five weekend bivouacs a year.
(e) 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.

As a member of the University of Newcastle Company you are eligible for the following benefits:

An opportunity to reach commissioned rank in 2-3 years.
Tax-free pay for all training undertaken.
Travelling expenses refunded.
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. 61 2121.

Officers and Staff.

- Officer Commanding:  Capt. J. G. Raymond
- Second in Command:  Lt. J. G. Digby
- Officers:  Capt. N. R. Watkins
            Capt. M. J. Hough
            Lt. F. S. O'Toole
            Lt. R. McGregor
            Lt. A. J. Shaw
            Lt. T. R. O'Brien
            Lt. B. G. Jordan

- Company Sergeant-Major:  WO2 N. G. Platts
- Full-time Staff:  Sgt. K. B. Carmichael

THE UNIVERSITY OF NEWCASTLE SPORTS UNION

The Sports Union is the student organization 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 eighteen affiliated clubs — Athletics, Badminton, Men's Basketball, Women's Basketball, Boating, Cricket, Golf, Women's Gymnastics, Men's Hockey, Women's Rowing, Rugby, Sailing, Ski-ing, Soccer, Squash, Tennis, Weightlifting, most of which participate in local competitions and send teams to Inter-Varsity contests each year. 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 your General Services Fee, to meet the cost of equipment, affiliation fees, Inter-Varsity trips, etc.

For outstanding individual performance in sport, the Sports Union awards "Blues" each year at the Annual "Blues" Dinner.
The number of constituent clubs is increasing continually, and you are urged to contact our Amenities Officer, Mr. Bradford, or one of the Executives for further information.

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 undergraduate members of the University must belong. Each year the governing body, known as the Students' Representative Council (SRC), is elected by the Association. Its functions are many and varied.

The SRC serves as the main liaison body between the students and the University and, as such, has a number of offices and committees in existence. Complaints and requests from members may be handled by the Library Office, the Welfare and Education Office or the Council as a whole. The committee with which most students come in contact is the Welfare and Education branch. Welfare work ranges over such topics as accommodation agencies, employment service (both vacation and other temporary work) and it is hoped that, in the near future, a health service will be established. Soon to come into operation is the second-hand book service. The Education branch conducts an education campaign (e.g. Newcastle seminars on education in 1966) and attempts, insofar as its resources allow, to study the local and national needs of education and participate in NUAUS activities in this regard.

The Papua-New Guinea committee is engaged in liaison work with a tertiary establishment in New Guinea and organises, on a local level, participants for work camps held in the territory over the long vacation.

One of the major ways in which the $6.00 membership fee is spent is in grants to affiliated clubs and societies, both of a cultural and social nature. To this end the Vice-President of the Association acts as Clubs and Societies Liaison Officer and, with his assistant, gives such assistance to affiliates within the competence of his office as they may from time to time require.

The SRC is also responsible for publishing the newspaper “OPUS” and the literary magazine “NIMROD” both of which will be seen around the campus at their time of publication.

The Association is a constituent member of the National Union of Australian University Students (NUAUS) and participates in conferences of this organisation and other activities such as the work camps, overseas student travel, education campaigns and the like.

Each year the SRC organises Autonomy Day—of this nothing need be said other than it is our equivalent of Commemoration or Foundation Day.

Every student is urged to take an active part in the functioning of the Association and enquiries may be made at the UNSA office, basement floor of the University Union.

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
COURSES AVAILABLE

The Faculty of Applied Science comprises the Department of Chemical Engineering and Industrial Chemistry Department of Metallurgy.

Two types of undergraduate courses are available.

The full-time course of four years leads to the degrees of B.E. (Chemical Engineering) or B.Sc. (Industrial Chemistry) or B.Sc. (Metallurgy)

Full-time students are required to obtain four months approved industrial experience before completion of their course.

The part-time courses are designed for students engaged in approved occupations in industry and are basically six year courses leading to the B.Sc. (Tech.). Three concurrent years of approved industrial experience are required before completion of the course. The duration of the course may be reduced by one year by taking one year full-time in accordance with the scheduled "accelerated" course.

Before they can proceed to a higher degree, students who have obtained the B.Sc. (Tech.), must complete the subjects normally offered in the fourth year of the full-time course. The Head of the Department should be consulted for particulars.

Provisions exist for transfer from full-time to part-time courses and vice versa and for some variation from the approved programmes for "accelerated" courses. Formal approval must be obtained from Senate. Students wishing to make such changes should consult the Head of their Department.

Post-graduate research leading to the degrees of M.Sc., M.E., and Ph.D. is offered in both Departments. Full details may be obtained from the Head of the Department concerned.

CONDITIONS FOR THE AWARD OF THE DEGREE OF BACHELOR OF ENGINEERING IN CHEMICAL ENGINEERING OR OF BACHELOR OF SCIENCE IN METALLURGY OR INDUSTRIAL CHEMISTRY

(a) A candidate for the degrees of Bachelor of Science or Bachelor of Engineering in the Faculty of Applied Science shall—
(i) comply with the requirements for admission;
(ii) follow the prescribed course of study in the appropriate Department and satisfy the examiners in the necessary subjects.
(iii) Undertake such concurrent industrial training as may be approved by the Head of the Department.

(b) A student or graduate from this or another institution may be admitted to the course with such advanced standing and under such conditions as are determined by the By-laws on Enrolment.

(c) During each year a student shall undertake assignments, perform laboratory, drawing office and field work, attend demonstrations and excursions to such an extent and in such a manner as is prescribed from time to time by the Senate on the recommendation of the Faculty.

(d) A student shall be required to complete the first year of the course in not more than two years.

(e) The degree shall be awarded in the pass or honours grade. Honours may be awarded in the following categories:
Honours Class I
Honours Class II (Division I)
Honours Class II (Division II)
Honours Class III

A student who satisfies the examiners in the final year of study but who fails to reach the standard for the award of Honours Class III may be awarded the degree of Bachelor of Science.
CONDITIONS FOR THE AWARD OF THE DEGREE OF
BACHELOR OF SCIENCE (TECHNOLOGY)
IN
CHEMICAL ENGINEERING, INDUSTRIAL CHEMISTRY,
AND METALLURGY

The courses leading to the award of the degree of Bachelor of Science (Technology) are normally programmed over six years of part-time study in the University whilst the student is employed in industry. The regulations governing the award of this degree are as follows:

1. A candidate for the degree of B.Sc. (Tech.) shall—
   (i) comply with the requirements for admission;
   (ii) follow the prescribed course of study in the appropriate school and pass the necessary examinations;
   (iii) complete an approved programme of industrial training over a period of not less than three years concurrently with attendance in the course.

2. During each year a student shall perform laboratory, drawing office and field work, attend demonstrations and excursions to such an extent and in such a manner as is prescribed from time to time by the Senate on the recommendation of the Faculty, and, in addition, undertake industrial training as approved by the Head of the Department.

3. A student may be granted advanced standing by the Senate on the recommendation of the appropriate Faculty but in each case a student must follow an approved course for at least three years with concurrent approved industrial training before being eligible for admission to the degree.

4. The degree of B.Sc. (Tech.) shall be awarded in the pass grade only, but in the case of superior performance throughout the course the degree shall be conferred "with merit."

5. Students shall be required to conform with the general rules relating to progression in University courses.

CLASSIFICATION OF STUDENTS IN COURSES

CLASSIFICATIONS

1. (i) Full-time students are classified by year (Roman numerals).
   (ii) Part-time students are classified by stage.

2. In the Faculties of Arts and Science, classification depends on the number of subjects passed.

3. (i) In all other Faculties, classification is determined by enrolment in a classifying subject, i.e., by a major subject in a course. The classifying subjects are set out below.
   (ii) If a student enrols in more than one classifying subject, then the year or stage of the lower classifying subject applies.
   (iii) 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 COURSE IN CHEMICAL ENGINEERING

### YEAR I

(30 weeks full-time course)

<table>
<thead>
<tr>
<th>Hours per week</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry I</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Mathematics I</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Physics I</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Engineering I</td>
<td>6</td>
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<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>24</td>
<td>24</td>
<td>24</td>
</tr>
</tbody>
</table>

### YEAR II

(30 weeks full-time course)

<table>
<thead>
<tr>
<th>Hours per week</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry II</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Physics I IT</td>
<td>4½</td>
<td>4½</td>
<td>4½</td>
</tr>
<tr>
<td>Mathematics II</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>(Chemical Engineering I)</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>(Fuel Science and Engineering I)</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>25½</td>
<td>25½</td>
<td>25½</td>
</tr>
</tbody>
</table>

### YEAR III

(30 weeks full-time course)

<table>
<thead>
<tr>
<th>Hours per week</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Engineering (6.801)</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Chemical Engineering IIA</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Structural Engineering (6.112)</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Humanities II</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Chemical Engineering IIB</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>27</td>
<td>27</td>
<td>27</td>
</tr>
</tbody>
</table>

† For 1967 either English I (literature only) or Economics I (microeconomics) are required in lieu of Humanities II. A student may, with the permission of the Dean of the Faculty of Arts substitute another Arts subject.

### YEAR IV

(30 weeks full-time course)

<table>
<thead>
<tr>
<th>Hours per week</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Engineering IIIA</td>
<td>9</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>Chemical Engineering IIIB</td>
<td>9</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>Research Project</td>
<td>6</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>24</td>
<td>24</td>
<td>19</td>
</tr>
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</table>
STAGE V
(30 weeks part-time course)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Engineering (6.801)</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Chemical Engineering IIA</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Structural Engineering (8.112)</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Humanities II †</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

† For 1967 either English I (literature only) or Economics I (microeconomics) are required in lieu of Humanities II.

A student may, with the permission of the Dean of the Faculty of Arts substitute another Arts subject.

STAGE VI*
(30 weeks part-time course)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Engineering IIB</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

* Note: Students in the B.Sc. (Tech.) course in Chemical Engineering are required to pass a combined Chemical Engineering Principles and Design examination in addition to examinations in each of these subjects separately.

BACHELOR OF SCIENCE (Technology)
IN CHEMICAL ENGINEERING

ACCELERATED COURSE

The student reading for the degree of B.Sc. (Tech.) in Chemical Engineering may reduce the time required to complete the academic requirements by undertaking the following programme of combined part-time/full-time study.

Stage 1—30 weeks Part-time Course (as for Stage 1 B.Sc. (Tech.) Course above).
Stage 2—30 weeks Part-time Course (as for Stage 2 B.Sc. (Tech.) Course above).
Stage 3A—30 weeks Full-time Course (as for Year II of Full-time B.E. Course above).
Stage 4A—30 weeks Full-time Course (as for Year III of Full-time B.E. Course above).
Stage 5A—30 weeks Part-time Course (as set out below).

STAGE 5A.

30 WEEKS PART-TIME COURSE

A programme of 6-9 hours per week selected from the following options:

Either Industrial Chemistry IIT or any other subject(s) and/or project(s) approved by the Professorial Board on the recommendation of the Head of Department. Students are required to consult the Head of Department before the final term of Stage 4A.

PRE-REQUISITES AND CO-REQUISITES FOR THE COURSES IN CHEMICAL ENGINEERING

<table>
<thead>
<tr>
<th>Subject</th>
<th>Pre-requisite</th>
<th>Pre- or Co-requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Engineering I</td>
<td>Maths I</td>
<td></td>
</tr>
<tr>
<td>Fuel Science and Engineering I</td>
<td>Physics I</td>
<td></td>
</tr>
<tr>
<td>Chemical Engineering IIA</td>
<td>Maths II</td>
<td>Structural Engineering (8.112)</td>
</tr>
<tr>
<td></td>
<td>Chemistry II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Physics IIT</td>
<td></td>
</tr>
<tr>
<td>Chemical Engineering IIB</td>
<td>Chemical Engineering I</td>
<td></td>
</tr>
<tr>
<td>Chemical Engineering IIIA</td>
<td>Chemical Engineering IIA</td>
<td></td>
</tr>
<tr>
<td>Chemical Engineering IIIB</td>
<td>Electrical Engineering (6.801)</td>
<td></td>
</tr>
<tr>
<td>Projects</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chemical Engineering IIIA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chemical Engineering IIIB</td>
</tr>
</tbody>
</table>
## BACHELOR OF SCIENCE COURSE

### IN

### INDUSTRIAL CHEMISTRY

#### YEAR I

(30 weeks full-time course)

<table>
<thead>
<tr>
<th>Courses</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry I</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Mathematics I</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Physics I</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Geology I (or Engineering I)</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>24</strong></td>
<td>24</td>
<td>24</td>
</tr>
</tbody>
</table>

#### YEAR II

(30 weeks full-time course)

<table>
<thead>
<tr>
<th>Courses</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry II</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Physics I (IIT)</td>
<td>4½</td>
<td>4½</td>
<td>4½</td>
</tr>
<tr>
<td>Mathematics II</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>(Chemical Engineering I)</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>(Fuel Science and Engineering I)</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>25½</strong></td>
<td>25½</td>
<td>25½</td>
</tr>
</tbody>
</table>

#### YEAR III

(30 weeks full-time course)

<table>
<thead>
<tr>
<th>Courses</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Chemistry I</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Humanities II †</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Chemistry IIT (*)</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>23</strong></td>
<td>23</td>
<td>23</td>
</tr>
</tbody>
</table>

† For 1967 either English I (literature only) or Economics I (microeconomics) are required in lieu of Humanities II. A student may, with the permission of the Dean of the Faculty of Arts, substitute another Arts subject.

* Physical and Organic Modules.

#### YEAR IV

(30 weeks full-time course)

<table>
<thead>
<tr>
<th>Courses</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Chemistry II</td>
<td>12</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>Industrial Seminar</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Research Project</td>
<td>3</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
<td>21</td>
<td>25</td>
</tr>
</tbody>
</table>

#### BACHELOR OF SCIENCE (Technology) COURSE

### IN

### INDUSTRIAL CHEMISTRY

#### STAGE I

(30 weeks part-time course)

<table>
<thead>
<tr>
<th>Courses</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry I</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Mathematics I</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12</strong></td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

#### STAGE II

(30 weeks part-time course)

<table>
<thead>
<tr>
<th>Courses</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics I</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Geology I (or Engineering I)</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12</strong></td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

#### STAGE III

(30 weeks part-time course)

<table>
<thead>
<tr>
<th>Courses</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry II</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Physics I (IIT)</td>
<td>4½</td>
<td>4½</td>
<td>4½</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>13½</strong></td>
<td>13½</td>
<td>13½</td>
</tr>
</tbody>
</table>

#### STAGE IV

(30 weeks part-time course)

<table>
<thead>
<tr>
<th>Courses</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics II</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>(Chemical Engineering I)</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>(Fuel Science and Engineering I)</td>
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<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12</strong></td>
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<td>12</td>
</tr>
</tbody>
</table>

#### STAGE V

(30 weeks part-time course)

<table>
<thead>
<tr>
<th>Courses</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry IIT (*)</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Humanities II †</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9</strong></td>
<td>9</td>
<td>9</td>
</tr>
</tbody>
</table>

* Physical and Organic Modules

† For 1967 either English I (literature only) or Economics I (microeconomics) are required in lieu of Humanities II. A student may, with the permission of the Dean of the Faculty of Arts, substitute another Arts subject.
STAGE VI
(30 weeks part-time course)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Chemistry I</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>14</td>
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</tr>
</tbody>
</table>

BACHELOR OF SCIENCE (Technology) in
INDUSTRIAL CHEMISTRY

ACCELERATED COURSE

The student reading for the degree of B.Sc. (Tech.) in Industrial Chemistry may reduce the time required to complete the academic requirements by undertaking the following programme of combined part-time/full-time study.

Stage 1 — 30 weeks Part-time Course (as for Stage 1 B.Sc. (Tech.) Course above).

Stage 2 — 30 weeks Part-time Course (as for Stage 2 B.Sc. (Tech.) Course above).

Stage 3A— 30 weeks Full-time Course (as for Year II of Full-time B.Sc. Course above).

Stage 4A— 30 weeks Full-time Course (as for Year III of Full-time B.Sc. Course above).

Stage 5A — 30 weeks Part-time Course (as set out below).

STAGE 5A.
30 WEEKS PART-TIME COURSE

A programme of 6-9 hours per week selected from the following:
Any subject(s) and/or project(s) approved by the Senate on the recommendation of the Head of Department. Students are required to consult the Head of Department before final term of Stage 4A.

PRE-REQUISITES AND CO-REQUISITES FOR THE COURSES IN INDUSTRIAL CHEMISTRY

<table>
<thead>
<tr>
<th>Subject</th>
<th>Pre-requisite</th>
<th>Co-requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Chemistry I</td>
<td>Chemistry II</td>
<td></td>
</tr>
<tr>
<td>Industrial Chemistry II</td>
<td>Industrial Chemistry I</td>
<td>Chemical Engineering IIA(T)</td>
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</tbody>
</table>

BACHELOR OF SCIENCE COURSE
IN
METALLURGY

YEAR I
(30 weeks full-time course)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics I</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Chemistry I</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Mathematics I</td>
<td>6</td>
<td>6</td>
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</tr>
<tr>
<td>Geology I</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>24</td>
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</table>

YEAR II
(30 weeks full-time course)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Term 1</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Physics IIIT</td>
<td>6½</td>
<td>6½</td>
<td>6½</td>
</tr>
<tr>
<td>Chemistry IIIT</td>
<td>8</td>
<td>7</td>
<td>5½</td>
</tr>
<tr>
<td>Mathematics II</td>
<td>6</td>
<td>6</td>
<td>6</td>
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<tr>
<td>Metallurgy I</td>
<td>10</td>
<td>10</td>
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</tr>
<tr>
<td></td>
<td>28½</td>
<td>27½</td>
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YEAR III
(30 weeks full-time course)

<table>
<thead>
<tr>
<th>Subject</th>
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<tbody>
<tr>
<td>Metallurgy IIA</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Electrical Engineering (6.801)</td>
<td>3</td>
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<tr>
<td>Humanities II†</td>
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<tr>
<td>Metallurgy IIB</td>
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</tr>
<tr>
<td></td>
<td>25</td>
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</tbody>
</table>

† For 1967 either English I (literature only) or Economics I (microeconomics) are required in lieu of Humanities II.

A student may, with the permission of the Dean of the Faculty of Arts substitute another Arts subject.

YEAR IV
(30 weeks full-time course)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Term 1</th>
<th>Term 2</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Metallurgy III</td>
<td>17</td>
<td>17</td>
<td>6</td>
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<tr>
<td>Metallurgy Project</td>
<td>5</td>
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<tr>
<td></td>
<td>22</td>
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</tbody>
</table>

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BACHELOR OF SCIENCE (Technology) COURSE

IN

METALLURGY

STAGE I

(30 weeks part-time course)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry I</td>
<td>6</td>
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<td>6</td>
</tr>
<tr>
<td>Mathematics I</td>
<td>6</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
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</table>

STAGE II

(30 weeks part-time course)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Term 1</th>
<th>Term 2</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Physics I</td>
<td>6</td>
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<td>6</td>
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<tr>
<td>Geology I</td>
<td></td>
<td></td>
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<td></td>
<td>12</td>
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</table>

STAGE III

(30 weeks part-time course)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Term 1</th>
<th>Term 2</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Physics IIT</td>
<td>4½</td>
<td>4½</td>
<td>4½</td>
</tr>
<tr>
<td>Chemistry IIT</td>
<td>7½</td>
<td>7</td>
<td>5½</td>
</tr>
<tr>
<td>Mathematics II Part I</td>
<td>3</td>
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</tr>
<tr>
<td></td>
<td>15</td>
<td>14½</td>
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</table>

STAGE IV

(30 weeks part-time course)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metallurgy I</td>
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</tr>
<tr>
<td>Mathematics II Part II</td>
<td>3</td>
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STAGE V

(30 weeks part-time course)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
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</thead>
<tbody>
<tr>
<td>Metallurgy IIA</td>
<td>6</td>
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<td>6</td>
</tr>
<tr>
<td>Electrical Engineering (6.801)</td>
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</tr>
<tr>
<td>Humanities II †</td>
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<tr>
<td></td>
<td>12</td>
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</tr>
</tbody>
</table>

† For 1967 either English I (literature only) or Economics I (microeconomics) are required in lieu of Humanities II. A student may, with the permission of the Dean of the Faculty of Arts substitute another Arts subject.

STAGE VI

(30 weeks part-time course)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Term 1</th>
<th>Term 2</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Metallurgy IIB</td>
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</tbody>
</table>

BACHELOR OF SCIENCE (Technology) in METALLURGY

ACCELERATED COURSE

A student reading for the degree of B.Sc. (Tech.) in Metallurgy may reduce the time required to complete the academic requirements by undertaking the following programme of combined part-time/full-time study.

Stage 1 — 30 weeks Part-time Course (as for Stage 1 B.Sc. (Tech.) Course above).

Stage 2 — 30 weeks Part-time Course (as for Stage 2 B.Sc. (Tech.) Course above).

Stage 3A — 30 weeks Full-time Course (as for Year II of Full-time B.Sc. Course above).

Stage 4A — 30 weeks Full-time Course (as for Year III of Full-time B.Sc. Course above).

Stage 5A — 30 weeks Part-time Course (as set out below).

STAGE 5A.

30 WEEKS PART-TIME COURSE

<table>
<thead>
<tr>
<th>Subject</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metallurgy Project</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Details of Subjects

Project — Project may involve laboratory work or a report on a literature survey or a combination of these by arrangement with the Head of Department.

In the event that it is elected to make a report on the literature survey, this is to be submitted not later than the end of the fifth week of third term. The survey is to be of approximately 10,000 words on a topic of relevance to the student's employment and which has been approved by the Head of Department. The topic proposed must be submitted to the Head of Department for approval before the end of the third week of first term.

PRE-REQUISITES AND CO-REQUISITES FOR THE COURSES IN METALLURGY

<table>
<thead>
<tr>
<th>Subject</th>
<th>Pre-requisite</th>
<th>Pre- or Co-requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metallurgy I</td>
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<td></td>
</tr>
<tr>
<td>Metallurgy II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(A &amp; B)</td>
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<td></td>
</tr>
<tr>
<td>Metallurgy III</td>
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</tr>
</tbody>
</table>

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DESCRIPTION OF SUBJECTS
DEPARTMENT OF CHEMICAL ENGINEERING AND INDUSTRIAL CHEMISTRY

CHEMICAL ENGINEERING I
(including Fuel Science)

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

Fluid-statics and Dynamics—Particularly related to the flow, metering and pumping of fluids in pipes with an introduction to boundary layer theory and dimensional analysis.

Heat and Mass Transfer—Introduction to conduction and 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.

Applied Thermodynamics—Engineering calculations of mass and energy balances and properties of real gases from gas law and equilibrium relationships.

Fuel Science—Classification, sampling and testing of fuels. Combustion and gasification reactions and equipment. Thermal and economic evaluation of fuels and equipment.

TEXT BOOKS:
Chemical Engineering—Vol. I, Coulson, J. M. & Richardson, J. F.
Chemical Engineers Handbook, Perry, J. H.
Introduction to Chemical Engineering, Anderson, L. B. & Wenzel, L. A.
Fuels, Solid Liquid & Gaseous, Brame, J. S. S. & King, G.

REFERENCE BOOKS:
H.M.S.O. "The Efficient Use of Fuel."

Perry is a reference text for this course but as it will be required in later stages, it is recommended that students should purchase it at this time.

"Chemical Process Industries," Shreve, R. N.

CHEMICAL ENGINEERING IIA

The course comprises about 90 hours of lectures and 90 hours of office work and seminars, together with plant inspections and reports.

Applied Thermodynamics and Kinetics—Thermodynamics applied to the analysis of power generation, refrigeration, heat pump and process heat cycles, to reaction equilibrium and overall process efficiency. Application of Kinetics and reactor theory to interpretation of experimental rate data and design analysis of simple mixing and reactor systems. Residence time concepts.

* Unit Operations—(Heat Exchangers).

Provision for support and thermal expansion, design of pressure vessels to code requirements, determination of heat transfer surface for plate and tubular type heat exchangers, overall design of a heat exchanger. Heat transfer characteristics of evaporators, boilers and condensers.

* NOTE—Stage 6 (IIA) students will take this module in 1967.

CHEMICAL ENGINEERING IIB

The course comprises about 120 hours of lectures, 150 hours of office work and seminars and 90 hours laboratory and field testing and investigation. In addition, students are required to take part in and report on inspections of chemical plants in the Sydney and Newcastle areas as organised by the Department.

FUNDAMENTALS:
Fluid mechanics of boundary layer and of turbulent flow.
Correlation of heat-mass and momentum transfer.
Introduction to process dynamics theory.

UNIT OPERATIONS:
Leaching, Absorption, Extraction, Distillation and Humidification.
The equilibrium stage concept.
Calculation and extension of vapour pressure and solubility data, use of thermodynamic relations.
Transfer coefficients and design methods for two component systems.
Hydraulic and structural characteristics of equipment.
Design outline of a simple unit.
Effect of changes of operating conditions on plant performance.

Solids (particulate systems):
Principles and outline of practice for size analysis, size reduction, sedimentation, filtration, gas cleaning, fluidization.

Combustion and Furnaces:
Fuel beds and flames; ignition and combustion rates, explosions, grates and burners, furnace heat transfer.

PROCESS PLANT LAYOUT AND ECONOMICS:
The concept of a plant as a complete unit, battery limits; siting, layout, services, instrumentation, process and engineering flow sheets, overall economics.

ENGINEERING MATERIALS:
The physical and chemical properties of structural alloys as determined by composition, heat treatment and fabrication methods.
Corrosion; creep, fatigue.
Engineering properties and uses of Polymers and Ceramics.

MANAGEMENT PRINCIPLES:
Statistical analysis of experimental and operational data, sampling theory, introduction to operational research, critical path planning.
Human performance and motivation, work study, industrial relations.
Industrial organisation; accounting and cost control; industrial and commercial law.

* Stage 6 students will NOT be required to take this module in 1967.
TEXT BOOKS:
Statistics Manual, Crow, E., Davis, F. & Maxwell, M.
Chemical Engineering—Vol. II, Coulson, J. M. & Richardson, J. F.
Metallurgy for Engineers, Rolloson, E. C.
S.A.A. Codes Pressure Vessels CBI, Part V.
Structural Steel, 351.
Building Loads, 350.

REFERENCE BOOKS:
"Introduction to Work Study," I.L.O.
"Science of Flames & Furnaces," Thring, M. W.
"Mass Transfer Operations," Treybal, R. E.
"Absorption, Distillation & Humidification," Norman, W. S.
"Industrial Furnaces," Vols. I & II, Trinks, W.
"Design of Piping Systems," Kellogg, N. W.

CHEMICAL ENGINEERING IIIA
Principles III:

Chemical Engineering Seminar: Critical evaluation and oral presentation of short papers on selected subjects.

TEXT BOOK:
Transport Phenomena, Bird, Stuart & Lightfoot.
(Other texts and references will be advised by lecturers in the course.)

CHEMICAL ENGINEERING IIIB
Chemical Engineering Design II:
Development of Design—Review of Chemical Engineering Design I — process representation, models, etc. Effect of plant location on design and layout—topography, climate, zoning, waste disposal. Process design principles—continuous and batch operation, services reticulation, storage, instrumentation, materials handling. Equipment selection — fields of application and preparation of specifications.


Cost Engineering—Feasibility study — market evaluation, profitability. Process research—selection and development of most suitable processes, thermodynamic feasibility, outline design, preliminary costing, product and market testing. Development of manufacturing process — material properties and special plant characteristics, control requirements, operating procedures, detailed design, manufacturing costs estimate, capital requirements.

Instrumentation and Automatic Control:
Instrumentation—A discussion of some of the more important types of measuring instruments, principles governing their operation, selection and installation, mainly concerned with pressure, temperature, and flow measuring devices, and some of the means of measuring process variables and chemical composition. Indicating and recording instruments. Pneumatic and electric controllers. Control valves and actuators, and control valve sizing.

Process Dynamics — A discussion of the dynamics of flow processes, thermal processes, mass transfer processes and chemical processes. This would include the use of block diagrams and signal flow diagrams, and of the mathematical techniques for handling the equations involved.

Automatically-controlled Processes — A discussion of the fundamental principles of automatic control, and of the mathematical techniques for solving automatic-control problems.

Laboratory—Aimed at introducing some of the problems associated with measuring instruments (calibration, errors, installation, etc.) and a study of the properties in controlled systems (lags, performance characteristics, valve characteristics, etc.). Other work involves the use of electronic and other types of analogue equipment for simulating controlled processes, and perhaps the use of the digital computer in similar problems.

(Text and Reference books will be advised by lecturers).

CHEMICAL ENGINEERING PROJECTS
The design project will consist of the design of plant for the production of chemicals and the estimation of product costs.
The experimental project will consist of the investigation of some aspects of chemical engineering.

INDUSTRIAL CHEMISTRY
INDUSTRIAL CHEMISTRY I
Processes: Services in the Chemical Industry (water, waste, disposal, steam, D.C. power, refrigeration, fuels—solid, liquid, gaseous); sulphuric acid; lime cement and plaster; alkalis (soda ash, caustic soda, ammonia); nitric acid; industrial gases; electric furnace products; phosphates, superphosphates and aluminium; glass; coal carbonisation; coal tar refining; petroleum refining; industrial fermentation (industrial alcohol, acetone and butanol); cellulose industries; acetylene and acetylene chemicals; chemicals from ethylene and propylene; synthetic methanol and formaldehyde; sugar.
MANAGEMENT PRINCIPLES:

- Statistical analysis of experimental and operational data, sampling theory, introduction to operational research, critical path planning.
- Human performance and motivation, work study, industrial relations.
- Industrial organisation; accounting and cost control; industrial and commercial law.

Thermodynamics: Introduction to Chemical Engineering Thermodynamics. Distinction between reversible and irreversible thermodynamics. Statistical basis of thermodynamics.


Laboratory: Students will be required to attend lectures on report writing, carry out laboratory assignments and attend factory inspections at local and country centres as required.

TEXT BOOKS:
- The Chemical Process Industries, Shreve, R. N.
- Chemical Machinery, Riegel, E. G.
- Chemical Reaction Engineering, Levenspiel, O.
- Statistics Manual, Crow, E., Davis, F., & Maxwell, M.
- Equilibrium Thermodynamics, Coull, J. & Stuart, E. B.

REFERENCE BOOKS:
- Industrial Chemicals, Faith, W. L., Keys, D. B., & Clark, R. L.
- The Properties of Liquids and Gases, Reid, R. L. & Sherwood, T. K.
- Introduction to Workstudy, I.I.O.
- Introduction to Operations Research, Churchman, C. W., Ackoff, R. L. & Arnoff, E. L.
- The Accounts Cost Handbook, Dickey, R. I.
- Nomograms and Empirical Equations, Davis, S.

INDUSTRIAL CHEMISTRY II

(a) Processes

- Appropriate examples of industrial processes will be covered to illustrate the following:

- Silicones, silicate chemistry; refractories, cermets; high temperature combustion processes; high temperature chemistry, oxidisers (hydrogen peroxide); fluorine chemistry; rocket fuels; high pressure processes (ammonia synthesis—thermodynamics and equipment); high vacuum processes and molecular distillation; titanium and zirconium; the actinide elements; industrial polymers, aromatic intermediates; acetylene chemistry; fermentation industries.

(b) Advanced Kinetics

The following topics will be covered:


Instrumentation and Automatic Control:

Instrumentation: A discussion of some of the more important types of measuring instruments, principles governing their operation, selection and installation, mainly concerned with pressure, temperature, and flow measuring devices, and some of the means of measuring process variables and chemical composition.

Indicating and recording instruments. Pneumatic and electric controllers. Control valves and actuators, and control valve sizing.

Process Dynamics: A discussion of the dynamics of flow processes, thermal processes, mass transfer processes and chemical processes. This would include the use of block diagrams and signal flow diagrams, and of the mathematical techniques for handling the equations involved.
Automatically-controlled processes: A discussion of the fundamental principles of automatic control, and of the mathematical techniques for solving automatic-control problems.

Laboratory: Aimed at introducing some of the problems associated with measuring instruments (calibration, errors, installation, etc.) and a study of the properties of some of the components in controlled systems (lags, performance characteristics, valve characteristics, etc.). Other work involves the use of electronic and other types of analogue equipment for simulating controlled processes, and perhaps the use of the digital computer in similar problems.

INDUSTRIAL SEMINAR
Critical evaluation and presentation of information on selected topics.

RESEARCH PROJECT
Investigation of a particular aspect of industrial chemistry.
(Text and reference books to be advised).
statistics, and the zone theory applied to an explanation of conductors, semiconductors, and insulators. Ferro- and antiferromagnetism.


**Metallurgical Engineering**

Metallurgical thermodynamics — a more advanced treatment with special attention to reactions involving complex solutions. Metallurgical kinetics — an introductory treatment of the rates of heterogeneous reactions.

Metallurgical electrochemistry — fundamentals of electrode processes and applications to corrosion, electrolysis, slag/metal reactions.

Engineering principles of the unit processes of extractive metallurgy, equilibria and rate considerations as considerations in design. Physico-chemical unit process of extraction metallurgy.

**Industrial Metallurgy**

A course of lectures on the applications of metallurgical principles to industrial practice, combined with a series of works visits. The lecture topics are selected from foundry technique and control electroplating, the joining of metals, machinability, powder metallurgy and industrial alloys.

**Metallurgy Seminar**

A series of lectures on the presentation of verbal reports and papers. Each student will deliver a paper on a topic of his choice, followed by a discussion of its technical aspects.

**METALLURGY III**

An advanced course of lectures and practical work together with a thesis of a substantial nature on a topic determined by the Head of Department. The formal lectures are composed as follows:

**Physical Metallurgy**


**Metallurgical Engineering**

An advanced treatment of such topics as solidification, surface chemistry and theories of metal oxidation. Irreversible thermodynamics. Engineering principles in plant design.

**Industrial Metallurgy**

The shaping of metals under complex stresses: rolling, forging, extruding, wire-drawing, deep-drawing and pressing, and stretch forming. Non-destructive testing; radiography; ultrasonic and magnetic testing.

**4.922 MATERIALS SCIENCE**

A course of basic metallurgy for engineering students. The atomic structure of metals. The grain structure of metals. The structure of alloys, and the properties and heat treatment of commercially important alloys, principally those based on aluminium, copper and iron. Corrosion, fuels and refractories.

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**THE UNIVERSITY OF NEWCASTLE**

**DEPARTMENT OF METALLURGY**

**PRESCRIBED TEXTS FOR 1967**

**METALLURGY I**

**TEXTS**

A Textbook of Metallurgy    Bailey, A. R.
Metallurgy in the Service of Man    Dennis, W. H.
Fuels and Refractories    Gilchrist, J. D.
Furnaces    Gilchrist, J. D.
Phase Diagrams in Metallurgy    Rhines, F. N.
Theoretical Structural Metallurgy    Cottrell, A. H.
Structure of Metals and Alloys    Hume-Rothery, W. A. & Raynor, A. V.
Introduction to the Physics of Metals and Alloys    Boas, W.
Mechanical Metallurgy    Dieter, G.
Heat, Mass and Momentum Transfer    Bennett, C. O. & Myers, J. E.
Principles of Metallographic Laboratory Practice    Kehl, G. L.
Transport Phenomena    Bird, Stuart & Lightfoot.

**REFERENCES**

A Hundred Years of Metallurgy    Dennis, W. H.
Principles and Application of Extractive Metallurgy    Dennis, W. H.
Metallurgy of the Ferrous Metals    Nutting, J., & Baker, R.G.
The Microstructure of Metals    Chalmers, B.
Physical Metallurgy    Pascoe, K. J.
Introduction to the Properties of Engineering Materials    Masing, G., (Thompson, F. C.)
The Physics of Metals    Seitz, F.
An Introduction to the Solidification of Metals    Winegard, W.
Metallurgical Equilibrium Diagrams    Hume-Rothery, W.
The Structure of the Alloys of Iron    Christian, J. W., & Pearson, W. B.
The Kinetics of Phase Transformation in Metals    Phillips, F. C.
Introduction to Crystalllography    Desch, C.

**METALLURGY II**

**TEXTS** — As for Metallurgy I, plus:

Atomic Theory for Students of Metallurgy    Hume-Rothery, W.
Dislocation and Plastic Flow in Crystals    Cottrell, A. H.
The Structure of the Alloys of Iron    Hume-Rothery, W.
Diffraction Methods in Materials Science    Cohen, J. B.
Elements of Mechanical Metallurgy    Tegart, W.
The Kinetics of Phase Transformation in Metals    Burke, J.
Thermodynamics of Solids    Swalin, R. A.
Diffusion in Solids    Shewmon, P.
Function of the Alloying Elements in Steel
Corrosion and Electrodeposition
Problems in Applied Thermodynamics
Making, Shaping and Treating of Steel

REFERENCES

The Structure of Metals
Elementary Dislocation Theory

Hardenability of Alloy Steels
The Theory of the Properties of Metals and Alloys
Physics of Solids
The Conduction of Heat in Solids
Processes of Creep and Fatigue in Metals
The Strengthening of Metals
Recovery, Recrystallisation and Grain Growth
Introduction to Phase Transformations in Condensed Systems
Electrons in Metals
Principles of the Theory of Solids
Atomic Migration in Crystals
The Physical Examination of Metals
The Electrolytic and Chemical Polishing of Metals
Interpretation of X-ray Diffraction Photographs
Practical Physical Metallurgy
Plasticity of Crystals
Structure and Properties of Alloys

Physical Metallurgy
Elements of X-ray Diffraction
Physical Chemistry of Metals
Interpretation of Metallographic Structures

METALLURGY III

As for Metallurgy II, plus:

REFERENCES

The Mechanical Properties of Metals
Grain Boundaries in Metals
Dislocations
Dislocations in Crystals
X-Ray Metallography
Imperfections in Crystals
Modern Physical Metallurgy
Introduction to Dislocations
The Mechanical Properties of Matter
Introduction to Crystallography of Martensite Transformations
X-Ray Diffraction in Crystals, Imperfect Crystals and Amorphous Bodies
The Theory of Transformations in Metals and Alloys

Procedure in Experimental Metallurgy
Handbook of Lattice Spacings
Transmission Electron Microscopy of Metals
Specimen Preparation for Electron Microscopy
Met. Reviews
Institution of Metallurgists Refresher Courses
Metals and Materials (The Metallurgist)
Progress in Materials Science (Progress in Metal Physics).

MATERIALS SCIENCE

TEXTS
Metallurgy for Engineers

REFERENCES

The Structure and Properties of Materials
Introduction to the Properties of Engineering Materials
Elements of Physical Metallurgy
Physical Metallurgy for Engineers
Engineering Metallurgy

Seybolt, A. U., & Burke, J. E.
Pearson, W. B.
Thomas, G.
Brammar, J. S. & Dewey, M. A. P.
Rollason, E. C.
Wulff, J. (Ed.)
Pascoe, K. J.
Samans, C. H.
Guy, A. G.
Clark, D. S. & Varney, W. R.
Higgins, R. A.
SUBJECTS IN THE FACULTY OF SCIENCE

CHEMISTRY I
A course of about 90 lectures, and 60 hours laboratory work in the Department of Chemistry and 30 hours lectures in the Faculty of Engineering.

The course will include general chemistry (20 lectures), inorganic chemistry (20 lectures) and Engineering Applications of Chemistry (15 lectures).

PRESCRIBED BOOKS:
Fundamental Chemistry, Andrews & Kakes.
Organic Chemistry, Topson & Vaughan.
Introduction to Semimicro Qualitative Analysis, Sorum.

CHEMISTRY II
A course of about 120 lectures and 150 hours laboratory work to be examined by four papers, each of two hours duration. The course will be arranged on the following pattern:

<table>
<thead>
<tr>
<th>Lecture</th>
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<tbody>
<tr>
<td>Term 1</td>
<td>Inorganic</td>
<td>Physical</td>
<td>Analytical</td>
<td>Organic</td>
</tr>
<tr>
<td>Term 2</td>
<td>Inorganic</td>
<td>Physical</td>
<td>Analytical</td>
<td>Organic</td>
</tr>
<tr>
<td>Term 3</td>
<td>Inorganic</td>
<td>Physical</td>
<td>Analytical</td>
<td>Organic</td>
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Brief outlines are as follows:

Inorganic Chemistry
Valence; the shapes of molecules and ions; simple crystal structures; co-ordination chemistry; systematic chemistry of the transition elements.

Physical Chemistry
Thermodynamics; phase equilibria; kinetics; surface chemistry.

Analytical Chemistry
Principles of gravimetric, volumetric, electrolytic and colorimetric methods of analysis.

Organic Chemistry
A study of functional groups in aliphatic and aromatic systems with modern theoretical concepts.

PRESCRIBED BOOKS:

Physical Chemistry
Physical Chemistry, Daniels & Alberty.
OR
Physical Chemistry, Moore.
OR
Physical Chemistry, Barrow.
Experimental Physical Chemistry, Daniels et al.
OR
Experiments in Physical Chemistry, Shoemaker & Garland.

Analytical Chemistry and Physical Methods
Fundamental Principles of Chemical Analysis, Pickering.

OR
Fundamentals of Analytical Chemistry, Skoog & West.

CHEMISTRY III
A course of about 60 lectures and 120 hours laboratory work to be examined by two papers, each of three hours duration. The course will comprise the Physical and the Organic sections of Chemistry III.

PRESCRIBED BOOKS:
Physical Chemistry
Physical Chemistry, Daniels & Alberty.
OR
Physical Chemistry, Moore.
OR
Physical Chemistry, Barrow.
Experimental Physical Chemistry, Daniels et al.
OR
Experiments in Physical Chemistry, Shoemaker & Garland.

Analytical Chemistry and Physical Methods
Fundamental Principles of Chemical Analysis, Pickering.

OR
Thermodynamics for Chemists, Glasstone.

67
Organic Chemistry
Organic Chemistry, Morrison & Boyd.
OR
OR
Organic Chemistry, Bordwell.
Guidebook to Mechanism in Organic Chemistry, Sykes.

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.

PRESCRIBED BOOKS:
Dana's Minerals and How to Study Them, (3rd Ed.), Hurlbut (Editor).
Principles of Physical Geology (2nd Ed.), Holmes.
Essentials of Earth History, Stokes.

MATHEMATICS I
A course of four lectures and two tutorial hours per week for three terms, covering the following topics:
Differential calculus, integral calculus and their applications; special functions; differential equations; number systems, matrices and determinants; introduction to groups and rings; co-ordinate geometry in two and three dimensions, introduction to vectors and their applications. From time to time there is an option for students to take a course of more advanced lectures.

PRESCRIBED BOOKS:
Complementary Mathematics, Keane, A., & Senior, S. A.
Calculus, Ayres, Frank.
OR
Differential & Integral Calculus, Schaum Publishing Co.
Higher Algebra for Undergraduates, Weiss, M. J., & Dubisch, R.

PURE MATHEMATICS II
A course of four lectures and two tutorial hours per week for three terms arranged on the following pattern:

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<tr>
<th>Lecture</th>
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<tbody>
<tr>
<td>Term 1</td>
<td>Linear Algebra</td>
<td>Analysis</td>
<td>Calculus (Several variables)</td>
<td>Vector Calculus</td>
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<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
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<tr>
<td>Term 2</td>
<td>Linear Algebra</td>
<td>Linear Algebra</td>
<td>Differential Equations</td>
<td>Complex Variable</td>
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<td>E</td>
<td>F</td>
<td>G</td>
<td>H</td>
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<tr>
<td>Term 3</td>
<td>Differential Geometry</td>
<td>Complex Variable</td>
<td>Differential Equations</td>
<td>Calculus</td>
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<td>J</td>
<td>K</td>
<td>L</td>
<td>M</td>
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PRESCRIBED BOOKS:
Complex Variables & Applications, Churchill, R. V.
Differential Equations, Agnew, R. P.
Advanced Calculus, Kaplan, W.
Mathematical Methods, Keane, A. & Senior, S. A.
Linear Algebra & Matrix Theory, Nering, E. D.
The Laplace Transform, an Introduction, Rainville, E. D.
Introduction to Topology, Mendelson, B.
Differential Geometry, Weatherburn, C. E.,
OR
Differential Geometry, Willmore, T. J.

APPLIED MATHEMATICS II
A course of four lectures and two tutorial hours per week for three terms arranged on the following pattern:

<table>
<thead>
<tr>
<th>Lecture</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Term 1</td>
<td>Dynamics</td>
<td>Dynamics</td>
<td>Fortran Programming</td>
<td>Probability</td>
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<tr>
<td></td>
<td>N</td>
<td>P</td>
<td>Q</td>
<td>R</td>
</tr>
<tr>
<td>Term 2</td>
<td>Dynamics</td>
<td>Hydrodynamics</td>
<td>Numerical Analysis</td>
<td>Statistics</td>
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<td>S</td>
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<td>V</td>
</tr>
<tr>
<td>Term 3</td>
<td>Dynamics</td>
<td>Hydrodynamics</td>
<td>Computing</td>
<td>Statistics</td>
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<td>W</td>
<td>X</td>
<td>Y</td>
<td>Z</td>
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</tbody>
</table>

PRESCRIBED BOOKS:
Vector Analysis, Newell, H. E.
Electricity, Coulson, C. A.
Introduction to Mathematical Statistics (3rd Ed.), Hoal, P. G.
MATHEMATICS II

A course of four lectures and two tutorial hours per week for three terms, comprising twelve modules selected from Pure Mathematics II and Applied Mathematics II as follows:

1. 1st term — Modules C, D, Q, R.
2. 2nd term — Modules G, H, U, V.
3. 3rd Term — Modules L, M, Y, Z.

Part-time students may take Mathematics II in two parts — each of two lectures per week for three terms.

Mathematics II, Part 1, comprises Modules C, D, G, H, L, M.

PRESCRIBED BOOKS:

Mathematics II Part 1
Mathematical Methods, Keane, A. & Senior, S. A.
Vector Analysis, Newell, H. E.

Mathematics II Part 2
Mathematical Methods, Keane, A., & Senior, S. A.
Introduction to Mathematical Statistics (3rd Ed.), Hoel, P. G.

PHYSICS I

The course includes study of mechanics, properties of matter, heat, light, wave motion, sound, electricity and magnetism. The first term work will be common to all students. For the second and third terms, depending on school grading in the subject and first term performance, the class will be divided into Physics IA and Physics IB.

The Physics IA course will assume a rather elementary prior knowledge of the subject, and the syllabus will be a general introductory one. The Physics IB course will assume a rather greater knowledge of Physics on entrance. The introductory material will be covered at a faster rate and additional lecture material of a broader scope, such as some elements of astronomy, will be introduced. Both courses will be of the same length, involving about 90 lectures, together with 90 hours of laboratory/tutorial work, together with a final examination of two three-hour papers.

Second year work will not be transferred into Physics IB. Consequently a satisfactory pass in either Physics IA or Physics IB will qualify for entry to Physics II.

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

PRESCRIBED BOOK:
Physics for Students of Science and Engineering, Halliday & Resnick.

PHYSICS II

A course which includes the following:

1. **Electricity and Magnetism:**
2. **Electronics:**
   - A survey of the principles of electronic circuitry, using valves.
3. **Physical Optics and Radiation:**
   - Electromagnetic wave and quantum concepts; interference; diffraction; polarization.
4. **Atomic Physics:**
   - Quantum theory of radiation; X-rays, nucleus, isotopes, radioactivity; optical spectra; Bohr theory.
5. **Solid State Physics:**
   - Electronic and thermal properties of solids; the perfect solid; defects in solids; strength of solids.
6. **Thermodynamics and Kinetic Theory:**
   - The first and second laws of thermodynamics; specific heats; ideal gases; Carnot cycle; entropy; absolute scale of temperature; the approach to absolute zero; practice cycles; kinetic molecular theory; van der Waal's equation; Maxwell distribution; mean free path; transfer phenomena; introduction to the classical statistical mechanics.
7. **Electromagnetism:**
   - Introductory field concepts; law of force; constitutive equations; Maxwell's equations, electromagnetic wave propagation in free space.
8. **Mechanics:**
   - Damped harmonic motion; forced vibrations; resonance; Q number; anharmonic motion; combination of harmonic motion. Longitudinal and transverse progressive waves; wave velocities; interference of waves; sound; Doppler effect; selected topics in mechanics.
9. **Nuclear Physics:**
   - Artificial nuclear disintegration; artificial radioactivity; alpha decay; beta decay; gamma rays and gamma decay.

A course of about 120 lectures and 180 hours laboratory work; a final examination of two three-hour papers.

PRESCRIBED BOOKS:
Physics for Students of Science and Engineering, Halliday and Resnick.
Intermediate Electromagnetic Theory, Schwarz.
Elementary Modern Physics, Wiedner and Sells.
Modern Physics, Sproull.

PHYSICS II

(For students in the Departments of Applied Science and Engineering excepting Electrical Engineering.)

A terminating course which comprises units 1 to 5 inclusive set out under Physics II.

A course of about 60 lectures and 75 hours laboratory work; a final examination of one three-hour paper.

PRESCRIBED BOOKS:
As for Physics II.
SUBJECTS IN THE FACULTY OF ENGINEERING

ENGINEERING I

Mechanics (Statics):
(60 hours lectures and tutorials).

(b) **Graphs.** Construction of graphs. Line charts. Linearization, logarithmic graphs. Graphical differentiation and integration.

**PRESCRIBED BOOKS:**
*Principles of Statistics*, Hall, A. S., and Archer, F., University of New South Wales Students Union.

Mechanics (Dynamics):
(60 hours lectures and tutorials).

**PRESCRIBED BOOK:**

Engineering Drawing:
(30 hours lectures and drawing).
Instruction in the correct use of drawing instruments and the application of drawing standards. Orthographic and Isometric Projections.
In the drawing office the student will be required to make accurate detail drawing and/or assembly drawings of a number of the following machine parts and elements: valves, cocks, bearings, couplings, clutches, pumps, pistons.

**PRESCRIBED BOOK:**
*Australian Standard Drawing Practice*, The Institution of Engineers, Australia.

Mechanical Technology:
(30 hours lectures).
Introduction — Materials and Processes definitions.
Materials — Ferrous Metals. Non-ferrous Metals; timber; plastics; rubber.
6.801/6.8015 ELECTRICAL ENGINEERING

90/96 hours lectures, tutorial and laboratory

A course for students in courses other than Electrical Engineering.

D.C. circuit theory, A.C. circuit theory, three-phase circuits.

Magnetic circuits and the transformer.

Principles of electrical machines, D.C. machines, the 3-phase induction motor.

Introduction to electronics.

PRESCRIBED BOOK:


SUBJECTS IN THE FACULTY OF ARTS

ENGLISH I

LITERATURE—Poetry, Drama, the Novel.

This part of the course is designed as an introduction to the major forms of English literature. The set texts will be studied both historically and critically and will be used also as basis for examining certain general problems in literary and critical theory. Students are recommended to obtain Legouis and Cazamian's *History of English Literature* (Dent).

Poetry: *Metaphysical Poetry* (Penguin) and the poetry of Hopkins, Yeats, Eliot and Auden will be studied in detail. Students are also required to obtain Cross and Marsh: *Poetry: Reading and Understanding* (Cheshire).

Drama: Shakespeare:

- Richard II
- Twelfth Night
- Macbeth
- The Winter's Tale (Signet or American Penguin)

Ibsen:
- Hedda Gabler (Penguin)

Synge:
- The Playboy of the Western World (Everyman Plays & Poems)

Beckett:
- Waiting for Godot (Faber)

Thomas:
- Under Milk Wood (Dent)

Osborne:
- Look Back in Anger (Faber)

Pinter:
- The Caretaker (Methuen)

Novel: Butler:
- The Way of All Flesh

Conrad:
- Heart of Darkness

Joyce:
- A Portrait of the Artist as a Young Man

Woolf:
- To the Lighthouse

Forster:
- A Passage to India

Hemingway:
- A Farewell to Arms

Greene:
- The Power and the Glory

Cary:
- The Horse's Mouth

Golding:
- Lord of the Flies

Heller:
- Catch 22

ECONOMICS I

MICROECONOMICS (3 hours per week)

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.
The prefix M, S or E denotes a room at Tighes Hill.

On the Shortland site:
- A — Class rooms in the Arts/Administration Building.
- B — Main Theatre.
- C — Class rooms in the Geology Building.
- D — Class rooms in the Physics Building.

Laboratory classes at Shortland will be allocated by the Departments concerned.

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<th>Time</th>
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<td>CHEMICAL ENGINEERING — FULL-TIME DEGREE</td>
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<td>Chemistry I</td>
<td>10-11 B.01</td>
<td>10-11 B.01</td>
<td>10-12.30 D.G04 (Prac.)</td>
<td>11-12 D.G08</td>
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<td>10-1</td>
<td>E.41</td>
<td>9-10 B.01</td>
<td>9-10 B.01</td>
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<td>Mathematics I</td>
<td>2-5 E.41</td>
<td>11-12 (Tut.)</td>
<td>11-12 (Tut.)</td>
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<td>Physics I</td>
<td>12-1 D.G08</td>
<td>12-1 D.G08</td>
<td>9-10 B.01</td>
<td>2-5 D.G11/13 (Lab.)</td>
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<td>6-8 S.30</td>
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<tr>
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<td>10-12 S.33</td>
<td>10-12 S.33</td>
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<td>(F.S &amp; E.I)</td>
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<td>(Fluids, Heat)</td>
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<td>Physics III</td>
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<td>10-1 D.105/107 (Lab.)</td>
<td>10-1 D.105/107 (Lab.)</td>
<td>10-1 D.105/107 (Lab.)</td>
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<td>Chemical Engineering II B</td>
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<td>(Principles)</td>
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<td>1.30-5.30</td>
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#### YEAR IV

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- **Research Project**
  - 9-5 S.14
- **Research Seminar**
  - 2-4 S.33

### CHEMICAL ENGINEERING — PART-TIME DEGREE

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### CHEMICAL ENGINEERING — PART-TIME DEGREE (contd.)

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  Humanities II (Electives to be arranged) | |
  Structural Engineering (8.112) | 6.30-9.30 | E.40 |

STAGE VI
Chemical Engineering IIB
  9-11 | S.33 (Design)
  11-1 | S.33 (Principles)
  1.30-5.30 | S.14 (Lab. alt. Design)
  6-8 | S.30 (Principles)

INDUSTRIAL CHEMISTRY — FULL-TIME DEGREE

YEAR I
  Engineering I | 10-1 | E.41 |
  Chemistry I | 2-5 | E.41 |
  Geology I | 9-10 | D.G08 |
  Mathematics I | 9-10 | B.01 |
  Physics I | 12-1 | D.G08 |

YEAR II
  Chemistry II | 9-10 | S.35 |
  Chemical Engineering I | 1-3 | S.30 (Fluids, Heat)
  Fuel Science & Engineering I | 10-12 | S.33 |
  Mathematics II | 9-11 | A.127 |
  Physics II | 11-12 | D.G08 |

YEAR III
  Chemistry III | 11-12 | S.40 (Org.)
  Humanities II (Electives to be arranged) | |

INDUSTRIAL CHEMISTRY — FULL-TIME DEGREE (contd.)

YEAR II
  Chemistry II | 9-10 | S.35 |
  Chemical Engineering I | 1-3 | S.30 |
  Fuel Science & Engineering I | 10-12 | S.33 |
  Mathematics II | 9-11 | A.127 |
  Physics II | 11-12 | D.G08 |
  Mathematics III | 10-11 | S.40 |
  Humanities II (Electives to be arranged) | |

YEAR III
  Chemistry III | 11-12 | S.40 (Org.)
  Humanities II (Electives to be arranged) | |
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### INDUSTRIAL CHEMISTRY — PART-TIME DEGREE

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### METALLURGY — FULL-TIME DEGREE

#### YEAR I

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**METALLURGY — FULL-TIME DEGREE** (cont'd.)

**YEAR III**

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**METALLURGY — PART-TIME DEGREE**

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*Alternatives

**STAGE IV**

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**STAGE V**

**Electrical Engineering 6.801**

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**STAGE VI**

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*Laboratory*
FACULTY OF APPLIED SCIENCE

POST-GRADUATE DEGREES
AND
RESEARCH FACILITIES

The Departments within the Faculty have good facilities for undertaking research leading to the degrees of Master of Engineering, (M.E.), Master of Science, (M.Sc.), or Doctor of Philosophy (Ph.D.).

In the Department of Chemical Engineering a large pilot scale gas producer is being operated under a grant from the National Coal Research Advisory Committee and associated research work in the fields of heat transfer with reaction in packed beds and of high temperature heat transfer generally is available in the Department.

Analogue Computing facilities are available within the Department and all research students have reasonable access to the University's new IBM 1130 computer.

The Department of Metallurgy has excellent facilities including an electron microscope and X-ray equipment and is currently engaged in a number of projects in the fields of physical Metallurgy and problems related to melting, casting and heat treatment.

A number of post-graduate scholarships are available to candidates who have obtained a good Honours degree to enable them to undertake full-time research, and prospective candidates are asked to consult their Head of Department not later than the third term of the final (Honours) year. Full details of recurrent scholarships will be given in the general Calendar issued by the University. Details of special scholarships are posted from time to time on Departmental Notice Boards.

Conditions of award of these Higher Degrees are given in the following pages.

CONDITIONS FOR THE AWARD OF DEGREE OF MASTER

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 Vice-Principal at least one full calendar month before the commencement of the term in which the candidate desires to register.

2. An applicant for registration for the degree of Master shall have been admitted to the degree of Bachelor in the University of Newcastle, or other approved University, in an appropriate Department.

3. (i) In exceptional cases persons may be permitted to register as candidates for the degree of Master if they submit evidence of such academic and professional attainments as may be approved by the Senate.

(ii) The registration of diplomates of the New South Wales Department of Technical Education as candidates for the degree of Master of Science shall be determined in each case by the Senate. Normally, such applicants shall be required to produce evidence of academic and professional progress over a period of five years from the time of gaining the diploma.

4. Notwithstanding any other provisions of these regulations the Senate may require an applicant to demonstrate his fitness for registration by carrying out such work and sitting for such examinations as the Board may determine.

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

6. An applicant approved by the Senate 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.

7. An approved applicant shall be required to pay the undermentioned fees:

(i) a registration fee of £2;

(ii) the appropriate laboratory and supervision fee according to the category in which the student is registered;

(iii) a fee of £15 when submitting the thesis for examination.

The combined laboratory and supervision fee shall be—

(a) £30 p.a. for students in full-time attendance at the University;

(b) £15 p.m. for students in part-time attendance at the University;

Fees shall be paid in advance.

8. (i) Every candidate for the degree shall be required to submit a thesis embodying the results of an original investigation or design, to take such examinations and to perform such other work as may be prescribed by the Senate. 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 8 (i) shall be conducted under the direction of a supervisor appointed by the Senate or under such conditions as Senate may determine.
Every candidate shall submit three copies of the thesis as provided under paragraph 8 (i). All copies of the thesis shall be in double-spaced typescript, shall include a summary of approximately 200 words, and a certificate signed by the candidate to the effect that the work 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.

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.

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 the degree of Bachelor with Honours or who has had previous research experience, this period may, with the approval of the Senate, be reduced by up to three terms.

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

CONDITIONS FOR THE AWARD OF DEGREE OF DOCTOR OF PHILOSOPHY

1. The degree of Doctor of Philosophy may be granted on the recommendation of the Senate to a candidate who has made an important contribution to knowledge and who has satisfied the following By-laws and Regulations made in accordance with these By-laws.

Qualifications

2. A candidate for registration for the degree of Ph.D. shall—
   (i) hold an honours degree from the University of Newcastle; or
   (ii) hold an honours degree of equivalent standing from any other approved University; or
   (iii) if he holds a degree without honours from the University of Newcastle or an approved University, have achieved by subsequent work and study a standard recognised by the Senate as equivalent to honours; or
   (iv) in exceptional cases, submit such other evidence of general and professional qualifications as may be approved by the Senate.

Registration

4. A candidate for registration for a course of study leading to the degree of Ph.D. shall—
   (i) apply to the Vice-Principal 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 proposed 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 and of reporting to the Senate at the end of the course on the merits of the candidate's performance in the prescribed course of study.

Course of Study

5. Subsequent to registration the candidate shall pursue a course of advanced study and research for at least nine academic terms, save that—
   (i) a candidate who is not fully engaged in research work for his degree will be required to satisfy the Senate on the amount of time he can devote to research work for the degree; and he may not proceed to the degree before the expiration of ten academic terms from the date of registration as a candidate;
   (ii) any candidate who before registration was engaged upon research to the satisfaction of the Senate, may be exempted from three academic terms.

6. 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.
7. 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 Board to spend a period of not more than three academic terms in research at another institution approved by the Senate.

8. 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.

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

Thesis

10. On completing his course of study every candidate must 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 and reach a satisfactory standard of literary presentation.

11. The thesis must 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.

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

13. 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.

14. It shall be understood that the University retains the 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.

Entry for Examination

15. The candidate shall give in writing two 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.

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. 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.

19. The Senate shall appoint the examiners, one of whom shall normally be an external examiner.

20. After the examiners have read the thesis they may—
   (i) without further test recommend the candidate for rejection;
   (ii) request additional work on the thesis before proceeding further with the examination.

21. If the thesis reaches the required standard, the examiners shall arrange for the candidate to be examined orally, and, at their discretion, by written papers and/or practical examinations on the subject of the thesis and/or subjects relevant thereto.

22. If the thesis is adequate but the candidate fails to satisfy the examiners at the oral or other examinations, the examiners may recommend the University to permit a candidate to re-present the same thesis and submit to a further oral, practical or written examination within a period specified by them but not exceeding eighteen months.

23. At the conclusion of the examination, the examiners will submit to the Senate a concise report on the merits of the thesis and on the examination results.

Fees

24. The fee payable for an examination qualifying for registration shall be $10.

25. An approved candidate shall pay—
   (i) a registration fee of $4.
   (ii) a supervision fee of $60 per annum.
   (iii) a fee of $42 on application for the examination.

26. Fees shall be paid in advance.