FOREWORD

It gives me great pleasure to welcome you back, or into, the Faculty of Science for this year. I trust that the year will be both profitable and enjoyable for you. Undoubtedly you will hear many people indicate that you will have the opportunity of getting as much from the year as you want, and that what you get from the year will be related to how much effort you put into it. Both of these comments are undoubtedly true. Within the Faculty of Science we trust that you will be well prepared during your time here for the years ahead.

The motto of the University "I look ahead" has been chosen with some thought. We look ahead to our graduates making important contributions to Newcastle and the Hunter Region, to Australia and to the world in the future — perhaps in another ten or fifteen years. Our aim is not to produce graduates who can simply capably fill an existing position in industry, education or research. Our aim is to turn out graduates who can go into positions, fill them capably, but then create and bring about developments which will lead to progress. In short, we aim to turn out the leaders who will bring about the necessary developments for the future. For these reasons, understanding and ability to handle principles is fundamentally important.

There is opportunity in the university to learn and to develop. You will learn quite a deal and you will develop quite a deal if you follow the work that is given to you during instruction periods. However, you will learn and develop more if you follow up this work by consulting extra resources such as those available to you within the Library. Consequently, you are encouraged to keep abreast of the instruction you are given but you are also urged to follow up the topics which interest you, or perhaps pose problems to you, by undertaking your own activity outside of class hours. The Board of this Faculty offers you the advice that, unless you devote at least 50 hours per week in each year of your degree programme, you will not be giving yourself appropriate opportunity to pass all of your subjects in a particular year.

As well as a pleasant site, this University offers a very great advantage — small numbers and small class sizes. In this way it becomes possible for staff and students to know each other and to have much more effective interplay than in a larger institution. Many staff members have chosen to take up posts here at Newcastle because of this important opportunity. You should be willing to make use of the opportunity of talking directly to staff members and asking questions, as well as seeking additional information. Be prepared to visit staff members outside of class hours. We were all students once and know only too well how reluctant we felt to approach staff members. But, I assure you, we were very similar to you and appreciate the situation that students feel themselves in. There is always someone who can give you advice on any matter. All that is necessary is to approach any staff member who will then, quite certainly, either provide the advice or inform you of the source where you can get help. Be prepared to seek information and advice and I am sure that many of your difficulties will be easily resolved.

As well as indicating to you that you should try to get as much as possible from your association with the Faculty of Science, I also indicate that you should try to get as much as possible from your association with the University, in the broad sense, both on a social and recreational basis as well as educational. There are opportunities for all sorts of activities other than purely formal learning and work, and I am certain that your life will be richer if you avail yourselves of the broader activities of the University.

Again, I hope that you will have a successful and enjoyable year. I trust that you will put in the effort required to achieve success and the satisfaction to be derived from success. The satisfaction is knowing that you have shown marked development, and that this will be of benefit to you, and also the realization that this will be of benefit to our community in the coming years.

B. BOETTCHER,
Dean of Science.
CONTENTS

Faculty of Science

Page

3 Foreword
5 Faculty of Science
6 Faculty Staff
12 Information for undergraduates
12 Professional employment & professional recognition
12 The University of Newcastle Psychology Students' Association
13 Subject timetable clashes
15 Student academic progress
15 Advisory prerequisite for entry to the Faculty
15 Student advice
15 Russian for the Scientist & Mathematician
16 Prerequisites for Curriculum & Method subjects

Undergraduate Course
17 Bachelor of Science degree
17 General provisions
18 Ordinary degree
20 Honours degree
21 Combined degree courses
21 Science/Arts
21 Science/Mathematics
21 Science/Engineering
22 Equivalent honours
22 Schedule of subjects

24 Postgraduate courses — requirements
24 Diploma in Geology
25 Diploma in Psychology
26 Master Degrees
32 Combined degree courses
37 Faculty policy in regard to standing
37 Guide to subject entries
38 Departments of — Biological Sciences
45 Chemistry
48 Geology
52 Physics
57 Psychology
61 Geography
67 Mathematics
77 Research in the Faculty of Science
84 Computer Numbers

General Information — Between pages 44 & 45

FACULTY OF SCIENCE

The Faculty of Science comprises the Departments of Biological Sciences, Chemistry, Geology, Physics and Psychology. The Departments of Geography and Mathematics also offer major sequences of qualifying subjects for the degree of Bachelor of Science in the Faculty of Science.

The Faculty Board, Faculty of Science, consists of the Professors, Associate Professors, Readers, Senior Lecturers, Lecturers, Senior Tutors, Demonstrators and Tutors of the Departments composing the Faculty together with the following representatives of the Departments offering services to the Faculty, as determined by Senate:

six members from the Department of Geography;
six members from the Department of Mathematics;
two members from the Faculty of Engineering;
two members from the Faculty of Arts;
one member from the Department of Metallurgy;
one member from the Department of Education;
two members from the Faculty of Medicine; and
four student members elected from the Faculty of Science.

The Role of the Faculty Board is defined by By-law 24.4.

“A Faculty Board shall:

(a) encourage and supervise the teaching and research activities of the Faculty;
(b) determine the nature and extent of examining in the subjects in the courses of study for the degrees and diplomas in the Faculty;
(c) determine the grades of pass to be awarded and the conditions for granting deferred or special examinations in respect of the subjects in the courses of study for the degrees and diplomas in the Faculty;
(d) determine matters concerning admissions, enrolment and progression in the courses of study for the degrees and diplomas in the Faculty and make recommendations on such of those matters as require consideration by the Admissions Committee;
(e) consider the examination results recommended in respect of each of the candidates for the degrees and diplomas in the Faculty and take action in accordance with the Examination Regulations made by the Council under By-law 59.1;
(f) deal with any matter referred to it by the Senate;
(g) make recommendations to the Senate on any matter affecting the Faculty; and
(h) exercise such other powers and duties as may from time to time be delegated to it by the Council".
BIOLOGICAL SCIENCES

Professor
B. Boettcher, BSc, PhD(Adelaide)

Associate Professor
R. C. Jones, BSc(New South Wales), PhD(Sydney)

Senior Lecturers
D. S. Angus, BSc, PhD(Queensland)
B. A. Conroy, BSc, PhD(Sydney)
R. N. Murdoch, BSc(New South Wales), PhD(Sydney)
J. W. Patriek, BSc(Agr)(Sydney), PhD(Macquarie)
P. J. Quinn, BAgSc(Adelaide), PhD(Sydney)
T. K. Roberts, BSc(Adelaide), PhD(Edinburgh)
R. J. Rose, BSc(Agr)(Sydney), PhD(Macquarie)

Senior Tutor
Christina E. Offer, BSc, PhD(Adelaide)

Tutors
L. Rosemary Parrie, BSc(Nottingham), Dip.AnGeol(Edinburgh), Dip.Ed
J. D. Stanger, BSc(James Cook)

Departmental Office Staff
Nancy Kirby
Karen E. Blackford

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F. Murray, BSc(London)

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Deirdre M. Rhodes

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D. G. Shillcock

Laboratory Assistants
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T. D. Frost
P. S. Jamieson
Janelle A. McDonald
Morag S. Rainford
Dianna L. Seally

CHEMISTRY

Professor
W. F. J. Pickering, MSc, PhD(New South Wales), DSc, ASTC, FRACI

Associate Professor
R. F. Cooney, BSc, PhD(Queensland), ARACI
G. C. Curlewis, BSc(Sydney), MSc, PhD(New South Wales), FRACI
H. Druitt, MSc(Sydney), PhD(Cambridge), ARACI
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L. A. Summers, BSc, PhD(Glasgow), FRACI
W. R. Walker, MSc(Sydney), PhD(New South Wales), DipEd(Sydney), FRACI

Senior Lecturers
K. H. Bell, BSc, PhD(New South Wales), ARACI
R. A. Frelchin, BSc, PhD(Queensland), ARACI
H. R. Tierce, MSc(London), DCT(Battersea), FRIC, FRACI

Lecturer
E. B. Jacobs, BSc(Sydney), ARACI

Senior Tutor
G. L. Orr, BSc(Queensland), PhD(New South Wales)

Departmental Office Staff
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Kathleen D. Hall

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Senior Laboratory Craftsman
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Judith Burton
R. J. Irving
Kim M. Marshall
W. J. Thompson

Laboratory Assistants
Sonia Fraser
K. W. Langford

GEOLOGY

Professor
Vacant

Associate Professors
C. F. K. Diesel, Dip.Geol, DeRerNat(Berlin), A AusIMM
B. A. Engel, MSc(New England), PhD(Head of Department)
K. H. R. Moelle, DSc, DrPhil(Heinrich), A AusIMM
S. St. J. Warren, BSc(Western Australia), PhD(New South Wales), FGS, FGAA, FMSA, FAIE

Senior Lecturer
R. O'Call, BSc, PhD(Adelaide)

Lecturer
P. K. Secombe, MSc(Melbourne), PhD(Manitoba)
Honorary Associate
G. H. Taylor, BSc(Melbourne), MSc(Adelaide), DrRerNat(Bonn), DSc(Melbourne)

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Technical Staff

Professional Officer
G. L. Dean-Jones, MSc(Macquarie)

Technical Officers
Kay E. Jackson, BSc
E. Krupic

Laboratory Assistants
Janice A. Walker
W. H. Crebert
B. L. Jenkins

Physics

Professor
R. J. MacDonald, BSc, PhD(New South Wales), FAIP

Associate Professors
B. J. Fraser, MSc(New Zealand), PhD(Canterbury)
C. S. L. Keay, MSc(New Zealand), PhD(Canterbury), MA(Toronto), FIP, FAIP, FAAAS, FRNZAS, FRAS
J. A. Ramsey, MSc(Melbourne), PhD, FAIP (Head of Department)

Senior Lecturers
F. T. Bagnall, BSc(New South Wales), MSc(New England), PhD, GAIP
J. D. Balfe, MSc(Queensland), AltStP, MAIP
J. E. R. Cleary, MSc(New South Wales)
P. A. McGovern, BE, BSc(Queensland), MS, PhD(California Institute of Technology), MIEEE, MIREAus
P. V. Smith, BSc, PhD(Monash)

Lecturer
R. H. Roberts, BE(New South Wales), MSc, ASTC

Honorary Professor
C. D. Elliott, MSc(New Zealand), PhD(Manchester), FRAS, FRSNZ, FAIP

Departmental Office Staff
June L. Haddow
Aileen M. Rowley

Psychology

Professors
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M. G. King, BA, PhD(Queensland), FAPS, MAPPs

Associate Professors
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D. C. Finlay, MSc, PhD(Melbourne), MAPs
A. Ivanitsk, BA(Queensland), MA, PhD, FAPS
N. F. Kafel, BA, PhD(Australian National), MAPs
Daphne M. Keats, BA(Sydney), MEd, PhD(Queensland), DipEd(Sydney), FAPS, MSAANZ
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J. L. Seggie, BA, PhD, MAPs

Lecturers
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Molly M. Cotton, MA, PhD(New England), MAPs
R. A. Heath, BSc, PhD(McMaster)
K. R. Mather, BA(Sydney), PhD(Macquarie), MAPs
J. A. C. Price, BA(QUEENLAND), ABPS, MSAANZ
J. D. C. Shea, BA, MA(Canterbury, New Zealand), PhD(QUEENSLAND)

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J. French, BSc
P. Geha, BA(Australian National)
Patricia Rhodes, BA

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J. T. Holland, MB, BS, BSc(Med)(Sydney), FRACP
J. Miles, BA, PhD
F. V. Smith, MA(Sydney), PhD(London), FBPS
J. W. Staines, BA, BEc(Sydney), BEc(Melbourne), PhD(London), MBPS, MAPs

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Annette Creffield
Margaret T. Callaghan

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P. W. McNabb

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J. S. Ratcliffe

Senior Laboratory Craftsmen
G. H. Clarke
H. Steigler

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J. C. Fosco
J. J. Norman
J. F. Pearson
T. G. White
GEOGRAPHY

Professors
K. W. Robinson, MA(New Zealand) (Head of Department)
A. D. Tweedie, MA(New Zealand) (Personal Chair)

Associate Professor
P. G. P. Irwin, BA(Sydney), BCom(Queensland), MA(New South Wales)

Senior Lecturers
J. C. R. Cann, MSc(Hull), PhD
Mary R. Hall, MA(Manchester)
R. J. Loughran, BSc(Durham), MSc, PhD(New England)
D. N. Parkes, BA(Durham), MA, PhD
J. C. Turner, BScAgr(Sydney), MS, PhD(Wisconsin)

Lecturers
Rosemary E. Barnard, BA(Sydney), PhD(Australian National)
H. A. Bridgman, BA(Belmont College), MA(Wisconsin), PhD(Wisconsin)
W. J. A. Jones, BA(New South Wales), MA, DipEd(New South Wales)
R. W. Kidd, BSc(New South Wales)
G. N. McLay, BA(Tasmania), MA(Australian National), FRMetS

Senior Tutors
Lister J. de Castro Lopo, CandMag(Copenhagen), MA(Wisconsin), PhD, DipEd(Copenhagen)
K. W. Lee, BA(Liverpool), MA(New England)

Departmental Office Staff
Jeanette Taylor
Valma M. Wiggins

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Cartographer
L. J. Henderson

Cartographic Draughtsmen
B. R. McEwan
P. E. Reynolds

Laboratory Attendants
Myra L. Graham (Map Library)
A. E. Williams

MATHEMATICS

Professors
R. G. Kears, BSc, PhD(Adelaide), FIMA, FASA
R. W. Robinson, MA(Dartmouth), PhD(Cornell)

Associate Professors
W. Bristle, BSc(Sydney), MSc(New South Wales), PhD, DipEd(New England)
C. A. Croxton, BSc(Leicester), MA, PhD(Cambridge)
J. R. Gilleo, BA(Sydney), PhD, DipEd(Sydney)
A. J. Guttmann, MSc(Melbourne), PhD(New South Wales) (Head of Department)
P. K. Smrz, PromPhys, CSc, RNDI(Charles)
W. D. Wallis, BSc, PhD(Sydney)

Senior Lecturers
Annette J. Dobson, BSc(Adelaide), MSc, PhD(James Cook)
R. B. Eggleston, BSc, MA(Melbourne), PhD(Calgary)
V. Ficker, PromMath, CSc, RNDI(Comenius)
R. W. Gibbard, BSc, PhD(Adelaide)
W. T. F. Lau, ME(New South Wales), PhD(Sydney), MAIA
D. L. S. McElwain, BSc(Queensland), PhD(York (Canada))
T. K. Shaeng, BA(Marian College), BSc(Malaya & London), PhD(Malaya)
R. J. Vaughan, BSc, MEngSc, ME(New South Wales), PhD(Adelaide), FSS

Lecturers
R. F. Bergbauer, MSc(Sydney)
D. W. E. Blatt, BSc, PhD(Sydney)
J. G. Cooper, BSc, PhD(New England)
M. J. Hayes, BACambridge
W. C. Summerfield, BSc(Adealaide), PhD(Flinders)
W. P. Wood, BSc, PhD(New South Wales)

Senior Tutors
C. J. Ashman, BA, LitB(New England)
G. W. Southern, BA(New South Wales), DipCompSc

Teaching Assistants
Louise E. Morris, BMath
J. S. Quinn, BMath
Simon, BSc, BA(James Cook), DipCompSc

Honorary Associate
I. L. Rose, BEd(Sydney), PhD(New South Wales)

Research Fellow
J. Reeve, BSc, MSc(Canterbury), PhD(Alberta)

Computer Programmer
A. Nymeyer, BMath, DipCompSc

Administrative Assistant
Rae Pease, BEd(Mitchel CAE)

Departmental Office Staff
Julie H. Latimer
Anne M. McKee
Gaylene Morgan
Information for Undergraduates

Students may choose subjects from the Departments of Geology, Physics, Chemistry, Biological Sciences, Psychology, Mathematics and Geography. A student may, with the permission of the Dean, count up to three subjects offered in other degree courses in the University as qualifying subjects.

Professional Employment and Professional Recognition

Geology

For employment as a geologist students must have at least an ordinary BSc degree but preferably an Honours degree.

There are two professional organisations which graduates in geology may join — the Geological Society of Australia, Inc. and The Australasian Institute of Mining & Metallurgy which has several categories of membership according to qualifications and experience. The Australasian Institute of Mining & Metallurgy has a code of ethics for professional behaviour to which members are expected to adhere.

The Geological Society is currently working with the various State Governments and Federal Government to bring about legislation to provide for the registration of geologists.

Psychology

The Australian Psychological Society is the professional organisation of psychologists in this country.

The objects of the Society are the advancement and diffusion of a knowledge of psychology and especially the promotion of the professional standing of its members by setting up a high standard of training and conduct, and by requiring the observance of rules of professional conduct.

There are two categories of membership in the Australian Psychological Society — Fellowship and Membership. Provision is also made for Student Subscribers and Affiliates. Membership normally requires a four year degree in psychology.

The University of Newcastle Psychology Students' Association

The Association is open to all interested students of Psychology at a nominal cost of 50c annually. Members meet regularly to see films, hear recordings and to listen to speakers on a wide variety of topics. In addition, an important object of the Association listed in the Constitution is — "To provide regular opportunities for social contacts among Psychology students, and Psychology students and staff."

You may join by leaving your name, address and telephone number with the Student Enquiries Office of the Department of Psychology (Room W204).

Subject Timetable Clashes

Students are strongly advised to check on possible timetable clashes before enrolling. Clashes may force students to take those subjects in different years. Although academic staff are always willing to advise students it is the student’s responsibility to ensure that chosen subjects may be studied concurrently. To help in this matter the following table of existing clashes has been compiled for Science Faculty subjects in 1981. However, Science students taking subjects from other faculties must examine the timetable to ensure that clashes do not exist in their proposed courses.

**Biological Sciences**

<table>
<thead>
<tr>
<th>Biology II A with</th>
<th>Chemistry II B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry II B</td>
<td>Geology III A</td>
</tr>
<tr>
<td>Geology III B</td>
<td>Chemistry III A</td>
</tr>
<tr>
<td>Biology II B</td>
<td>Mathematics III (some topics only)</td>
</tr>
</tbody>
</table>

**Chemistry**

<table>
<thead>
<tr>
<th>Chemistry II A with</th>
<th>Geology III B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geology II B</td>
<td>Chemistry III B</td>
</tr>
<tr>
<td>Geology III A &amp; III B</td>
<td>Biology II A</td>
</tr>
<tr>
<td>Physics III A</td>
<td>Geology III B</td>
</tr>
<tr>
<td>Mathematics (some topics)</td>
<td>Electronics &amp; Instrumentation II</td>
</tr>
</tbody>
</table>

**Mathematics**

<table>
<thead>
<tr>
<th>Mathematics III (some topics only)</th>
</tr>
</thead>
</table>
Student Academic Progress

All students are reminded of the need to maintain satisfactory progress and, in particular, attention is drawn to the Regulations Governing Unsatisfactory Progress. The following should be borne in mind.

1. The Faculty Board requires that students shall pass at least one subject in their first year of full-time attendance or in their first two years of part-time attendance.
2. The Faculty Board has determined that at least four subjects be passed at the end of the first two years of full-time attendance or four years of part-time attendance.
3. Notwithstanding paragraphs 1 and 2, above, the Faculty Board may review the academic progress of a student in the later years of the course.

N.B. Where there is a change in attendance status, two part-time years will be taken as the equivalent of one full-time year for the purposes of this policy.

Advisory Prerequisite for entry to the Faculty

Prospective science degree students are advised to include four units of Science and at least two units of Mathematics in their H.S.C. programme. Although prerequisites are not prescribed, some subjects are currently presented on the assumption that students have previously studied subjects and achieved results in them at the 30th percentile or above.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Assumed Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics 1A</td>
<td>Mathematics (3-unit course) and Physics (2-unit course).</td>
</tr>
<tr>
<td>Physics 1B</td>
<td>Physics (2-unit course) or Science (Mutilstrand).</td>
</tr>
<tr>
<td>Chemistry 1</td>
<td>Chemistry (2-unit course), or Mutilstrand (4-unit) Science.</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Mathematics (2-unit course).</td>
</tr>
</tbody>
</table>

Student Advice

Students who have problems should feel free to seek the advice of the DEAN, SUB-DEAN, the appropriate HEAD OF DEPARTMENT OR MEMBER OF TEACHING STAFF whose area of responsibility relates to the particular problem concerned. THE UNIVERSITY COUNSELLING SERVICE is also available to help with broad educational problems on planning life goals as well as personal difficulties.

Russian for the Scientist and Mathematician

FORMAL ENROLMENT NOT NECESSARY

Prerequisites

None, although familiarity with a modern language would be of advantage.

Hours

Approximately 27 lecture hours

Examination

None

Content

This is a voluntary course designed to give students and members of staff a working knowledge of scientific and technical Russian. Translation from Russian into English is costly, and only a very small proportion of the Soviet Union's technical literature is routinely translated into English: often translation of the abstract alone is sufficient to determine whether a complete translation is warranted. Emphasis
throughout the course will be on translation from Russian into English, although both
written and spoken Russian will necessarily be involved. The course should provide a
good introduction for those seeking a somewhat more literary understanding of the
language.
Further details may be obtained from Associate Professor Croxton in the Department of
Mathematics.

Prerequisites for Curriculum and Method Subjects offered in the Diploma in
Education
Students who intend to proceed to a Diploma in Education should familiarise themselves
with the prerequisites for curriculum and method subjects offered in the Diploma Course.
These prerequisites are stated in terms of subjects of the University of Newcastle.
Applicants with qualifications from other universities, or in 1981 or 1982 from this
University, whose courses of study have included subjects which are deemed for this
purpose to provide an equivalent foundation, may be admitted by the Dean on the
recommendation of the Head of the Department of Education.
In the Diploma course the Curriculum and Method units, now known as Group C, are
grouped as follows:

Humanities (English, History)
Geography and Social Science
(Commerce, Social Science)
Mathematics and Science
Languages (French, German)
Primary

Prerequisites
For secondary methods a Part III subject in the main teaching area and a Part II subject in
another teaching area.
For primary methods a Part III subject in at least one teaching area, or a Part III subject in
Psychology or Education together with a Part II subject in a teaching area.

N.B.  Except in Education, a Part II subject assumes as a prerequisite a pass in a Part I subject in the
same discipline.
A Part III subject assumes a pass in a Part II subject in the same discipline.

Requirements for the Degree of Bachelor of Science
In the Faculty of Science
General Provisions

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

2. Grading of Degree
The Degree of Bachelor of Science may be conferred either as an ordinary degree or
as an honours degree and may be undertaken by either full-time or part-time study.

3. Approval of Enrolment
(a) A candidate shall obtain the approval of the Dean or the Dean's nominee for
his enrolment in any year and for any subsequent alteration in that enrolment.
(b) A candidate enrolling in the Faculty for the first time or a candidate wishing to
enrol in more subjects than the number recommended for the normal
programme, as set out in Clause 18, shall, when seeking the approval required
in sub-clause (a) of this Clause, report in person to the Dean or the Sub-Dean.

4. Timetable Requirements
A candidate may not enrol in any year in any combination of subjects which is
incompatible with the requirements of the timetable for that year.

5. Annual Examinations
The Annual Examinations shall be conducted by means of written examinations
supplemented by such oral and practical tests as the examiners think fit.

6. Special Examinations
A candidate may be granted a special examination in accordance with the provisions of
Examination Regulations.

7. Examination Grades
The results of successful candidates at Annual Examinations and Special
Examinations, except for those enrolled in the final honours subjects, shall be
classified:
Pass, Credit, Distinction, High Distinction.

8. Withdrawal
(a) A candidate may withdraw from a subject or course only by informing the
Secretary to the University in writing and the withdrawal shall take effect from
the date of receipt of such notification.
(b) A candidate who withdraws from any subject after the sixth Monday in second
term shall be deemed to have failed in that subject unless granted permission by
the Dean to withdraw without penalty.

9. Relining Clause
In order to provide for exceptional circumstances arising in particular cases, the
Senate, on the recommendation of the Faculty Board, may relax any requirement.

10. Expected Work Load
In the Faculty of Science students are expected to spend at least one hour in private
study for every contact hour. For example, if a full-time student in the Faculty has
24 contact hours per week, he would be expected to spend a minimum of another 24
hours in private study.
THE ORDINARY DEGREE

11. **A Subject**
   (a) To complete a subject qualifying towards the degree, hereinafter called a subject, a candidate shall attend such lectures, tutorials, seminars, laboratory classes and field work and submit such written work as the Department concerned shall require.
   (b) To pass a subject, a candidate shall satisfy the requirements of sub-clause (a) of this Clause and pass such examinations as the Faculty Board shall require.

12. **Degree Patterns**
   (1) To qualify for admission to the ordinary degree a candidate shall pass nine subjects of which at least six shall be chosen from the Schedule of Subjects. Up to three subjects may be chosen from subjects offered in the courses leading to other degrees of the University with the permission of the Dean, who shall determine the classification of each such subject as a Part I, Part II or Part III subject.
   (2) The subjects shall be taken in one of the following degree patterns:
      (a) 4 subjects from Part I, 3 subjects from Part II, 2 subjects from Part III;
      (b) 4 subjects from Part I, 2 subjects from Part II, 3 subjects from Part III;
      (c) 5 subjects from Part I, 2 subjects from Part II, 2 subjects from Part III; or
      (d) in exceptional circumstances, with the permission of the Dean, either
         (i) 4 subjects from Part I, 4 subjects from Part II, 1 subject from Part III, or
         (ii) 5 subjects from Part I, 3 subjects from Part II, 1 subject from Part III.

13. **Choice of Subjects**
   (1) The subjects passed shall include:
      (a) at least three of the following:
         Biology I, Chemistry I, Geography I, Geology I, Mathematics I, Physics IA or Physics IB, and Psychology I;
      (b) (i) at least one Part III subject and two Part II subjects
         OR
         (ii) at least two Part III subjects and one Part II subject, in either case chosen from the Schedule of Subjects to these Requirements;
   (2) A candidate shall not be entitled to count:
      (a) more than one of Physics IA and Physics IB;
      (b) more than four subjects listed in Schedule A of the Requirements for the degree of Bachelor of Mathematics;
      (c) more than five subjects from any one Department;
      (d) Psychology IIC together with either Psychology IIA or Psychology IIB;
      (e) Geology III C together with either Geology III A or Geology III B;
      (f) Psychology III C together with either Psychology III A or Psychology III B.

14. **Prerequisites and Corequisites**
   Except with the permission of the Faculty Board granted after considering any recommendation made by the Head of the Department offering a subject, no candidate may enrol in that subject unless he has passed the subjects prescribed as its prerequisites at any grade which may be specified and has already passed or concurrently enrols in or is already enrolled in the subjects prescribed as its corequisites.

15. **Preparatory Subjects**
   Preparatory subjects are those which students are strongly advised to have completed before enrolling in the subject for which the preparatory subject is recommended.

16. **Omitted Sept. 1978**

17. **Omitted Sept. 1978**

18. **Progression**
   (a) Progression in the course shall be by subject.
   (b) A candidate shall be liable to exclusion from the course if he has not passed four subjects at the completion of two years full-time enrolment or four years part-time enrolment.
      Where a candidate has transferred from full-time to part-time enrolment, or vice-versa, two part-time years shall be taken as the equivalent of one full-time year for the purpose of this clause.
   (c) A candidate may not enrol in more than four subjects in any one academic year.
   (d) A candidate enrolling in four subjects in any one academic year shall not include a Part III subject nor more than two Part II subjects in the four in which he is enrolling.
   (e) A candidate enrolling in three subjects in any one academic year shall not include more than one Part III subject in the three in which he is enrolling.
   (f) One of the following shall be regarded as the normal programme for a full-time student:
      Year I
      Four Part I subjects
      Year II
      Three Part II subjects
      Year III
      Two Part III subjects
      OR
      Year I
      Four Part I subjects
      Year II
      Two Part II subjects and one Part I subject
      Year III
      Two Part III subjects.
   The Dean may in individual cases relax restrictions (c), (d), (e) but only if he is satisfied that the academic merit of the candidate warrants such relaxation.

19. **Standing**
   (a) A candidate may be given standing in qualifying subjects in recognition of work completed in another faculty or tertiary institution and be deemed to have passed in these subjects for the purpose of Clause 12. If the candidate is a graduate such standing shall be limited to a maximum of four subjects.
   (b) Standing may be granted in subjects not offered in the University. Any such subject shall be regarded for the purpose of these Requirements as being a subject in the Part in the Schedule of Subjects as determined by the Dean at the time such standing is granted.

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1 Candidates who enrolled in the B.Sc. degree course prior to 1977 may proceed under these provisions or those in existence in 1976 (see 1976 Faculty Handbook).
2 Candidates enrolled in the course prior to 1978 are deemed to have the permission of the Dean.
3 Candidates enrolled in the course prior to 1972 are exempt from this proviso.
4 These are subjects offered in the Faculty of Mathematics.
HONOURS DEGREE

20. Honours
(a) A candidate seeking to complete an honours degree shall consult with the Head of the Department concerned before enrolling in Part II subjects. Such a candidate may be required to complete concurrently with the study prescribed for the ordinary degree such additional work as the Department may prescribe.
(b) A candidate for the honours degree, before enrolling in the honours subject shall:
   (i) have completed the requirements for admission to the ordinary degree;
   (ii) have been granted approval to enrol in the honours subject from both the Head of the Department concerned and the Dean.
(c) The honours subjects offered shall be:
   Biology IV
   Chemistry IV
   Geography IV
   Geology IV
   Mathematics IV
   Physics IV
   Psychology IV
   (d) To qualify for admission to the honours degree a candidate, in addition to satisfying the other provisions of these Requirements, shall:
      (i) complete the requirements of the honours subject in one year’s full-time study or two years’ part-time study; and
      (ii) pass the honours subject.

21. Combined Honours
(a) A candidate seeking to complete a combined honours degree shall consult with the Heads of the Departments concerned before enrolling in Part II subjects. Such a candidate may be required to complete, concurrently with the study prescribed for the ordinary degree, such additional work as the Departments may prescribe.
(b) A candidate for the combined Honours degree in the Faculty of Science, before enrolling in the combined Honours subject shall:
      (i) have completed the Requirements for admission to the ordinary degree and have included in his degree course such prerequisite subjects as prescribed by Faculty Board for admission to the combined Honours subject;
      (ii) have been granted approval to enrol in the combined Honours subject from the Heads of the Departments concerned and the Dean.
(c) The combined honours subjects offered shall be:
      Physics/Mathematics IV
      Psychology/Mathematics IV
   (d) To qualify for admission to the combined Honours degree a candidate, in addition to satisfying the other provisions of these requirements, shall:
      (i) complete the requirements of the combined Honours subject in one year’s full-time study or two years’ part-time study; and
      (ii) pass the combined Honours subject.

22. There shall be three classes of Honours or Combined Honours, namely Class I, Class II and Class III. Class II shall have two divisions.

23. In each Honours subject or Combined Honours subject, the candidate or candidates at the head of Honours Class I in any year may, if of sufficient distinction, be awarded a University Medal.

1 See section 13(2)(b) of these Requirements.

COMBINED DEGREE COURSES

24. General
A candidate may complete the requirements for the degree of Bachelor of Science in conjunction with another Bachelor’s degree by completing a combined course approved by the Faculty Board of the Faculty of Science and the other Faculty Board concerned provided that:
(a) admission to a combined course shall normally be at the end of the first year and shall be subject to the approval of the Deans of the two Faculties concerned;
(b) admission to combined courses will be restricted to students with an average of at least Credit level;
(c) the Deans of both Faculties shall certify that the work in the combined degree course is no less in quantity and quality than if the two courses were taken separately;
(d) the candidate shall complete the requirements for both degrees except as provided in clauses 25, 26 and 27.

25. Science/Arts
To qualify for admission to the ordinary degrees of Bachelor of Science and Bachelor of Arts, a candidate shall complete all the requirements for the degree of Bachelor of Arts other than Clause 12 and all the requirements for the degree of Bachelor of Science other than Clauses 12(2) and 18, and shall pass fourteen subjects chosen from the Schedules of Subjects approved for the two degrees, provided that:
(a) at least six subjects including at least one Part III subject, shall be chosen from Group I of the Schedule of Subjects approved for the degree of Bachelor of Arts;
(b) at least six subjects, including at least one Part III subject and one Part II subject in a different department, shall be chosen from the Schedule of Subjects approved for the degree of Bachelor of Science (the Part III subject elected must be from a department different from that providing the Part III subject mentioned in (a));
(c) the maximum total number of Arts Part I subjects and Science Part I subjects shall not exceed six.

26. Science/Mathematics
A candidate shall qualify for admission to the ordinary degrees of Bachelor of Science and Bachelor of Mathematics by passing fourteen subjects, as follows:
(a) five subjects being Mathematics I, Mathematics IIA, Mathematics IIC, Mathematics IIIA and another Part III subject chosen from the Schedules of Subjects approved for the degree of Bachelor of Mathematics;
(b) six subjects chosen from the other subjects listed in the Schedule of Subjects approved for the degree of Bachelor of Science;
(c) three subjects chosen, with the approval of the Deans of the Faculties of Mathematics and Science, from the subjects approved for any of the degree courses offered by the University;
provided that:
(i) the number of Part I subjects shall not exceed six;
(ii) the minimum number of Part III subjects shall be three;
(iii) a candidate counting Psychology IIC shall not be entitled to count either Psychology IIA or Psychology IIB;
(iv) a candidate counting Psychology IIC shall not be entitled to count either Psychology IIA or Psychology IIB;
(v) a candidate counting Economics III C shall not be entitled to count either Economics III A or Economics III B;
(vi) a candidate counting Geology III C shall not be entitled to count either Geology III A or Geology III B.

27. Science (Engineering)
A candidate shall qualify for admission to the ordinary degree of Bachelor of Science and the degree of Bachelor of Engineering in any specialisation by completing a combined course approved by the Faculty Boards of Science and Engineering.

EQUIVALENT HONOURS

28. (a) On the recommendation of a Head of Department in the Faculty and with the permission of the Dean, a graduate who, in the discipline concerned, has not completed the fourth year honours subject either as a full-time or a part-time student at this or any other Australian university, may enrol in the fourth year honours subject either as a full-time or a part-time student.
(b) Such a graduate who has completed all of the requirements of the fourth year honours subject shall be issued with a statement to this effect by the Secretary; the Statement shall indicate the honours level equivalent to the standard achieved by the student in completing the fourth year honours subject.

SCHEDULE OF SUBJECTS

Subject Remarks, Prerequisites, Corequisites, Preparatory Subjects

PART I
Biology I
Chemistry I
Geography I
Geology I
Mathematics I
Physics I A
Physics I B
Psychology I

PART II
Biology II A
Biology II B
Chemistry II A
Chemistry II B
Computer Science II
Electronics & Instrumentation II
Geography II A
Geography II B
Geography II C

Prerequisite: Biology I
Prerequisite: Chemistry I
Preparatory Subjects:
Mathematics I & either Physics I A or Physics I B
Prerequisite: Chemistry I
Corequisite: Chemistry II A (Advisory)
Prerequisite: Mathematics I
Prerequisite: Physics I A or I B
Corequisite: a Part III subject approved by the Faculty Board on the recommendation of the Head of the Dept. of Physics.

Prerequisite: Geography I

Subject
Geology II A
Geology II B
Mathematics II A
Mathematics II B
Mathematics I
Physics II
Psychology II A
Psychology II B

Remarks, Prerequisites, Corequisites, Preparatory Subjects

Geology II A
Prerequisite: Geology I

Geology II B
Prerequisite: Mathematics I

Mathematics II A
Corequisite: Mathematics II A

Mathematics II B
Prerequisite: Mathematics II A

Mathematics I
Prerequisite: Mathematics I, Physics I A or normally a credit pass or better in Physics I B.

Psychology II A
Prerequisite: Psychology I

Psychology II B

PART III
Biology I I A
Biology I I B
Chemistry III A
Chemistry III B
Geography III A
Geography III B
Geology III A

Geology III B

Prerequisite: Biology III A
Prerequisite: Biology II A or II B
Prerequisite: Mathematics I and Chemistry III A
Corequisite: Chemistry III A

Prerequisite: Mathematics III A
Prerequisite: Geography III A, II B or II C
Prerequisite: Geography II A, II B or II C

Physic I II A
Prerequisite: Physics I I B

Geology III B

Corequisite: Geology III A

Prerequisite: Mathematics III A
Corequisite: Mathematics III A

Physics III A

Prerequisite: Physics II
Corequisite: Physics III A

This subject will not be offered in any one year unless there are three or more enrolments.

Psychology III A
Prerequisite: Psychology I I A

Psychology III B
Prerequisite: Psychology I I B

Statistics III
Prerequisite: Mathematics III A and Mathematics III C (including topics CO, I I and I).
POSTGRADUATE COURSES
Studies may be undertaken for the following postgraduate qualifications:
- Diploma in Coal Geology
- Diploma in Psychology
- Master of Psychology (Clinical)
- Master of Psychology (Educational)
- Master of Science
- Doctor of Philosophy

REQUIREMENTS FOR THE DIPLOMA IN COAL GEOLOGY
1. In these Requirements, unless the context or subject matter otherwise indicates or requires:
   - "the Department" means the Department of Geology;
   - "the Diploma" means the Diploma in Coal Geology;
   - "the Faculty Board" means the Faculty Board of the Faculty of Science.
2. An application for admission to candidature for the Diploma shall be made on the prescribed form and lodged with the Secretary to the University by the prescribed date.
3. An applicant shall:
   (a) have satisfied the requirements for admission to a degree of the University of Newcastle or a degree, approved for this purpose by the Faculty Board, of any other tertiary institution, provided that the course completed for that degree by the applicant included a major sequence in Geology; or
   (b) have other qualifications and professional experience deemed appropriate by the Faculty Board on the recommendation of the Head of the Department.
4. Admission to candidature shall require the approval of the Faculty Board on the recommendation of the Head of the Department. Such approval shall be subject to such conditions as the Faculty Board may determine on the recommendation of the Head of the Department.
5. (1) To qualify for the Diploma a candidate shall enrol and shall complete to the satisfaction of the Faculty Board a programme consisting of:
   (a) lectures, tutorials and practical work as determined by the Faculty Board on the recommendation of the Head of the Department; and
   (b) two reports, each embodying the result of a project, at least one of which shall be field-oriented.
   (2) Except with the permission of the Faculty Board on the recommendation of the Head of the Department, the programme shall be completed in not less than two years of part-time enrolment.
   (3) The programme shall include periods of attendance at both the University of Newcastle and the University of Wollongong as prescribed by the Faculty Board on the recommendation of the Head of the Department.
6. A candidate's programme shall require approval by the Faculty Board on the recommendation of the Head of the Department.
7. A candidate may withdraw from the course only by notifying the Secretary to the University in writing and the withdrawal shall take effect from the date of receipt of such notification.
8. In order to provide for exceptional circumstances arising in particular cases, the Senate, on the recommendation of the Faculty Board, may relax any of the provisions of these Requirements.

REQUIREMENTS FOR THE DIPLOMA IN PSYCHOLOGY
GENERAL
1. There shall be a Diploma in Psychology.
2. In these Requirements, unless the context or subject matter otherwise indicates or requires, "the Faculty Board" means the Faculty Board of the Faculty of Science, "the Board of Studies" means the Board of Studies in Psychology, and "the Dean" means the Dean of the Faculty of Science.
3. A candidate for the Diploma shall register in one of the following specialisations:
   (a) Clinical Psychology; or
   (b) Educational Psychology.
4. The Diploma shall be awarded in one grade only.
5. A candidate may withdraw from the course only by informing the Secretary to the University in writing and the withdrawal shall take effect from the date of receipt of such notification.
6. In exceptional circumstances, the Senate may, on the recommendation of the Faculty Board, relax any provision of these Requirements.
   Clinical Specialisation
7. An applicant for registration as a candidate for the Diploma in the Clinical Specialisation shall:
   (a) have satisfied all of the requirements for admission to a Bachelor's degree withhonours in Psychology in the University of Newcastle or to such a degree in another university approved for this purpose by the Faculty Board; and
   (b) be selected for admission to the course by the Board of Studies which shall, in making this determination, take account of the applicant's academic qualifications, experience, and the report of an interview which shall be conducted by a selection committee which the Board shall appoint.
8. (a) Notwithstanding the provision of subsection (a) of Section 7, the Faculty Board, on the recommendation of the Board of Studies, may permit to register as a provisional candidate a person who has satisfied all of the requirements for admission to a degree of the University of Newcastle or another university approved for this purpose by the Faculty Board, provided that the course completed for that degree by the applicant included a major study in Psychology.
   (b) A candidate permitted to register provisionally under the provisions of subsection (a) of this Section shall complete such work and pass such examinations at Bachelor's degree honours level as may be prescribed by the Faculty Board before his registration may be confirmed by the Faculty Board.
9. A candidate for the Diploma in the Clinical Specialisation shall, in not less than two years of part-time enrolment, attend such lectures, seminars and tutorials; complete such written and practical work; and pass such examinations as may be prescribed by the Board of Studies.
   Educational Specialisation
10. An applicant for registration as a candidate for the Diploma in the Educational Specialisation shall:
   (a) (i) have satisfied all of the requirements for admission to a Bachelor's degree in the University of Newcastle and have included in the qualifying course for that degree at least one Part III Psychology subject; or
       (ii) have satisfied all of the requirements for admission to an equivalent qualification in another university recognised for this purpose by the Faculty Board;
   (b) have satisfied all of the requirements for the award of the Diploma in Education in the University of Newcastle or another teaching qualification approved for this purpose by the Faculty Board;
(c) have at least two years teaching or other relevant practical experience approved by the Board of Studies; and
(d) be selected for admission to the course by the Board of Studies which shall, in making this determination, take account of the applicant's academic qualifications; experience; and the report of an interview which shall be conducted by a selection committee which the Board shall appoint.

11. A candidate for the Diploma in the Educational Specialisation shall, in not less than two years of full-time enrolment or an equivalent period of part-time enrolment, attend lectures, seminars and tutorials; complete such written and practical work; and pass such examinations as may be prescribed by the Board of Studies.

REGULATIONS GOVERNING MASTERS DEGREES

PART I — GENERAL

11. (1) These Regulations, including the Schedules thereto, prescribe the conditions and requirements relating to the degrees of Master of Architecture, Master of Arts, Master of Commerce, Master of Education, Master of Educational Studies, Master of Engineering, Master of Engineering Science, Master of Mathematics, Master of Psychology (Clinical), Master of Psychology (Educational) and Master of Science.

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

“Faculty Board” means the Faculty Board of the Faculty responsible for the course in which a person is enrolled or is proposing to enrol;

“programme” means the programme of research and study prescribed in the Schedule;

“Schedule” means the Schedule of these Regulations pertaining to the course in which a person is enrolled or is proposing to enrol; and

“thesis” means any thesis or dissertation submitted by a candidate.

(3) These Regulations shall not apply to degrees conferred honoris causa.

(4) A degree of Master shall be conferred in one grade only.

2. An application for admission to candidacy for a degree of Master shall be made on the prescribed form and lodged with the Secretary to the University by the prescribed date.

3. (1) To be eligible for admission to candidacy an applicant shall:

(a) (i) have satisfied the requirements for admission to a degree of Bachelor in the University of Newcastle as specified in the Schedule; or
(ii) have satisfied the requirements for admission to a degree or equivalent qualification, approved for the purpose by the Faculty Board, in another tertiary institution; or
(iii) have such other qualifications and experience as may be approved by the Senate on the recommendation of the Faculty Board or otherwise as may be specified in the Schedule; and
(b) have satisfied such other requirements as may be specified in the Schedule.

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

(3) An applicant shall not be admitted to candidacy unless adequate supervision and facilities are available. Whether these are available shall be determined by the Faculty Board unless the Schedule otherwise provides.

4. To qualify for admission to a degree of Master a candidate shall enrol and satisfy the requirements of these Regulations including the Schedule.

5. The programme shall be carried out:

(a) under the guidance of a supervisor or supervisors either appointed by the Faculty Board or as otherwise prescribed in the Schedule; or
(b) as the Faculty Board may otherwise determine.

6. Upon request by a candidate the Faculty Board may grant leave of absence from the course. Such leave shall not be taken into account in calculating the period for the programme prescribed in the Schedule.

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

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

The relevant date shall be:

(a) in the case of a subject offered in the first half of the academic year — the eighth Monday in first term;
(b) in the case of a subject offered in the second half of the academic year — the second Monday in third term;
(c) in the case of any other subject — the sixth Monday in second term.

8. (1) If the Faculty Board is of the opinion that the candidate is not making satisfactory progress towards the degree then it may terminate the candidate or place such conditions on its continuation as it deems fit.

(2) For the purpose of assessing a candidate's progress, the Faculty Board may require any candidate to submit a report or reports on his progress.

(3) A candidate against whom a decision of the Faculty Board has been made under Regulation 8(1) of these Regulations may request that the Faculty Board cause his case to be reviewed. Such request shall be made to the Dean of the Faculty within seven days from the date of posting to the candidate the advice of the Faculty Board's decision or such further period as the Dean may accept.

(4) A candidate may appeal to the Vice-Chancellor against any decision made following the review under Regulation 8(3) of these Regulations.

9. In exceptional circumstances arising in a particular case, the Senate, on the recommendation of the Faculty Board, may relax any provision of these Regulations.

PART II — EXAMINATION AND RESULTS

10. The Examination Regulations approved from time to time by the Council shall apply to all examinations with respect to a degree of Master with the exception of the examination of a thesis which shall be conducted in accordance with the provisions of Regulations 12 to 16 inclusive of these Regulations.

11. The Faculty Board shall consider the results in subjects, the reports of examiners and any other recommendations prescribed in the Schedule and shall decide:

(a) to recommend to the Council that the candidate be admitted to the degree; or
(b) in a case where a thesis has been submitted, to permit the candidate to resubmit an amended thesis within twelve months of the date on which the candidate is advised of the result of the first examination or within such longer period of time as the Faculty Board may prescribe; or
(c) to require the candidate to undertake such further oral, written or practical examinations as the Faculty Board may prescribe; or
(d) not to recommend that the candidate be admitted to the degree, in which case the candidature shall be terminated.
PART III — PROVISIONS RELATING TO THESSES

12. (1) The subject of a thesis shall be approved by the Faculty Board on the recommendation of the Head of the Department in which the candidate is carrying out his research.

(2) The thesis shall not contain as its main content any work or material which has previously been submitted by the candidate for a degree in any tertiary institution unless the Faculty Board otherwise permits.

13. The candidate shall give to the Secretary to the University three months' written notice of the date he expects to submit a thesis and such notice shall be accompanied by any prescribed fee.  

14. (1) The candidate shall comply with the following provisions concerning the presentation of a thesis:

(a) the thesis shall contain an abstract of approximately 200 words describing its content;

(b) the thesis shall be typed and bound in a manner prescribed by the University;

(c) three copies of the thesis shall be submitted together with:

(i) a certificate signed by the candidate that the main content of the thesis has not been submitted by the candidate for a degree in any other tertiary institution; and

(ii) a certificate signed by the supervisor indicating whether the candidate has completed the programme and whether the thesis is of sufficient academic merit to warrant examination; and

(iii) if the candidate so desires, any documents or published work of the candidate whether bearing on the subject of the thesis or not.

(2) The Faculty Board shall determine the course of action to be taken should the certificate of the supervisor indicate that in the opinion of the supervisor the thesis is not of sufficient academic merit to warrant examination.

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

16. (1) For each candidate two examiners, at least one of whom shall be an external examiner (being a person who is not a member of the staff of the University) shall be appointed either by the Faculty Board or otherwise as prescribed in the Schedule.

(2) If the examiners' reports are such that the Faculty Board is unable to make any decision pursuant to Regulation 11 of these Regulations, a third examiner shall be appointed either by the Faculty Board or otherwise as prescribed in the Schedule.

SCHEDULE 9 — MASTER OF PSYCHOLOGY (CLINICAL)

1. (1) The Faculty of Science shall be responsible for the course leading to the degree of Master of Psychology (Clinical).

(2) Unless the context or subject matter otherwise indicates or requires, "the Board" means the Board of Studies in Psychology.

2. On the recommendation of the Head of the Department of Psychology, the Board shall appoint a course controller who shall recommend to the Board the nature and extent of the programmes to be prescribed and shall be responsible for the collation of all written work submitted by candidates in pursuing those programmes.

3. To be eligible for admission to candidature an applicant shall:

(a) have satisfied all the requirements for admission to a degree of bachelor with honours in Psychology of the University of Newcastle or to an honours degree, approved for this purpose by the Faculty Board, of another university, OR

(b) on the recommendation of the Board, have satisfied all the requirements for admission to a degree of the University of Newcastle or to a degree, approved for this purpose by the Faculty Board, of another university, provided that the course completed for that degree by the applicant included a major sequence in Psychology.

4. (1) The Board shall consider each application for admission to candidature and shall make a decision thereon.

(2) Before approving an admission to candidature under Section 3(b) of this schedule the Board may require an applicant to complete such work and pass such examinations at honours level as may be prescribed by the Board.

(3) Before an application for admission to candidature is approved, the Board shall be satisfied that adequate supervision and facilities are available.

(4) In considering an application, the Board shall take account of the applicant's academic qualifications and experience, the report of an interview with the applicant and any other selection procedures applied to the applicant as determined by the Board. The interview and selection procedures shall be conducted by a Selection Committee approved by the Board.

5. To qualify for admission to the degree the candidate shall:

(a) in not less than two years attend such lectures, seminars and tutorials and complete to the satisfaction of the Board such written and practical work and examinations as may be prescribed by the Board; and

(b) submit a thesis embodying the results of an empirical investigation.

6. (1) Examiners shall be appointed by the Faculty Board on the recommendation of the Board.

(2) One examiner appointed pursuant to Regulation 16(1) of these Regulations shall be an internal examiner being a member of the staff of the University.

7. Before a decision is made under Regulation 11 of these Regulations the Board shall consider:

(a) the examiners' reports on the thesis; and

(b) a report of the internal examiner made in consultation with the course controller on the candidate's performance in the work prescribed under section 2(5) of this Schedule;

and shall submit these to the Faculty Board together with its recommendation. The Faculty Board shall make its decision in the light of these reports and on the recommendation of the Board.
SCHEDULE 10 — MASTER OF PSYCHOLOGY (EDUCATIONAL)

1. (1) The Faculty of Science shall be responsible for the course leading to the degree of Master of Psychology (Educational).

(2) Unless the context or subject matter otherwise indicates or requires, "the Board" means the Board of Studies in Psychology.

2. On the recommendation of the Head of the Department of Psychology, the Board shall appoint a course controller who shall recommend to the Board the nature and extent of the programmes to be prescribed and shall be responsible for the collation of all written work submitted by candidates in pursing those programmes.

3. To be eligible for admission to candidature an applicant shall:

(a) have satisfied all the requirements for admission to a degree of bachelor of the University of Newcastle or to a degree, approved for this purpose by the Faculty Board, of another university and have satisfactorily completed a Part III Psychology subject or reached a standard in Psychology deemed by the Board to be equivalent; and

(b) have satisfied all the requirements for the award of the Diploma in Education of the University of Newcastle or another teaching qualification approved for this purpose by the Faculty Board; and

(c) have at least two years teaching or other relevant practical experience approved by the Board.

4. (1) The Board shall consider each application for admission to candidature and shall make a decision thereon.

(2) Before an application for admission to candidature is approved, the Board shall be satisfied that adequate supervision and facilities are available.

(3) In considering an application, the Board shall take account of the applicant's academic qualifications and experience, and also the report of an interview with the applicant and any other selection procedures applied to the applicant as determined by the Board, which shall be conducted by a Selection Committee approved by the Board.

5. To qualify for admission to the degree the candidate shall:

(a) in not less than 2 years, attend such lectures, seminars and tutorials, and complete to the satisfaction of the Board such written and practical work and examinations as may be prescribed by the Board; and

(b) submit a thesis embodying the results of an empirical investigation.

6. (1) Examiners shall be appointed by the Faculty Board on the recommendation of the Board.

(2) One examiner appointed pursuant to Regulation 16(1) of these Regulations shall be an internal examiner being a member of the staff of the University.

7. Before a decision is made under Regulation 11 of these Regulations the Board shall consider:

(a) the examiners' reports on the thesis; and

(b) a report of the internal examiner made in consultation with the course controller on the candidate's performance in the work prescribed under section 5(a) of this Schedule;

and shall submit these to the Faculty Board together with its recommendation. The Faculty Board shall make its decision in the light of these reports and on the recommendation of the Board.

SCHEDULE 11 — MASTER OF SCIENCE

1. A candidate for the degree of Master of Science may be enrolled in either the Faculty of Engineering or the Faculty of Science. The Faculty in which the candidate is enrolled shall be responsible for the programme.

2. (1) To be eligible for admission to candidature in the Faculty of Science an applicant shall:

(a) have satisfied all the requirements for admission to the degree of Bachelor of Science with honours Class I or Class II of the University of Newcastle or to a degree, approved for this purpose by the Faculty Board, of this or any other university; OR

(b) have satisfied all the requirements for admission to the degree of Bachelor of Science of the University of Newcastle or other approved university and have completed such work and passed such examinations as the Faculty Board may have determined and have achieved a standard at least equivalent to that required for admission to a degree of bachelor with second class honours in an appropriate subject; OR

(c) in exceptional cases produce evidence of possessing such other qualifications as may be approved by the Faculty Board on the recommendation of the Head of the Department in which the applicant proposes to carry out the programme.

(2) To be eligible for admission to candidature in the Faculty of Engineering an applicant shall:

(a) have satisfied the requirements for admission to a degree with honours in the University of Newcastle or other university approved for this purpose by the Faculty Board in the area in which he proposes to carry out his research; OR

(b) have satisfied the requirements for admission to a degree in the University of Newcastle or other university approved for this purpose by the Faculty Board and have completed to the satisfaction of the Faculty Board such work and examinations as determined by the Faculty Board; OR

(c) in exceptional cases produce evidence of possessing such other qualifications as may be approved by the Faculty Board on the recommendation of the Head of the Department in which the candidate proposes to carry out his programme.

3. To qualify for admission to the degree a candidate shall complete to the satisfaction of the Faculty Board a programme consisting of:

(a) such work and examinations as may be prescribed by the Faculty Board; and

(b) a thesis embodying the results of an original investigation or design.

4. The programme shall be completed:

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

(b) except with the permission of the Faculty Board, in not more than 5 years.

5. (1) Except with the permission of the Faculty Board, which shall be given only in special circumstances, a part-time candidate enrolled in the Faculty of Science shall:

(a) conduct the major proportion of the research or design work in the University; and

(b) take part in research seminars within the Department in which he is carrying out his research.

(2) Except with the permission of the Faculty Board, a candidate enrolled in the Faculty of Engineering shall take part in the research seminars within the Department in which he is carrying out his research.
Combined Degree Courses

Any student contemplating enrolment in a combined degree course under Sections 24-27 of the Requirements for the degree of Bachelor of Science is required to consult the Deans of both Faculties with a view to determining his individual programme.

Sample programmes are shown below for guidance only.

Science/Arts

Normally the combined degree programme would be pursued as in either (a) or (b):

(a)

Year I  Four Science Part I subjects passed with an average performance of credit level or higher.

Year II  Three Science Part II subjects and an additional subject which will be an Arts Group I Part I subject if no Arts Group I subject has been passed.

Year III  At least one Science Part III subject and to other subjects including an Arts Group I Part II subject if no Arts Group I Part II subject has so far been passed. At the end of Year III students must have passed at least three Arts Group I subjects.

Year IV  One subject which is an Arts Group I Part III subject if this requirement has not already been met (and is from a department different from that of the Science Part III subject) and two other subjects to complete the Requirements for the degree of Bachelor of Arts.

(b)

Year I  Four Arts Part I subjects passed with an average performance of credit level or higher.

Year II  Three Arts Part II subjects and an additional subject which will be a Part I subject chosen from the B.Sc. Schedule if no subject included in that Schedule has been passed.

Year III  At least one Arts Part III subject and two other subjects including a Science Part II subject if no Science Part II subject has so far been passed. By the end of this year at least three subjects from the B.Sc. Schedule of Subjects must be passed.

Year IV  One subject, which is a Science Part III subject if this requirement has not already been met (and is from a department different from that providing the Arts Part III subject), and two other subjects to complete the Requirements for the degree of Bachelor of Science.

Science/Mathematics

Normally the combined degree programme would be pursued as follows:

Year I  Mathematics I and three Part I subjects passed with an average performance of credit level or higher.

Year II  Three Part II subjects including Mathematics IIA and Mathematics IIC, and another Part I subject.

Year III  Mathematics IIIA plus two other subjects which must include at least one Part III subject.

Year IV  Either Mathematics IIIIB or a schedule B subject from the requirements for B.Math, plus two other subjects which will complete the requirements for the Science degree.

Science/Engineering

A — CIVIL ENGINEERING

Year I

(CE111) Statics
(ME111) Graphics and Engineering Drawing
(GE112) Introduction to Engineering Design
(ME131) Dynamics
(CE171) Engineering Surveying I
(GE151) Introduction to Materials Science
(EE131) Circuit Fundamentals

• Mathematics I
• Physics IA

Year II

• Mathematics IIA
• Science Part I

(CE212) Mechanics of Solids I
(CE213) Mechanics of Solids II
(CE221) Properties of Materials
(CE222) Materials Technology
(CE231) Fluid Mechanics I
(CE232) Fluid Mechanics II
(CE241) Water Resources Engineering I
(CE223) Engineering Geology
(Chemistry IS)

Year III

• Science Part II
• Science Part II

(ME121) Workshop Practice
(EE211) Energy Conversion
(CE314) Structural Analysis I
(CE315) Structural Design I
(ME204) Engineering Computations

Year IV

• Science Part II
• Science Part III

(CE324) Soil Mechanics
(CE333) Fluid Mechanics III
(CE334) Fluid Mechanics IV
(CE342) Water Resources Engineering II

Year V

(CE351) Civil Engineering Systems I
(CE372) Transportation Engineering
(CE425) Earth and Rock Engineering
(CE452) Engineering Construction
(CE453) Project

Structures Elective
Departmental Elective

• Subjects counted towards Science degree.
B — ELECTRICAL ENGINEERING

Year I
- (ME111) Graphics and Engineering Drawing
- (GE112) Introduction to Engineering Design
- (ME131) Dynamics
- (CE111) Statics
- EE131 Circuit Fundamentals
- Mathematics I
- Physics IA
- Chemistry I

Year II
- Mathematics IIA
  - EE211 Energy Conversion
  - EE221 Semiconductor Devices
  - EE232 Electrical Circuits
  - EE263 Systematic Programming
  - EE264 Introduction to Logic and Assembly Language
  - Ph221 Electromagnetics and Quantum Mechanics
- Science Part I

Year III
- Science Part II
- Science Part II
  - EE313 Power Systems
  - EE314 Electrical Machines
  - EE323 Linear Electronics
  - EE324L Electronics Laboratory
  - EE325 Introduction to Digital Technology
  - EE333 Advanced Circuit Analysis
  - EE341 Automatic Control
  - EE344 Communications

Year IV
- Science Part II
- Science Part III
  - GE350 Seminar
  - EE362 Switching Theory and Logic Design

Year V
- EE421 Electronics Design A
- EE480 Project
- EE481 Project, or 2 from EE300, 400
- EE491 Seminar
- 8 units from EE300/400 subjects
- 1 unit elective (Engineering Faculty — non-EE)

C — MECHANICAL ENGINEERING

Year I
- (ME111) Graphics and Engineering Drawing
- (GE112) Introduction to Engineering Design
- (ME131) Dynamics
- (CE111) Statics
- ME223 Engineering Technology
- Mathematics I
- Physics IA
- Chemistry I
- GE151 Introduction to Materials Science

Year II
- Mathematics IIA
- Science Part I
  - EE131 Circuit Fundamentals
  - ME201 Experimental Methods I
  - ME202 Dynamics of Engineering Systems
  - ME214 Mechanics of Solids I
  - ME241 Properties of Materials I
  - ME251 Fluid Mechanics I
  - ME271 Thermodynamics I
  - ME203 Experimental Methods II

Year III
- Science Part II
- Science Part II
  - ME312 Engineering Design I
  - ME121 Workshop Practice
  - ME322 Dynamics of Machines I
  - EE211 Energy Conversion
  - ME304 Engineering Computations
  - ME342 Properties of Materials II
  - ME343 Mechanics of Solids II
  - ME361 Automatic Control

Year IV
- Science Part II
- Science Part III
  - ME373 Thermodynamics II
  - ME352 Fluid Mechanics II
  - ME372 Heat Transfer
  - ME302 Experimental Methods III

Year V
- ME333 Dynamics of Machines II
- CE315 Structural Design I
- ME481 Engineering Administration
- ME482 Engineering Economics I
- ME496 Project/Seminar
- Electives — 4 units Departmental Technical Electives
- ME312 Engineering Design II
- ME313 Engineering Design III

D — INDUSTRIAL ENGINEERING

Year I to Year III as for Mechanical Engineering

Year IV
- Science Part II
- Science Part III
- ME312 Engineering Design II
- ME313 Engineering Design III
- ME381 Methods Engineering
- ME383 Quality Engineering
- ME333 Dynamics of Machines II

Year V
- ME384 Design for Production
- ME482 Engineering Economics I
- ME484 Engineering Economics II
- ME487 Operations Research — Deterministic Models
- ME488 Operations Research — Probabilistic Models
ME496  Project/Seminar
Electives — 4 units Departmental Technical Electives
1 unit Industrial Engineering Elective (4 units)

Note: The course proposed for Industrial Engineering totals 81 units.
If Psychology I is taken as the Science Part I subject in Year II the
Industrial Engineering Elective in Year V can be dropped. This would
require the Electives in Year V to be increased to 4 units.

E — CHEMICAL ENGINEERING
Either one of two course patterns is recommended for Chemical Engineering.

(1) Year I

* (ChE141) Industrial Process Principles
* (ChE151) Industrial Chemical Processes and Equipment
* (ChE152) Industrial Process Design I
* (GE151) Introduction to Materials Science
* Mathematics I
* Physics I
* Chemistry I

Year II

* Chemistry IIA
* Mathematics IIA

ChE261 Separation Processes I
ChE271 Fuels and Combustion
ChE251 Structures and Pressure Vessel Design
ChE291 Laboratory
ChE272 Fluid Mechanics
ChE241 Process Analysis I
ME121 Workshop Practice

Year III

* Science Part II
* Science Part III
* Science Part II

ChE361 Separation Processes II

Year IV

* Science Part III

ChE371 Kinematics and Thermodynamics
ChE391 Laboratory
ChE362 Solids Handling and Minerals Processing
ChE354 Electrochemistry and Corrosion
ChE351 Equipment Design
ChE341 Process Analysis II
ChE381 Computations
ChE352 Process Engineering
ChE353 Process Economics

Year V

ChE462 Environmental Control
ChE471 Industrial Safety
ChE472 Transport Phenomena
ChE482 Process Control
ChE483 Reaction Engineering
ChE493 Design Project
ChE491 Seminar
ChE492 Research Project
Elective I — 5 units

Year II

* Mathematics IIA
* Chemistry IIA

ChE261 Separation Processes I
ChE241 Process Analysis I
ME121 Workshop Practice

* Science Subject — Part I

Year III

ChE251 Structures and Pressure Vessel Design
ChE271 Fuels and Combustion
ChE272 Fluid Mechanics
ChE361 Separation Processes II

* Science Subject — Part II

Year IV

ChE371 Kinetics and Thermodynamics
ChE391 Laboratory
ChE362 Solids Handling and Minerals Processing
ChE354 Electrochemistry and Corrosion
ChE351 Equipment Design
ChE341 Process Analysis II
ChE381 Computations
ChE352 Process Engineering
ChE353 Process Economics

* Science Subject — Part III

Year V

ChE462 Environmental Control
ChE471 Industrial Safety
ChE472 Transport Phenomena
ChE482 Process Control
ChE483 Reaction Engineering
ChE493 Design Project
ChE491 Seminar
ChE492 Research Project
Elective I — 5 units

Faculty Policy in Regard to the Granting of Standing for Diploma Courses Completed through the CAE

The Faculty Board is willing to grant standing to Diplomates of Teachers Colleges and Colleges of Advanced Education who have taken an approved amount of Science in their course. The minimum requirements for the award of the ordinary degree of Bachelor of Science would be satisfied by the completion of a major sequence, i.e. part I, II and III in an approved Science discipline, and a minor sequence, i.e. part I and II in a different approved Science discipline.

GUIDE TO SUBJECT ENTRIES

Subject outlines and reading lists are set out in a standard format to facilitate easy reference. An explanation is given below of some of the technical terms used in this Handbook.
1. (a) **Prerequisites** are subjects which must be passed before a candidate enrolls in a particular subject.
   (b) Where a subject is marked **Advisory** it refers to a pass in the Higher School Certificate. In such cases lectures will be given on the assumption that a pass has been achieved at the level indicated.
   (c) **Preparatory subjects** are those which candidates are strongly advised to have completed before enrolling in the subject for which the preparatory subject is recommended.
2. **Corequisites** refer to subjects or topics which the candidate must either pass before enrolling in the particular subject or be taking concurrently.
3. **Texts** are books recommended for purchase.
4. **References** are books relevant to the subject or topic which need not be purchased.

**DEPARTMENT OF BIOLOGICAL SCIENCES**

**711100 Biology I**
N.B. It is expected that in future this subject will not be offered in the evenings in even years.

**Prerequisites**
Nil, but a series of 10 lectures in background chemistry will be offered during orientation week (23rd to 27th February, 1981, between 9:30 and 11:30 a.m. each day in the Department of Biological Sciences lecture theatre, JLG08) for those students enrolling in Biology I who have done little chemistry. Attendance at the lectures is optional.

**Hours**
3 lecture hours and 3 hours of tutorial and laboratory classes per week. A two-day excursion.

**Examination**
One 3-hour paper

**Content**
Cells and Cell Constituents

Fundamental Chemical Reactions
Photosynthesis. Respiration (aerobic and anaerobic). Chemosynthesis. Production of ATP.

Diversity of Organisms

Plant Classification and Processes
Plant Kingdom. Structure, function and development of higher plants.

Animal Classification and Processes

Immunology
Antigens and antibodies. Blood groups.

Genetics and Development

Population Biology
An introduction to ecology, population genetics and evolution.

**Human Biology**
The practical classes will present exercises relevant to these topics.

**Preliminary Reading**
White, E. H. _Chemical Background for the Biological Sciences_ 2nd edn (Prentice-Hall 1973)

**Texts**

**References**
Clarke, R. B. & Panchen, A. L. _Synopsis of Animal Classification_ (Chapman & Hall)
Holloway, B. W. _Genes and Chromosomes in Action_ (Thomas Nelson)
Moroney, M. J. _Facts from Figures_ (Penguin)
Parker, R. E. _Introductory Statistics for Biology_ (Edward Arnold 1973)
Rayle, D. & Wedberg, L. _Botany: A Human Concern_ (Houghton Mifflin 1975)

Gardner, E. J. _Principles of Genetics_ 5th edn (Wiley 1975)

**712100 Biology IIA**

**712101 Biochemistry & Molecular Genetics**

**712102 Cell Biology**

**Molecular and Cellular Biology**

**Prerequisites**
Biology I

**Hours**
3 lecture hours and 6 hours tutorial and laboratory classes per week

**Examination**
Two 3-hour papers

**Content**
Biochemistry and Molecular Genetics

Cell Biology
Cellular organization and inter-relationships. Organelles, their structure and function. Cellular processes.

Statistics
Normal distribution. Tests of significance. Correlation. Regression. The practical classes will present exercises relevant to these fields. Tutorials will deal with biological topics of interest, and provide practice in statistical evaluation of biological data.
Texts
Bailey, N. T. J.
Gardner, E. J.
Goodenough, V.
Giese, A. C.
Metzler, D. E.
Conn, E. E. & Stumpf, P. K.

References
Bonner, J. & Varner, J. E. (eds)
Dyson, R. D.
Harper, H. A.
Mahler, H. R. & Cordes, E. H.
McDermott, A.
DeRobertis, E. D. P.
et al.
Stent, G. S. & Calendar, R.
White, A. et al.
White, E. H.
Wold, F.
Woods, R. A.

712200 Biology IIB
712201 Comparative Structure & Function
712202 Animal Ecology & Population Genetics

Biology of Organisms and Populations

Prerequisites
Biology I

Hours
3 lecture hours and 6 hours tutorial and laboratory classes per week

Examination
Two 3-hour papers

Content
Comparative Structure and Function
Evolutionary development of particular structures in terms of their functional capacities to solve environmental problems.

Ecology and Population Genetics
Physical and biological factors influencing the abundance and distribution of organisms. Determination and measurement of these factors. Genetic analysis of populations. Factors affecting gene frequencies in populations.

Statistics
The practical classes will present exercises relevant to these fields. Tutorials will deal with biological topics of interest, and provide practice in statistical evaluation of biological data.

Texts
Bailey, N. T. J.
Gordon, M. S.
Krebs, C. J.
Nuttall, I. & Stewart, J. (ed.)
Sutcliffe, J.

References
Baker, D. A.
Bell, P. & Woodcock, C.
Bloom, W. & Fawcett, D. W.
Bossart, E. Q. & Wilson, W. H.
Clark, L. R. et al.
Darnell, R. M.
Plank, E. R.
Roughgarden, J.
Rueb, T. C. & Patton, H. D.
Schmidt-Nielsen, K.
Torrey, T. W. & Feduccia, A.

713100 Biology IIIA

Biology IIIA consists of two units, Developmental Biology, and Immunology and Cell Processes.
It is possible to substitute a unit from Biology IIB for either of these Biology IIIA units, allowing flexibility of choice of topics.

713101 Developmental Biology

Prerequisite
Biology IIA

Hours
4 lecture hours and 8 hours tutorial and laboratory classes per week for 14 weeks

Examination
One 3-hour paper
Various aspects of development in animals at the molecular and cellular level. Topics include cellular differentiation, control mechanisms and gene expression and genetic regulation.

Plants

Cell and molecular biology of plant development. Hormonal, environmental and genetic control are considered. Topics also included are the development, architecture and nucleic acids of chloroplasts; and the application of cell and molecular biology and genetic engineering to plant improvement.

Texts

Practical Studies of Animal Development (Chapman & Hall 1975)

OR

Development (McGraw-Hill 1976)

Plant Growth and Development (McGraw-Hill 1975)

Biosatistical Analysis (Prentice-Hall)

References

Ashworth, J. M.
Bulinsky, B. I.
Garrod, D.
Graham, C. F.
Waringa, P. F.
Hart, J. L. et al.
Salisbury, F. B.
Ross, C. W.
Smith, H. (ed.)

The Molecular Biology of Plant Cells (Blackwell 1977)

713103 Immunology and Cell Processes

Prerequisites

Biology IIA

Hours

4 lecture hours and 8 hours tutorial and laboratory classes per week for 14 weeks

Examination

One 3-hour paper

Content

Hormones, Blood and Digestion

Biochemical and cellular aspects of mammalian hormones will be considered together with their role in homeostasis. The biochemistry of blood and the digestion and absorption of foodstuffs will also be major topics for consideration.

Immunology

Molecular and cellular aspects. Emphasis will be on understanding at a molecular level both cellular and humoral immunity.

Texts

Cunningham, A. J.
Zar, J. H.

Understanding Immunology (Academic Press 1978)

Biostatistical Analysis (Prentice-Hall)

References

Bellanti, J. A.
Gordon, B. L.
Hobart, M. J.
McConnell, T.
Martin, C. R.
White, A. et al.
Metzler, D. E.

Immunology (Saunders 1971)

Essentials of Immunology 2nd edn (Davis 1974)

The Immune System (Blackwell 1976)

Textbook of Endocrine Physiology (Williams & Wilkins 1976)


713200 Biology IIIB

Biology IIIB consists of two units, Environmental Physiology, and Ecology and Quantitative Genetics. It is possible to substitute a unit from Biology IIA for either of these Biology IIIB units, allowing flexibility of choice of topics.

Biology IIIB, Topic 3

713201 Environmental Physiology

Prerequisites

Biology IIA or IIB

Hours

4 lecture hours and 8 hours tutorial and laboratory classes per week for 14 weeks

Examination

One 3-hour paper

Content

Plants

Interrelationships between the environment and the operation of key physiological processes including photosynthesis, mineral ion acquisition and assimilate transfer.

Animals

Biology of reproduction in vertebrates with particular emphasis on gamete physiology.

Texts

Baker, D. A.
Mithen, F. L.
Moorey, J.
Nallandov, A. V.

Transport Phenomena in Plants (Chapman & Hall 1978)


Reproductive Physiology 3rd edn (Freeman 1976)

References

Austin, C. R.
Short, R. V.
Bloom, W.
Fawcett
Evans, L. T.


A Textboook of Histology 10th edn (Saunders 1975)

Crop Physiology (Paper back ed. Cambridge University Press)

Plant Growth and Development (McGraw-Hill 1975)

Morphogenesis of the Vertebrates 4th edn (John Wiley 1979)
Biology III B, Topic 4

713203  Animal Ecology and Quantitative Genetics

Prerequisites    Biology IIA or IIB

Hours            4 lecture hours and 8 hours tutorial and
                 laboratory classes per week for 14 weeks

Examination      One 3-hour paper

Content
Ecology
Structure and dynamics of biological communities, evolutionary ecology.

Quantitative Genetics
Continuous variation components of generation means. Heritability. The effect of
selection and inbreeding. Neutral traits.

Texts
Krebs, C. J.
Stewart, J. (ed.)
Zar, J. H.

Ecology 2nd edn (Harper & Row)
S299 Genetics, Units 11, 12, 13 (Open University Press
1976)
Biostatistical Analysis (Prentice-Hall)

References
C.S.I.R.O.
Daubenmire, R. F.
Falconer, D. S.
Ford, E. B.
Kershaw, K. A.

Plants and Environment 3rd edn (Wiley 1974)
Introduction to Quantitative Genetics (Oliver & Boyd
1975)
Ecological Genetics (Methuen 1975)
Quantitative and Dynamic Plant Ecology 2nd edn
(Arnold 1973)

GENERAL INFORMATION

714100  Biology IV

Prerequisite    Nil

Hours            To be advised

Examination
The University of Newcastle Calendar consists of the following volumes:

Volume 1 — Legislation: The Act, By-laws and Regulations

Volume 2 — University Bodies
and Staff:
Part 1 — Principal Officers, Council, Senate, Boards
and Committees.
Part 2 — The Professors and Staff.

Volume 3 — Handbook, Faculty of Architecture

Volume 4 — Handbook, Faculty of Arts

Volume 5 — Handbook, Faculty of Economics and Commerce

Volume 6 — Handbook, Faculty of Education

Volume 7 — Handbook, Faculty of Engineering

Volume 8 — Handbook, Faculty of Mathematics

Volume 9 — Handbook, Faculty of Medicine

Volume 10 — Handbook, Faculty of Science

Volume 11 — Annual Report

All volumes, except Volume 1 — Legislation, are published annually.

Volume 1 — Legislation is published irregularly the last issue being 1980.

All volumes except Volumes 2 Staff and 11 Annual Report are available on microfiche.

Other Publications
Undergraduate Prospectus
Postgraduate Prospectus
Information for Students
University News
Gazette

CONTENTS

I PRINCIPAL DATES 1981

II GENERAL INFORMATION
Enrolment of New Students
Re-enrolment
Student Cards
Library Cards
Re-admission after absence
Attendance Status
Change of Address
Change of Name
Change of Programme
Withdrawal without Academic Penalty
Confirmation of Enrolment
Leave of Absence
Attendance at Classes
General Conduct
Notices
Student Matters Generally

III EXAMINATIONS
Examination Periods
Sitting for Examinations
Papers for Formal Examinations
Examination Results
Special Examinations
Deferred Examinations

IV UNSATISFACTORY PROGRESS
Regulations Governing Unsatisfactory Progress

V CHARGES
Payment of Charges
Scholarship Holders and Sponsored Students
Higher Degree Candidates
Refund of Charges
Extension of time to Pay

VI CAMPUS TRAFFIC & PARKING
I PRINCIPAL DATES 1981

January
1 Thursday  Public Holiday — New Year's Day
9 Friday    Last day for return of Re-Enrolment Forms — Continuing Students
12 Monday   Deferred Examinations begin
23 Friday   Deferred Examinations end
26 Monday   Public Holiday — Australia Day
31 Saturday Closing date for applications for residence in Edwards Hall

February
11 Wednesday New students attend in person to enrol and pay charges
12 Thursday  Late enrolment session for new students
23 Monday   First Term begins

March
2 Monday    First Term begins

April
17 Friday   Good Friday — Easter Recess commences
22 Wednesday Lectures resume
22 Wednesday Last day for withdrawal without academic penalty from first half year subjects
25 Saturday Public Holiday — Anzac Day

May
9 Saturday   First Term ends
25 Monday   Examinations begin
29 Friday   Examinations end

June
1 Monday    Second Term begins
8 Monday    Public Holiday — Queen's Birthday
12 Friday   Last day for return of Confirmation of Enrolment forms
30 Tuesday Closing date for Applications for Admission to the Bachelor of Medicine course in 1982

July
6 Monday    Last day for withdrawal without academic penalty from full year subjects
6 Monday    Examinations begin
10 Friday   Examinations end

August
8 Saturday  Second Term ends
10 Monday   Examinations begin
14 Friday   Examinations end
31 Monday   Third Term begins

September
7 Monday    Last day for withdrawal without academic penalty from second half year subjects

October
1 Thursday  Closing date for Applications for Admission 1982 (Undergraduate courses other than Medicine)
5 Monday    Public Holiday — Eight Hour Day

November
2 Monday    Annual Examinations begin
20 Friday   Annual Examinations end

Note: Term dates for students in the Bachelor of Medicine course are printed in Calendar Volume 9 — Medicine Handbook.

1982

January
18 Monday   Deferred Examinations begin
29 Friday   Deferred Examinations end

March
1 Monday    First Term begins
II GENERAL INFORMATION

Enrolment of New Students
Persons offered admission are required to attend in person at the Great Hall in mid-February to enrol and pay charges. Detailed instructions are given in the Offer of Admission.

Enrolment of Continuing Students
The University makes arrangements for continuing students to enrol by mail. There are two steps involved:
- Lodging the Enrolment form with details of your proposed programme.
- Completing enrolment by lodging the Authority to Complete Enrolment form with the cashier with charges payable.

1. Lodging Enrolment Forms
Re-enrolment materials will be mailed to all undergraduate students in mid-December. Those who wish to enrol in 1981 and who are eligible to do so (see Regulations Governing Unsatisfactory Progress) should complete the enrolment forms as soon as possible after the release of the 1980 annual examination results, and forward it to The Secretary, University of Newcastle, N.S.W., 2308.
Enrolment forms from continuing students are due by 9 January 1981 except in the case of a student who is required to take a special or deferred examination in which case the enrolment form must be submitted within seven days of the release of those examination results.
Submission of enrolment forms after the due date will render the student liable to a late lodgement charge of $14.00.
Students who, for good reason, are unable to submit their enrolment forms by the due date, may apply for an extension of time. The request, with details of the reason for the extension must reach the Secretary by the due date if the late lodgement charge is to be avoided. The By-laws provide that no enrolment will be accepted after 31 March without the approval of the Secretary which shall be given only in exceptional circumstances.

2. Completing Enrolment
When the proposed programme has been approved, an Authority to Complete Enrolment form will be mailed to the student showing charges payable. Students are required to complete enrolment by lodging the form with the Cashier with the charges payable. This can be done by mail or in person. The Cashier's office is open 10 am to 12 noon and 2 pm to 4 pm Monday to Friday. At least 21 days notice is allowed from the date of posting to the date by which charges must be paid if a late charge is to be avoided.

Student Cards
The Authority to Complete Enrolment form incorporates the student's identification card which is returned to him after payment of charges. It should be carried by students when at the University. It serves as evidence that the student is enrolled and must be presented when applying for travel concessions, a parking permit or to confirm membership of the University Union.
If a student loses his Student Card he should pay the replacement charge of 50 cents to the Cashier and present the receipt at the Student Administration Office when seeking a replacement card.
A student who withdraws completely from studies should return the Student Card to the Student Administration Office.

Library Cards
Students should present their Student Card to the Library desk to be issued with their Library Borrowers Card. This card, which has machine readable lettering, must be presented when borrowing books from the Library.

Re-admission after Absence
A person who has been enrolled previously at the University of Newcastle, but not enrolled in 1980, is required to lodge an Application for Admission if further undergraduate enrolment is desired. Applications are available from the Student Administration Office and should preferably be lodged by 1 October 1980.

Attendance Status
Students enrol as full-time or part-time students as may be determined by the Dean of the Faculty.

Change of Address
Students are responsible for notifying the Student Administration Office in writing of any change in their address. A Change of Address form should be used and is available from the Student Administration Office.
Failure to notify changes could lead to important correspondence or course information not reaching the student. The University cannot accept responsibility if official communications fail to reach a student who has not notified the Student Administration Office of a change of address.
It should be noted that examination results, re-enrolment and other correspondence will be mailed to students in December and January. Students who will be away during the long vacation from the address given to the University for correspondence should make arrangements to have mail forwarded to them.

Change of Name
Students who change their name should advise the Student Administration Office. Marriage, deed poll or naturalisation etc. certificates should be presented for sighting in order that the change can be noted on University records.

Change of Programme
Approval must be sought for any changes to the programme for which a student has enrolled. This includes adding or withdrawing subjects, changing attendance status (for example from full-time to part-time) or transferring to a different degree or faculty.
All proposed changes should be entered on the Variation of Programme form available at the Student Administration Office. Reasons for changes and where appropriate documentary evidence in the form of medical or other appropriate certificates must be submitted.

Withdrawal without Academic Penalty
A student is regarded as having failed in a subject if he enrols in it and does not pass the examination (not sitting for the examinations is regarded as not passing the examinations) unless withdrawal without penalty has been approved.
Application to withdraw from a subject or subjects should be made on a Variation of Programme form and lodged at the Student Administration Office or mailed to the Secretary.
Withdrawal will normally be approved without penalty if the application to withdraw is received by the Secretary before the date shown below.

<table>
<thead>
<tr>
<th>Full Year Subjects</th>
<th>First Half-year Subjects</th>
<th>Second Half-year Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sixth Monday in</td>
<td>First Term</td>
<td>Second Term</td>
</tr>
</tbody>
</table>

Unless the Dean of the Faculty grants permission for withdrawal without penalty a student who withdraws after the date shown above will be deemed to have failed in the subject or subjects.
Confirmation of Enrolment

In May each year the University mails to all students a Confirmation of Enrolment form which also serves as the application to sit for examinations. This form must be checked carefully, signed and returned by all students (including non-degree students and postgraduate students not taking formal subjects) to confirm that they are actively pursuing subjects for which they are enrolled and that the information on University records is correct and complete.

Indebtedness

The Council of the University has directed that students who are indebted to the University because of unpaid charges, library fines or parking fines may not:
- complete enrolment in a following year;
- receive a transcript of academic record; or
- graduate or be awarded a Diploma.

Students are requested to pay any debts incurred without delay.

Leave of Absence

A student who does not wish to re-enrol for any period up to three years should apply for leave of absence. Leave of absence is normally granted only to those students who are in good standing. Applications should be submitted before the end of first term in the first year for which leave of absence is sought. Leave of absence will not be granted for more than three years and will not be granted retrospectively.

Any student who does not enrol for a period of two years and does not obtain leave of absence, must apply for re-admission to the University when he wishes to resume his studies.

Attendance at Classes

Students are expected to be regular and punctual in attendance at classes in the course or subjects in which they are enrolled.

Where a student’s attendance or progress has not been satisfactory, action may be taken under the Regulations Governing Unsatisfactory Progress.

In the case of illness or absence for some other unavoidable cause, a student may be excused for non-attendance at classes.

All applications for exemption from attendance at classes must be made in writing to the Head of the Department offering the subject. Where tests or term examinations have been missed, this fact should be noted in the application.

The granting of an exemption from attendance at classes does not carry with it any waiver of the General Services Charge.

General Conduct

In accepting membership of the University, students undertake to observe the by-laws and other requirements of the University.

Students are expected to conduct themselves at all times in a seemly fashion. Smoking is not permitted during lectures, in examination rooms or in the University Library. Gambling is forbidden.

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

Notices

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

A notice board on the wall opposite the entrance to Lecture Theatre B01 is used for the specific purpose of displaying examination time-tables and other notices about examinations.

Student Matters Generally

The main notice board is the display point for notices concerning enrolment matters, scholarships, University rules and travel concessions, etc. This notice board is located on the path between the Union and the Library.

III EXAMINATIONS

Tests and assessments may be held in any subject from time to time. In the assessment of a student’s progress in a university course, consideration will be given to laboratory work, tutorials and assignments and to any term or other tests conducted throughout the year.

The results of such assessments and class work may be incorporated with those of formal written examinations.

Examination Periods

Formal written examinations take place on prescribed dates within the following periods:

<table>
<thead>
<tr>
<th>Exam Period</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>End of First Term</td>
<td>1981 to 25 May</td>
</tr>
<tr>
<td>Mid Year</td>
<td>6 to 10 July, 1981</td>
</tr>
<tr>
<td>End of Second Term</td>
<td>10 to 14 August, 1981</td>
</tr>
<tr>
<td>End of Year</td>
<td>3 to 20 November, 1981</td>
</tr>
</tbody>
</table>

Timetables showing the time and place at which individual examinations will be held will be posted on the examinations notice board near Lecture Theatre B01.

Misreading of the timetable will not under any circumstances be accepted as an excuse for failure to attend an examination.

Sitting for Examinations

Formal examinations, where prescribed, are compulsory. Students should consult the final timetable in advance to find out the date, time and place of their examinations and should allow themselves plenty of time to get to the examination room so that they can take advantage of the 10 minutes reading time that is allowed before the examination commences. Formal examinations are usually held in the Great Hall area and in (November) the Auchmuty Sports Centre. The seat allocation list for each examination will be on a noticeboard outside the room.

Students can take into any examination any writing instrument, drawing instrument or calculating instrument. Logarithmic tables may not be taken in: they will be available from the supervisor if needed.

Calculators may be used, if permitted by the examiner in any examination. They must be hand held, battery operated and non-programmable* and students should note that no concession will be granted:

(a) to a student who is prevented from bringing into a room a programmable calculator;
(b) to a student who uses a calculator incorrectly; or
(c) because of battery failure.

Rules for Formal Examinations

Regulation 15 of the Examination Regulations sets down the rules for formal examinations, as follows:

(a) candidates shall comply with any instructions given by a supervisor relating to the conduct of the examination;
(b) before the examination begins candidates shall not read the examination paper until granted permission by the supervisor which shall be given ten minutes before the start of the examination;

* A programmable calculator will be permitted provided program cards and devices are not taken into the examination room.
IV UNSATISFACTORY PROGRESS

The University has adopted Regulations Governing Unsatisfactory Progress which are set out below.

Students who become liable for action under the Regulations will be informed accordingly by mail after the release of the End of Year examination results and will be informed of the procedure to be followed if they wish to 'show cause'.

Appeals against exclusion must be lodged together with re-enrolment forms by Friday 9 January 1981.

The Faculty's progress requirements are set out elsewhere in this volume.

Regulations Governing Unsatisfactory Progress

1. (1) These Regulations are made in accordance with the powers vested in the Council under By-law 5.1.2.

(2) These Regulations apply to all students of the University except those who are candidates for a degree of Master or Doctor.

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

"Admissions Committee" means the Admissions Committee of the Senate constituted under By-law 2.3.5;

"Dean" means the Dean of a Faculty in which a student is enrolled.

"Faculty Board" means the Faculty Board of a Faculty in which a student is enrolled.

2. (1) A student's enrolment in a subject may be terminated by the Head of the Department offering that subject if that student does not maintain a rate of progress considered satisfactory by the Head of the Department. In determining whether a student is failing to maintain satisfactory progress the Head of Department may take into consideration such factors as:

(a) unsatisfactory attendance at lectures, tutorials, seminars, laboratory classes or field work;

(b) failure to complete laboratory work;

(c) failure to complete written work or other assignments; and

(d) failure to complete field work.

(2) The enrolment of a student in a subject shall not be terminated pursuant to regulation 2 (1) of these Regulations unless he has been given prior written notice of the intention to consider the matter with brief particulars on the grounds for so doing and has also been given a reasonable opportunity to make representations either in person or in writing or both.

(3) A student whose enrolment in a subject is terminated under regulation 2 (1) of these regulations may appeal to the Faculty Board which shall determine the matter.

(4) A student whose enrolment in a subject is terminated under this Regulation shall be deemed to have failed the subject.

3. (1) A Faculty Board may review the academic performance of a student who does not maintain a rate of progress considered satisfactory by the Faculty Board and may determine:

(a) that the student be permitted to continue the course;

(b) that the student be permitted to continue the course subject to such conditions as the Faculty Board may decide;

(c) that the student be excluded from further enrolment;

(i) in the course; or

(ii) in the course and any other course offered in the Faculty; or

(iii) in the Faculty; or

(iv) from any course or courses.
(d) if the Faculty Board considers its powers to deal with the case are inadequate, that the case be referred to the Admissions Committee together with a recommendation for such action as the Faculty Board considers appropriate.

(2) Before a decision is made under regulation 3 (1) (b) (c) or (d) of these Regulations the student shall be given an opportunity to make representations with respect to the matter, either in person or in writing or both.

(3) A student may appeal against any decision made under regulation 3 (1) (b) or (c) of these Regulations to the Admissions Committee which shall determine the matter.

4. Where the progress of a student who is enrolled in a combined course or who has previously been excluded from enrolment in another course or Faculty is considered by the Faculty Board to be unsatisfactory, the Faculty Board shall refer the matter to the Admissions Committee together with a recommendation for such action as the Faculty Board considers appropriate.

5. (1) An appeal made by a student to the Admissions Committee pursuant to Regulation 3 (3) of these Regulations shall be in such form as may be prescribed by the Admissions Committee and shall be made within fourteen (14) days from the date of receipt of the notification of the decision of the Admissions Committee.

(2) In hearing an appeal the Admissions Committee may take into consideration any circumstances whatsoever including matters not previously raised and may seek such information as it considers necessary concerning the academic record of the appellant and the making of the determination by the Faculty Board. Neither the Dean nor the sub-Dean shall act as a member of the Admissions Committee on the hearing of any such appeal.

(3) The appellant and the Dean or his nominee shall have the right to be heard in person by the Admissions Committee.

(4) The Admissions Committee may confirm the decision made by a Faculty Board or may substitute for it any other decision which the Faculty Board is empowered to make pursuant to these Regulations.

6. (1) The Admissions Committee shall consider any case referred to it by a Faculty Board and may:
(a) make any decision which the Faculty Board itself could have made pursuant to regulation 3 (1) (a) (b) or (c) of these Regulations or,
(b) exclude the student from enrolment in such other subjects, courses, or Faculties as it thinks fit; or
(c) exclude the student from the University.

(2) The Committee shall not make any decision pursuant to regulation 6 (1) (b) or (c) of these Regulations unless it has first given to the student the opportunity to be heard in person by the Committee.

(3) A student may appeal to the Vice-Chancellor against any decision made by the Admissions Committee under this Regulation.

7. Where there is an appeal against any decision of the Admissions Committee made under Regulation 6 of these Regulations, the Vice-Chancellor may refer the matter back to the Admissions Committee with a recommendation or shall arrange for the appeal to be heard by the Council. The Council may confirm the decision of the Admissions Committee or may substitute for it any other decision which the Admissions Committee is empowered to make pursuant to these Regulations.

8. (1) A student who has been excluded from further enrolment in a Faculty may enrol in a course in another Faculty only with the permission of the Faculty Board of that Faculty and on such conditions as it may determine after considering any advice from the Dean of the Faculty from which the student was excluded.

V CHARGES

Enrolment is completed by lodging with the Cashier the approved Authority to Complete Enrolment form with a remittance to cover all charges due or evidence that a sponsor will meet these charges.

New students are required to pay charges when they attend to enrol.

For re-enrolling students at least 21 days notice is allowed from the date of the Authority to Complete Enrolment form to the date by which charges must be paid. The actual date, which is usually after mid February, will be printed on the form. A later date will be set if approval of the proposed programme has been delayed or if the student has taken Special or Deferred examinations.

1. General Services Charge
   (a) Students Proceeding to a Degree or Diploma
      Full-time students .............................................. $120.50 Per annum
      Part-time students ............................................. $155.50 Per annum
      Plus Students joining Newcastle University Union for the first time ............................................. $10
   (b) Non-Degree Students
      Union charge ................................................... $56 Per annum

   The above charges must be paid in full by the prescribed date.

2. Late Charges
   (a) Late Lodgement of Enrolment Form
      Where a continuing student does not lodge application by Friday, 9 January, 1981 ............................................. $14
      Where a candidate for a special or deferred examination in January does not lodge re-enrolment application by Monday, 16 February, 1981 ............................................. $14
   (b) Late Lodgement of Authority to Complete Enrolment Form with Cashier
      Where the Authority to Complete Enrolment Form is received with
      (i) General Services Charge payable; or
      (ii) evidence of sponsorship (e.g. scholarship voucher or letter
           from Sponsor); or

(xiii)
(iii) an Extension of Time to Pay Charges form
is not lodged with the Cashier by 25 February (new students)
or 23 February 1981 (other students) or by some later date as
may be prescribed by the Secretary on the Authority to Complete
Enrolment form .......................................................... $14
(c) Late Payment of Charges
Where all charges have not been paid by the Due Date
(i) if not more than 14 days overdue ...................... $8
(ii) if more than 14 days overdue ...................... $14
3. Other Charges
(a) Examination under special supervision ................. $15 per paper
(b) Review of examination results ........................... $6 per subject
(c) Statement of matriculation status for non-members of the
University .......................................................... $8
(d) Academic statements in excess of six per annum ........ 15c per copy
(e) Replacement of student cards ........................... 50c each

Payment of Charges
Enrolment is completed by lodging with the Cashier the approved Authority to Complete
Enrolment Form with a remittance to cover all charges due or evidence that a sponsor will
meet these charges. Payment by mail is encouraged. Money Orders should be made
payable at the Newcastle University Post Office, N.S.W. 2308. The Cashier’s Office is
located on the First Floor of the McMullin Building, and is open from 10 am to 12 noon,
and 2 pm to 4 pm.

Scholarship Holders and Sponsored Students
Students holding scholarships or receiving other forms of financial assistance must lodge
with the Cashier their Authority to Complete Enrolment Form together with warrants or
other evidence that charges will be paid by sponsors. Sponsors must provide a separate
voucher, warrant or letter for each student sponsored.

Extension of Time to Pay Charges
Students who have finalised their programme and been issued with their Authority to
Complete Enrolment form but who, due to circumstances beyond their control, are
unable to pay the charges due, may apply for an extension of time to pay charges. The
Extension of Time form should be completed and presented in person at the Student
Administration Office where arrangements will be made for the student to be interviewed.

Refund of Charges
Students who notify the Student Administration Office of a complete withdrawal from
their courses should also lodge a claim form for a refund of charges. A refund cheque will
be mailed to the student or, if applicable, to the sponsor.
The refund will be based on the date of notification of withdrawal, as follows:
Notification on or before Monday, 2 March, 1981 .................. 100%
Notification on or before Friday, 27 March, 1981 .................. 90%
Notification on or before Friday, 26 June, 1981 .................. 50%
No refund will be made before 31 March 1981.

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

VI CAMPUS TRAFFIC AND PARKING
Persons wishing to bring motor vehicles (including motor cycles) on to the campus are
required to obtain and display on the vehicle a valid permit to do so. Permits may be
obtained from the Attendant (Patrol) Office which is located off the foyer of the Great
Hall. Permit holders must comply with the University’s Traffic and Parking Regulations
including parking in approved parking areas, complying with road signs and not
exceeding 35 k.p.h. on the campus.
If the Vice-Principal, after affording the person a period of seven days in which to submit a
written statement is satisfied that any person is in breach of Regulations, he may:
(a) warn the person against committing any further breach; or
(b) impose a fine; or
(c) refer the matter to the Vice-Chancellor.
The range of fines which may be imposed by the Vice-Principal in respect of various
categories of breach include:
Parking in areas not set aside for parking ................................ $4
Parking in special service areas, e.g. loading bays, by fire hydrants,
etc. .......................................................................... $10
Driving offences — including speeding and dangerous driving ...... up to $25
Driving to stop when signalled to do so by an Attendant (Patrol) ...... up to $25
Refusing to give information to an Attendant (Patrol) .................. up to $25
Failing to obey the directions of an Attendant (Patrol) .................. up to $25
The Traffic and Parking Regulations are stated in full in the Calendar, Volume 1.
721100 Chemistry I

Prerequisites Nil

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

Examination A student may satisfy the examiners: EITHER by achieving an overall satisfactory performance in the progressive examinations OR by achieving satisfactory performance in the final 3 hour examination scheduled in the November examination period. Students who attempt both sets of examination will be credited with the higher of the two results. The laboratory mark counts 10% towards the final grading.

Content
Inorganic Chemistry (30 lectures)
Revision of basic concepts; periodic properties of the elements and their compounds; bonding and structure.

Organic Chemistry (30 lectures)
Historical development. The shapes, structures and names of organic compounds; reactions of common functional groups; synthesis, differentiation and structural elucidation of organic compounds; methods of separation and purification.

Physical Chemistry (30 lectures)
Chemical equilibria; thermodynamics; electrochemistry; chemical kinetics.

Texts

722200 Chemistry IIA

Prerequisite Chemistry I

Preparatory Subjects Mathematics I & either Physics LA or IB

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

Examination The subject is examined progressively with seven 1-hour papers distributed over the three vacation and the mid-year examination periods. The laboratory mark counts 20% towards the final grading.

45
Content

Analytical Chemistry
Basic principles; spectroscopic procedures; separation methods.

Inorganic Chemistry
Symmetry and structure; main group metal chemistry; types of co-ordination complexes; structure elucidation; transition metal chemistry.

Dynamics
Kinetics; chemical affinity; electrochemical cells.

Organic Chemistry
Aliphatic and aromatic chemistry.

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

Texts
Atkins, P. W.  Physical Chemistry (Oxford 1978)

722300 Chemistry IIB

Prerequisites
Chemistry I

Corequisites
Chemistry IIA (advisory)

Hours
3 lecture hours and 6 laboratory hours per week. The subject comprises 7 units of which the student must attempt 6. Each unit consists of approximately 10 lectures, 4 tutorials and associated laboratory or other support activities.

Examination
One hour examination for each unit. The laboratory mark counts 20% towards the final grading.

Content
Each student's programme must be approved by the Head of the Department.
The units offered may vary from year to year and the topics available include: electronic instrumentation for chemists; problem solving; evaluation of chemical pollution; analysis in organic systems; radiochemistry; chemistry in industrial processes; polymers. In the industrial processes unit, attendance on factory excursions is compulsory.

Texts
To be advised

CHEMISTRY — PART III SUBJECTS

Prerequisites
A pass in Chemistry IIA is a prerequisite for entry into Chemistry IIB; Chemistry IIA is a pre- or corequisite for Chemistry IIB; Mathematics I.

Hours
The Chemistry Department offers two Part III subjects, each involving ninety hours of lectures. Associated with each subject are 8 hours per week of laboratory work.

Examination
Both subjects will be examined by progressive examinations. To pass each subject, students must achieve an acceptable aggregate mark and earn a pass grading in the specified laboratory programme.
The laboratory mark counts 25% towards the final grading.

Content
Each student enrolling in Chemistry IIA must select nine topics from the list provided by the Department. Likewise, students enrolling in Chemistry IIB must nominate nine topics from the IIB list.
All proposed programmes must be approved by the Head of Department (or his nominee) before the start of the academic year.

Texts
To be advised: see departmental topic summaries.

724100 Chemistry IV

Prerequisites
Completion of ordinary degree requirements and permission of Head of Department.

Hours
To be advised

Examination

Content
A subject extending over one full-time academic year or its equivalent comprising:
(i) a minimum of 50 hours of lectures and tutorials, and a course of directed reading;
(ii) a supervised research project, the results of which are to be embodied in a thesis and presented at a seminar.
The lecture and tutorial work will be assessed progressively, whereas the directed reading course will be examined by two papers, each of three hours duration.
Assessment of the grade of Honours to be awarded will be based on the standard achieved in the formal courses; the quality of the research project and thesis; and performance in the undergraduate programme.

Texts
To be advised
DEPARTMENT OF GEOLOGY

731100 Geology I

Prerequisite Nil

Hours 3 lecture hours and 2½ laboratory hours per week and 2 days field work

Examination Two 3-hour papers, class assignments and practical examinations

Content

Material Geology
Introductory crystallography; mineralogy and petrology; classification of rocks; economic mineral deposits; applications of geology to engineering.

Physical Geology
Erosion cycle; agents of erosion; diastrophism; structural geology; marine geology; geomorphology.

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

Texts
EITHER Press, F. & Siever, R. Earth (Freeman 1978)
EITHER Reed, H. H. Rutley’s Elements of Mineralogy 24th edn (Murby 1960)
OR Mason, B. & Berry, L. G. Mineralogy (Freeman 1959)
Uyeda, S. The New View of the Earth (Freeman 1978)

732200 Geology II

Prerequisite Geology I

Hours 4 lecture hours and 3 laboratory hours per week and 8 days field work

Examination Two 3-hour papers, class assignments and practical examinations

Content

Mineralogy
Crystallography and optical mineralogy.

Petrology
Rock forming minerals; nature of and crystallization from a magma; chemical equilibrium studies; petrology of igneous rock associations; petrography and classification of igneous and sedimentary rocks.

Stratigraphy and Palaeontology
Stratigraphy of Australia; invertebrate palaeontology.

Structural Geology and Geotectonics
Nomenclature and origin of diastrophic and non-diastrophic structures.

Texts
Bishop, A. C. An Outline of Crystal Morphology (Hutchinson 1967)
Clarkson, E. N. K. Invertebrate Palaeontology and Evolution (Allen & Unwin 1979)
OR Hobbs, B. E. et al. An Outline of Structural Geology (Wiley Int. edn 1976)
Kerr, P. F. Optical Mineralogy (McGraw-Hill 1977)

732300 Geology III

Prerequisite Geology I

Hours 3 lecture hours and 4 laboratory hours per week and 8 days field work

Examination Two 3-hour papers, class assignments and practical examinations

Content

Marine Geology — the morphology of ocean basins
Nature and origins of morphological features of the oceans and their floors; destructive and constructive processes; submarine volcanicity; genesis types and potential of heavy and economic mineral deposits; the role of eustatic changes.

Introduction to Mineralogical and Petrological Techniques
Crystallography; methods of preparing materials for mineralogical and petrological examination; introduction to natural gem materials and synthetic and cultured gem materials; presentation of mineralogical and petrological data.

Environmental Geology
Development of Earth’s primary and secondary atmospheres; importance of trace metals; bacterial oxygen demand; litho- and hydro- and atmospheric balances; waste disposal; geological hazards; mineral and energy resources—present and future demands.

Introduction to Engineering and Mining Geology
Geological parameters related to engineering works; geological hazards associated with foundations, stability problems, sampling and mining.

Geomathematics
Elementary introduction to basic mathematics and data processing in geology.

Extraterrestrial Geology
Origin of the solar system; structure; distribution, age, chemical characteristics and petrogenesis of lunar rocks; astroblemes; meteorites; geology of other planets.

Palaeoecology
Application of ecological laws to modern and ancient plant and animal communities.

Text
Till, R. Statistical Methods for the Earth Scientist (Macmillan 1974)
733100 Geology IIIA

Prerequisites
Geology I & II A

Preparatory Subjects
Chemistry I & either Physics IA or IB

Hours
5 lecture hours and 6 laboratory hours per week and 4 days field work

Examination
Two 3-hour papers, class assignments and practical examinations

Content

Petrology
Petrology of igneous rock associations; petrogenesis of metamorphic rocks, metamorphic belts and plate tectonics.

Sedimentology
Petrogenesis of sedimentary rocks.

Economic Geology
Principles of formation of economic mineral deposits; textures of ore minerals; major Australian ore deposits; ore mineralogy.

Structural Geology and Geotectonics
Advanced structural geology, geotectonics and tectonophysics; structural aspects of geosynclinal concept; orogenies; continental drift; global tectonics.

Photogrammetry and Photogeology
Basic principles of photogrammetry and photogeological interpretation; aerial photographs and their use in cartography and in stratigraphic and structural studies.

Micropalaeontology and Theoretical and Evolutionary Palaeontology
Micropalaeontology, principles of taxonomy, quantitative methods; species concepts, genetics, evolution; selected evolutionary patterns from the palaeontological record.

Geochronology and World Stratigraphy
Principles of age dating; regional geology of selected provinces of the world.

Exploration Geophysics
Geophysical techniques — their interpretation and application in petroleum and mining exploration, and hydrogeological and engineering investigations.

Texts
Cox, K. G., Bell, J. D. & Pankhurst, J. 
Hobbs, B. E. et al. 
Stanton, R. L. 
EITHER 
Winkler, H. J. F. 
OR 
Mason, R. 

The Interpretation of Igneous Rocks (Allen & Unwin 1979)

An Outline of Structural Geology (Wiley Int. edn 1976)

Ore Petrology (McGraw-Hill 1972)

Petrogenesis of Metamorphic Rocks 4th edn (Springer Verlag 1979)

Petrology of the Metamorphic Rocks (Allen & Unwin 1978)

For others, consult lecturers concerned.

733200 Geology IIIB

Prerequisites
Geology I & II A

Corequisite
Geology III A

Hours
4 lecture hours and 4 laboratory hours per week and 12 days field work

Examination
Two 3-hour papers, class assignments and practical examinations

Content

Economic and Exploration Geology
Source, transport and precipitation of ore minerals; sulphide mineralogy, wallrock alteration; ore-forming fluids; sulphur, oxygen and lead isotopes in ore mineral genesis; fluid inclusions; geochemical environments; dispersion of metals; geochemical exploration.

Mineralogical and Geochemical Techniques
X-ray diffraction and fluorescence; X-radiography; atomic absorption, infra-red and optical spectroscopy; differential thermal and thermogravimetric analysis; scanning and transmitted electron microscopy; the electron microprobe; differential staining techniques.

Sedimentology
Lithologic associations in relation to the depositional facies of their environment of formation with emphasis on the genetic connection between the geological setting of a depositional area and its sedimentary fill (basin analysis).

Stratigraphic Principles
Stratification; top and bottom criteria; stratigraphic breaks; facies changes; factors in lithostatigraphy (rock units, lithofacies, lithosomes); catastrophic stratigraphy, uniformitarianism and the processes of sedimentation; stratigraphic nomenclature; biostratigraphic zones; correlation; stratigraphic palaeontology.

Types of stratigraphic maps and sections; numerical analysis of data strings; numerical map analysis.

Coal Geology
Origin, distribution, classification and economic potential of coal.

Petroleum Geology
Origin, source, migration, entrapment and distribution of petroleum and gas; the exploration and exploitation techniques for its detection, evaluation and recovery.

Mining and Engineering Geology
Mechanical properties and behaviour of rocks; movement picture and movement plan; stress-strain relationships; symmetry concepts.

Design and stability of structures in rocks; geological problems in engineering design and construction; rock mechanics.

Igneous Petrology
Interpretation and representation of chemical analyses of minerals and rocks, microscale analysis; petrology of selected igneous rock associations.

Metamorphic Petrology
Examination of the texture of metamorphic rocks; determination of processes involved in the production of grain shapes and deformation features within grains.

Texts
Consult lecturers concerned.
734100 Geology IV

Prerequisites
Geology IIIA, completion of ordinary degree requirements and permission of the Head of Department

Hours
To be advised

Examination
(i) performance in one 3-hour paper
(ii) a viva voce examination
(iii) research work carried out and its presentation in a thesis
(iv) such other work, e.g. seminars, assignments, earlier academic record, which may be considered relevant.

Content
Part A
Lecture-tutorial work with directed reading in two of the following fields of geology: mineralogy and crystallography; geochemistry; igneous petrology; metamorphic petrology; coal petrology; sedimentology; stratigraphy; palaeontology; structural geology; economic geology.
Not all fields will be available every year.
Part B
A research project, the results of which are to be embodied in a thesis.

DEPARTMENT OF PHYSICS

741200 Physics IA

Prerequisite
Nil, however refer to Advisory Prerequisite for entry to the Faculty on p.15.

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

Examination
One paper after the end of each term and an hour's written examination on the year's practical work.

Content
For students who may wish to proceed to Physics II, and for all students in the Faculty of Engineering except Civil Engineering, some of whom may be advised to read Physics IB. A rigorous, mathematically based discipline with emphasis on the unifying principles which link together different areas of the subject. Lectures will cover mechanics, wave motion, electromagnetism, thermal physics, geometrical optics, physical optics, and quantum physics. The treatment throughout will assume some knowledge of calculus.

Texts
Halliday, D. & Resnick, R.
Williams, S. A. et al.
Physics (3rd combined edn) (Wiley 1977)
Student Study Guide (Wiley 1978)

741300 Physics IB

Prerequisite
Nil, however refer to Advisory Prerequisite for entry to the Faculty on p.15.

Hours
3 lecture hours and 3 hours laboratory or demonstrations per week.

Examination
One 2-hour paper after the end of each term.

Content
For students who in general do not intend to proceed with further studies in Physics. The treatment will require a minimum of mathematics and will involve an experimental approach throughout. The coverage of the subject will be somewhat broader than in Physics IA.

Texts
Arya, A. P.
Introductory College Physics (Macmillan Publishing Co. Inc. 1979)
Arya, A. P. & Goldberg, F. M.
Student Study Guide (Macmillan Publishing Co. Inc. 1979)

742200 Electronics & Instrumentation II

This subject will not be offered in 1981.

Prerequisites
Physics IA or IB

Hours
3 lecture hours, 4 laboratory hours and 2 tutorial hours with directed assignments each week.

Examination
One 2-hour paper on each of the 3 topics selected.

Content
Topic A — Basic Theory of Techniques; Instrumentation Practice; Specialist Instrumentation.
Topic B — Instrumentation Theory.
Topic D — Basic Device Physics; Measurement Devices.

Students taking Physics II (either previously or concurrently) will be examined in Topics B, C and D. They must also attend the lectures on Instrumentation Practice in Topic A as part of the directed assignments requirements.

Students who have not taken Physics II will be examined in Topics A, C and D.

Texts
Malmstadt, H. V.
Instrumentation for Scientists Series, Texts with Experiments Modules 1, 2, 3 & 4 (Benjamin).
742100 Physics II

Prerequisites
Mathematics I, Physics I A or normally a credit pass or better in Physics I B.

Advisory Co-requisite
While Mathematics II is not an essential corequisite for Physics II, Physics II students who have completed only Mathematics I, should include a Mathematics II subject. It is suggested that in addition to Topic CO this should include Topic B and one of the Topics D, F, and H.

Hours
3 lecture hours and 6 laboratory hours per week. Engineering students refer to Engineering Faculty Handbook.

Examination
Equivalent of 6 hours total examination.

Content
Mechanics
Thermal Physics
Quantum Physics
Electromagnetics
Physical Optics

Texts
Refer to the Physics Department notice board.

743100 Physics IIIA

Prerequisites
Physics II, at least one Mathematics II subject which should include, in addition to topic CO (which counts as two topics), topic B and one of the topics D, F and H.

Hours
Approximately 120 lecture hours and 240 laboratory and tutorial hours.

Examination
Assessment to the equivalent of 10 hours 25 minutes of examination time.

Content
The areas of classical and quantum physics essential to the understanding of both advanced pure physics and also the many applications of physics. Some electronics is also included.

A. Classical Physics
Mathematical methods, advanced mechanics, special theory of relativity, electromagnetics including waveguide and antenna theory.

B. Modern Physics
Quantum mechanics, atomic and molecular physics, statistical physics, solid state physics, nuclear physics, electronics.

C. Laboratory
Parallels the lecture course in overall content, with at least one experiment available in each topic, although students are not expected to carry out all the experiments available.

Texts
Refer to the Physics Department notice board. Students should retain their Physics II texts.

743200 Physics IIIB

This subject will not be offered in 1981.

Corequisite
Physics III A

Hours
90 lectures, 180 hours laboratory total, and two Mathematics topics.

Examination
Two 2½-hour papers and assessment. The mathematics topics will be examined by the Department of Mathematics.

Content
The subject emphasizes the experimental and applied aspects of Physics. The Department considers it desirable that some mathematical studies should be continued through this level, so two mathematics topics are included in Physics II B, to be selected in consultation with the Physics Department.

The Physics lecture course will treat the following topics:

Experimental Techniques
Photometry and Instrumental Optics
Nuclear Measurements
Radio-frequency Spectroscopy
Electronics
Geophysics
Statistical Mechanics
Solid State Physics
Physics of Fluids

744100 Physics IV

Prerequisite
Physics III A. Attention is drawn to degree requirements for Honours, p.20. Normally a grade in Physics III A of a credit or better is required.

Hours
100 lecture hours and, in addition, a research project

Examination
Assessment will be on the basis of one 45 minute formal formal examination question per 5 hours of lectures. Individual lecturers may choose to assess, in part, by other means, e.g. essays, problems, etc. Occasionally, where appropriate, there may be an open book examination. In addition the research project is evaluated and normally an oral examination is conducted.

Content
Physics IV is intended to give students an advanced understanding of the fundamentals of modern physics appropriate for an Honours graduate in the discipline as well as an exposure to the current interests of the Department viz. solid state theory, surface physics, geophysics, biophysics and aspects of applied physics.
In seeking to achieve these aims the subject is divided into two parts, a compulsory core of fundamental principles and a group of optional topics, reflecting the specific interests of staff members. The details are as follows:

**Compulsory part — Fundamental Principles**

- **Quantum Mechanics**
  - 15 lectures
  - Dr. P. V. Smith
- **Interaction of Radiation with Matter**
  - Mr. J. D. Balfie
- **Statistical Physics**
  - Asoc. Prof. J. A. Ramsey
- **Relativity**
  - Dr. P. A. McGovern

**Elective part — Special Interests**

- **Applied Nuclear Physics**
  - 10 lectures
  - Asoc. Prof. C. S. L. Keay
- **Surface Physics**
  - Asoc. Prof. J. A. Ramsey
- **Biophysics**
  - Mr. J. D. Balfie
- **Principles of Magnetic Resonance**
  - Dr. S. Chandra
- **Radio Astronomy**
  - Asoc. Prof. C. S. L. Keay
- **High speed processes**
  - Mr. J. E. Cleary
- **Fourier transforms and physical applications**
  - Mr. J. E. Cleary
- **Advanced Electromagnetic Theory**
  - Dr. P. A. McGovern
- **Time Domain Measurement**
  - Dr. P. A. McGovern

***Not all topics will necessarily be offered in any one year.***

**Research Project**

The research project is carried out under the supervision of a staff member and results are embodied in a formal report. The Department generally provides to prospective students a short list of research projects carefully chosen for suitability as Physics IV projects, and for relevance to research within the Department. The choice is not necessarily confined to this list. Students should consult with staff members on choice of project topic. Project work is to be started in the first week of February.

**Texts**

Texts and literature references will be given as needed by the lecturers concerned.

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**Department of Psychology**

**751100 Psychology I**

**Prerequisites**

Nil

**Hours**

3 lecture hours and one 2-hour practical/tutorial session

**Examination**

One 3-hour paper and an assessment of practical work

**Content**

A general introduction to psychology, including such topics as learning theory, perception, developmental psychology, physiological psychology, theory of measurement and descriptive statistics, statistical analysis of data, human information processing, and humanistic psychology.

**Texts**

To be advised

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**752100 Psychology IIA**

**Prerequisite**

Psychology I

**Hours**

3 lecture hours, one 2-hour practical session and one hour tutorial per week

**Examination**

Two 3-hour papers and an assessment of practical work

**Content**

Such topics as scientific method, learning, physiological psychology, mathematical models, cognition, perception, information processing and animal behaviour. Statistical methods will be taught and tested during the year.

**Texts**

To be advised

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**752200 Psychology IIB**

**Prerequisite**

Psychology I

**Hours**

3 lecture hours, one 2-hour practical session and 1 tutorial hour per week

**Examination**

Two 3-hour papers and an assessment of practical work

**Content**

Such topics as developmental psychobiology, drugs and behaviour, clinical neuropsychology, personality, social psychology, abnormal psychology, child development and test construction. Statistical methods will be taught and tested during the year.

**Texts**

To be advised
753100 Psychology IIIA

Prerequisite Psychology II A

Hours 4 lecture hours and up to 5 hours practical work per week

Examination Two 3-hour papers and an assessment of practical work

Content
Such topics as cognition, genetic constraints on learning, human information processing, physiological psychology, animal communication, statistical analysis, experimental method, consciousness, social psychology, vision and perceptual development. The practical work is divided into
(a) Laboratory sessions — 3 hours per week.
(b) An investigation carried out under supervision. The topic of this will usually be selected by the student, although some restrictions may be decided by the Department — 2 hours per week.

Texts To be advised

753200 Psychology III B

Prerequisite Psychology II B

Hours 4 lecture hours and approximately 5 hours practical work per week

Examination Two 3-hour papers and an assessment of practical work

Content
Such topics as social psychology, psychopathology development, and neuropsychology, quantitative psychology, cross-cultural psychology, abnormal psychology, ethology, statistics, non-verbal behaviour, ergonomics and human factors. Practical work comprises workshop and laboratory work for up to 3 hours per week plus a supervised independent experimental project.

Texts To be advised

754100 Psychology IV

Prerequisites Completion of an ordinary degree normally including a Pass at or above Credit level in Psychology IIIA or IIIB, as well as a Pass at any level in both Psychology II A and II B, and permission of the Head of Department.

Hours To be advised

Examination Assessment of thesis. Seminar material may be examined either by assignment during the year or by examination at the end of the year.

Content
The student is expected to cover such fields as abnormal and clinical psychology, animal behaviour, developmental psychology, learning and cognition, motivation, perception, personality, physiological psychology, quantitative psychology, and social psychology.

Texts To be advised

664200 Psychology/Mathematics IV

Prerequisites Mathematics III A & Psychology II C

Hours To be advised

Examination To be advised

Content
4 Mathematics topics chosen from the Part IV Mathematics topics (see Faculty of Mathematics Handbook).
Psychological Measurement (see below).
Mathematical Models in Perception and Learning (see below).

(i) Psychological Measurement — J. A. Keats

Prerequisites Nil

Hours 1½ hours per week

Examination To be advised

Content
The logic of measurement and its application to psychological phenomena and at least one paper on one of the more recently developed psychological scaling methods.

Text Nil

(ii) Mathematical Models in Perception and Learning — R. A. Heath

Prerequisites Part II Mathematics Topic H recommended

Hours 1½ hours per week

Examination To be advised

Content
An introduction to the application of stochastic process models to the analysis of psychological processes involved in perception and learning. Use of a real-time computer.

Text Nil

References To be advised
Master of Psychology (Clinical)
The course leading to the degree of Master of Psychology (Clinical) is offered in the Faculty of Science.

Prerequisites
Honours degree in Psychology or other qualifications approved by the Faculty Board of the Faculty of Science. It is considered highly desirable, if not essential, that candidates for this degree be concurrently employed in a position related to the practice of Clinical Psychology.

Hours
The course is a part-time course extending over 2 years. There are 8 hours of classwork per week plus a clinical internship organised either as two full days per week or an equivalent period of time in longer blocks.

Examination
Assessment is continuous and is achieved by:
1. Evaluation of practical performance by academic and field supervisors.
2. Evaluation of written or other exercises required in specific course components.
3. Evaluation of case presentation with viva voce defence to an interrogation panel.
4. Internal and external examination of research thesis.

Content
There are three major sections of the course:
(i) Classwork includes both didactic and practical components and covers topics such as: Professional Practice and Forensic Psychology; Psychopharmacology; Psychological Assessment and Clinical Decision Making; Therapy; Preventative Psychology; Programme Development; Clinical Child Psychology; Psychotropic Drugs.
   In the second year of the course a limited degree of specialization is offered in the following areas: Clinical Neuropsychology; Clinical Child Psychology; Psychosomatic Psychology; Counselling.
(ii) Clinical internship provides 2 days per week (or equivalent blocks) supervised clinical experience in professional settings outside that of the candidates' regular employment. It is intended to augment and consolidate instruction provided in classwork. A wide range of institutions and agencies are available for internship placements.
(iii) A Research Thesis is required embodying the results of a research investigation in an approved area.

Master of Psychology (Educational)

Prerequisites
A bachelor's degree including at least one Part III Psychology subject, a Diploma in Education or equivalent qualification and at least two years teaching or other relevant practical experience approved by the Board of Studies in Psychology.

Hours
18 formal hours and six practical hours per week in the first year; 10 formal hours and 24 practical hours per week in the second year.

Examination
Professional proficiency is evaluated through practical examinations and ongoing assessments. There is a formal examination at the end of the first year and an assessment of the thesis at the end of the second year.

Content
First Year
Seminars on psychological development of the child, the child in school and society, cognitive development, exceptional and problem children, counselling theory and procedures, education systems and personal development.
Workshops concentrating on the development of diagnostic skills and methods of psychological testing and assessment. Further activities include case study skills, consulting, communication and report writing, counselling procedures and personal development. Approximately equal time will be devoted to seminar and workshop activities and thesis supervision will continue throughout the year.

Second Year
The course work consists of seminars and workshops which extend the work from the first year in counselling theory and procedures, case work, consulting and communication skills. The thesis begun in the previous year will be completed.

DEPARTMENT OF GEOGRAPHY

351100 Geography I

Prerequisites
Nil

Hours
2 lecture hours and 3 hours practical work per week, 1 tutorial hour per fortnight and 2 days of field work

Examination
To be advised

Content
A study of the structure and interaction of two major systems: the ecological system that links man and his environment, and the spatial system that links one region with another in a complex interchange of flows. The study explores the internal structure and the linkages between each of the basic components in the two systems.
The practical programme is designed to enable students to gain proficiency in and understanding of the tools of geographical analysis. Methods in the cartographic and statistical organization of geographic data are studied.

Texts
Manual of meteorology rev. edn (Bureau of Meteorology 1977)

Part II Subjects
The Geography Department offers three Part II subjects each comprising three topics chosen from the list below.
Students selecting two or more topics from Topics B-D to make up a subject must nominate that subject Geography IIA; those selecting Topics E and F for one subject must nominate that subject Geography IIB; those selecting Topic G-H for one subject must nominate that subject Geography IIC.
LIST OF TOPICS FOR PART II GEOGRAPHY

**Topic**

B  Historical and political geography
C  Urban social geography  
D  Development; geography  
E  Climatology  
F  Geomorphology  
G–H  East and Southeast Asia

**352100 Geography IIA**

**Prerequisite**

Geography I  

**Hours**

Six hours per week of lectures, practical classes and tutorials. Each topic may require up to 3 days fieldwork or its equivalent per year  

**Examination**

To be advised  

**Content**

Three topics selected from the list above and not included in Geography IIB or IIC.

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**352200 Geography IIB**

**Prerequisite**

Geography I  

**Hours**

Six hours per week of lectures, practical classes and tutorials. Each topic may require up to 3 days fieldwork or its equivalent per year  

**Examination**

To be advised  

**Content**

Three topics selected from the list above and not included in Geography IIA or IIC.

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**352300 Geography IIC**

**Prerequisite**

Geography I  

**Hours**

Six hours per week of lectures, practical classes and tutorials. Each topic may require up to 3 days fieldwork or its equivalent per year  

**Examination**

To be advised  

**Content**

Three topics selected from the list above and not included in Geography IIA or IIB.

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**Part II Topics**

**352102 Topic B — Historical and Political Geography — J. C. R. Camm**

**Content**

A study of aspects of the historical and political geography of the cultural area of Western Europe with particular reference to the British Isles. The course includes the following units of study:

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**352103 Topic C — Urban Social Geography — D. N. Parkes**

**Content**

An introduction to the study of the spatial characteristics of cities. Emphasis is placed on the structures, patterns and processes which contribute to the geography of socio-demographic and behavioural components of cities in industrial societies. Lectures cover the following components: (1) An overview of the urban condition; (2) the study of urban geography; (3) urbanisation; aspects of adaptive social systems; (4) settlement systems and urban growth: an Australian emphasis; (5) classical and neo-classical urban ecology; (6) critical pivotal spaces in the city; (7) critical social area analysis; (8) a) classical social area analysis, b) introduction to factorial ecology, (9) urban image studies: a basis for the study of urban spatial behaviour; (10) residential mobility; (11) human activity analysis and travel behaviour.

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**352104 Topic D — Development Geography — W. A. Jonas**

**Content**

An examination of a number of theories and models which have been put forward to explain why some areas of the world are more or less developed than others. The emphasis is on development as a totality and the works treated have, explicitly or implicitly, a spatial component or they offer reasons for spatial inequalities. Empirical evidence is drawn from both so-called advanced and less developed countries.

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**352201 Topic E — Climatology — H. A. Bridgman, G. N. McIntyre**

**Content**

A study of processes and patterns in man's physical environment. The course examines the behaviour of the atmosphere, including its interaction with the earth's surface over wide ranges of scale in space and time.
Examination To be advised
Content Three topics selected from the list above and not included in Geography IIIA.
Part III Topics

353213 Topic L-M — Advanced Climatology — Geomorphology
G. N. McIntyre, R. J. Loughran

Content Processes in agricultural climatology. Sediments and solutes in the drainage basin system.

Texts
Wiesner, C. J. Climate, irrigation & agriculture (Angus & Robertson 1970)

353204 Topic O — Biogeography — J. C. Turner

Content Study of some basic concepts in biogeography; an introduction to ecology with emphasis on man as an inseparable part of nature; approaches towards ecological harmony between man and the rest of nature.

Texts
Bates, M. The forest and the sea (Vintage paperback 1960)
Kellman, M. C. Plant geography (Methuen paperback 1975)
Leopold, A. A sand county almanac, with other essays on conservation from Round River (Oxford U.P. paperback 1966)
Mowat, F. Never cry wolf (Pan paperback 1979)

353205 Topic P — Advanced Economic Geography — W. A. Jonas

Content The main topic areas studied are agricultural location theory, transportation networks and impact studies, markets and marketing, and underdevelopment.

Text To be advised

353206 Topic Q — Advanced Urban Geography — D. N. Parkes


Text To be advised
353209 Topic T — Southeast Asia — R. E. Barnard

Content
The examination of various concepts relating to the geography of development in Southeast Asia and the application of these concepts to selected parts of the region. The relationship between the modern and traditional sectors of Southeast Asia's economy are particularly emphasised.

Text Nil

353211 Topic V — Explanation in Geography — M. R. Hall

Content
The course emphasises the study of primary sources. It consists of two basic sections:
(i) Knowing the world: identification of the relevant tools for interpretation;
(ii) the known world: study of the development of geography through the history of cartography and the study of sample texts for the mid 19th century and the period since 1960.

Recommended for preliminary reading:
Baumer, F. L. *Modern European Thought: Continuity and Change in Ideas 1600-1950* (Macmillan 1977)

Text Nil

353214 Topic X — Map and Fieldwork Skills for Teachers of Geography — J. C. R. Cann, P. G. Irwin

Content
With the aim of developing cartographic, statistical, and fieldwork skills for the teaching of geography in secondary schools, the following themes are studied: (1) thematic mapping; (2) annotated sketch maps and diagrams; (3) synoptic charts; (4) application of statistics; (5) fieldwork techniques; (6) regional geography.

The programme includes ten hours of school-based observations.

Students holding Teacher Education Scholarships awarded by the N.S.W. Department of Education are advised that this topic is an approved education-oriented study. Students undertaking the topic qualify for the higher rate of scholarship awarded to 3rd year scholarship holders who undertake such studies.

Text Nil

354100 Geography IV

Prerequisites
In order to qualify for admission to Geography IV, a student must normally have completed a sequence of Geography I, II and III subjects; two of these, including the Part III subject must have been passed at Credit level or better. The student must also satisfy the Head of the Department of his/her ability in the area of study within which the proposed research topic lies.

Hours To be advised

Examination Two 3-hour papers

content
This subject is designed in part as an introduction to research work in Geography. Each student is required to submit a thesis embodying the result of an original investigation on a topic approved by the Head of the Department of Geography.

Seminars and field work will be offered in the following:
(a) The relationship between man and society and nature.
(b) A systematic topic approved by the Head of the Department.

Note: A candidate who wishes to proceed to Honours should notify the Head of Department by the commencement of Third Term 1981, and must confirm this as soon as final results for the year are known. Candidates are expected to commence work on their thesis early in the new year.

DEPARTMENT OF MATHEMATICS

Preliminary Notes
The Department offers and examines subjects. Each subject is composed of topics, each single-unit topic consisting of about 27 lectures and 13 tutorials throughout the year. Each of the Part I, Part II, and Part III subjects consists of the equivalent of four single unit topics. For Mathematics I, there is no choice of topics; for Mathematics II, III, and IV, there is some choice available to students; for Mathematics IIIA and IIIB, there is a wider choice. No topic may be counted twice in making up distinct subjects. (Students who passed some mathematics subjects before the arrangement of subjects was introduced should consult the "transition arrangements" set out in p.155 of the 1970 Faculty of Arts handbook, and p.76 of the 1973 Faculty of Mathematics handbook, Note that the "code letters" for the topics may vary slightly from year to year.)

The subject Computer Science II is taught and examined jointly by the Departments of Electrical Engineering and Mathematics. There is no choice of topics.

Students should take particular note of Clause 13(2)(b) of the requirements for the ordinary degree of Bachelor of Science which states that not more than four mathematics subjects may be counted.

Progressive Assessment
From time to time during the year students will be given assignments, tests, etc. Where a student's performance during the year has been worse than his performance in the final examination, then the former will be taken into account in determining his final result. On the other hand, when a student's performance during the year has been better than his performance in the final examination, then his performance during the year will be ignored in determining his final result.

661100 Mathematics I

Prerequisites Nil

Hours 4 lecture hours and 2 tutorial hours per week

Examination Two 3-hour papers

Content
Topics AM — Algebra
AN — Real Analysis
CA — Calculus
SC — Statistics and computing
Part I Topics

Algebra (Topic AL) — R. B. Eggleton

Prerequisites Nil

Hours 1 lecture hour and ½ tutorial hour per week

Content Introduction to basic algebraic objects and ideas. Induction. Matrices, solution of systems of linear equations. Determinants. Permutations. Vector geometry in two and three dimensions. Vector spaces, basis and dimension, subspaces. Linear maps, matrix representation, rank and nullity. Eigenvectors and eigenvalues. Applications are illustrated throughout the course.

Text
Anton, H. Elementary Linear Algebra 2nd edn (Wiley 1977)

References
Bristley, W. A Basis for Linear Algebra (Wiley 1973)
Kollman, B. Elementary Linear Algebra (Macmillan 1977)
Liebeck, H. Algebra for Scientists and Engineers (Wiley 1971)
Lipschutz, S. Linear Algebra (Schaum 1968)

Real Analysis (Topic AN) — J. G. Couper

Prerequisites Nil

Hours 1 lecture hour and ½ tutorial hour per week

Content Real Numbers. Sequences and series. Functions of one real variable, continuity, differentiability, integrability. Power series, Taylor Series.

Text Nil

References
Apostol, T. Calculus Vol. 1 2nd edn (Blaisdell 1967)
Spivak, M. Calculus (Benjamin 1967)

Calculus (Topic CA) — W. P. Wood

Prerequisites Nil

Hours 1 lecture hour and ½ tutorial hour per week


Text
Ayres, F. Calculus (Schaum 1974)

References
Apostol, T. Calculus Vol. 1 2nd edn (Blaisdell 1967)
Hille, E. & Salkin, S. First Year Calculus Internat. Textbook Series (Blaisdell 1968)
Spivak, H. Calculus (Benjamin 1967)

Statistics and Computing (Topic SC) — R. W. Gibberd

Prerequisites Nil

Hours 1 lecture hour and ½ tutorial hour per week


Text
University of Newcastle Computing Centre DEAMON Handbook
University of Newcastle Statistical Tables

References
Conte, S. D. & de Boor, C. Elementary Numerical Analysis (McGraw-Hill 1972)
Grogono, P. Programming in PASCAL 2nd edn (Addison-Wesley 1980)
Hoel, P. G. Introduction to Mathematical Statistics (Wiley 1971)

Part II Subjects

The Department offers three Part II Mathematics subjects and Computer Science II. Students whose course restricts them to one such subject must study Mathematics IIA or Mathematics III or Computer Science II. The subject Mathematics IIA is a pre- or corequisite for Mathematics IIC, and IIA and IIC together a prerequisite for any Part III subject, so students wishing to take two Part II subjects would normally choose Mathematics IIA and IIC. Summaries and extended booklists for these topics will appear in the handbook of the Faculty of Mathematics and will also be available from the Department. When selecting topics for Part II subjects, students are advised to consider the prerequisites needed for the various Part III subjects offered by the Department of Mathematics (Mathematics IIA, Mathematics IIB and Statistics III).
## LIST OF MATHEMATICS PART II TOPICS

<table>
<thead>
<tr>
<th>Topic</th>
<th>Corequisite or Prerequisite Topic</th>
<th>Part III Topic Requiring this Part II Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Mathematical Models</td>
<td>CO</td>
</tr>
<tr>
<td>B</td>
<td>Complex Analysis</td>
<td>CO</td>
</tr>
<tr>
<td>CO</td>
<td>Vector Calculus &amp; Differential Equations</td>
<td>M, N, P, PD, Q, TC, Y, Z</td>
</tr>
<tr>
<td>D</td>
<td>Linear Algebra</td>
<td>P, T, X, Z</td>
</tr>
<tr>
<td>E</td>
<td>Topic in Applied Mathematics e.g. Mechanics, Potential Theory and Fluid Dynamics</td>
<td>CO</td>
</tr>
<tr>
<td>H</td>
<td>Probability &amp; Statistics</td>
<td>R, ST, U, V</td>
</tr>
<tr>
<td>I</td>
<td>Applied Probability and Statistics</td>
<td>H</td>
</tr>
<tr>
<td>K</td>
<td>Topics in Pure Mathematics e.g. Group Theory</td>
<td>FM, O, T, X</td>
</tr>
<tr>
<td>L</td>
<td>Analysis of Metric Spaces</td>
<td>FM, O, P, V, W</td>
</tr>
<tr>
<td>ML</td>
<td>Introduction to Logic and Assembly Languages</td>
<td></td>
</tr>
<tr>
<td>SI</td>
<td>Introduction to Structuring of Information</td>
<td></td>
</tr>
<tr>
<td>SP</td>
<td>Systematic Programming</td>
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</tbody>
</table>

* It is strongly suggested that those students wishing to take Topic Z in 1982 should take Topic F in 1981.

The selection rules and definitions of the Part II subjects follow.

### 662100 Mathematics IIA

**Prerequisite** Mathematics I  
**Hours** 4 lecture hours and 2 tutorial hours per week  
**Examination** Each topic is examined separately

**Content**  
Topics B, CO and D. In exceptional circumstances and with the consent of the Head of Department, one other topic may be substituted for B. Additional substitutions may be allowed in the case of candidates who have passed the subject Mathematics IIB. In addition, students taking Mathematics IIA will be required to prepare a report on some aspect of the history of the mathematics studied in this subject.

### 662200 Mathematics IIB

**Prerequisite** Mathematics I  
**Hours** 4 lecture hours and 2 tutorial hours per week  
**Examination** Each topic is examined separately

**Content**  
Four topics chosen from A to H, where CO counts as two topics, and approved by the Head of Department. In exceptional circumstances, and with the consent of the Head of Department one or more of the topics I, E, K or L may be included.

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### 662300 Mathematics IIC

**Prerequisite** Mathematics I  
**Pre- or Corequisite** Mathematics IIA  
**Hours** 4 lecture hours and 2 tutorial hours per week  
**Examination** Each topic is examined separately

**Content**  
Topics K, L and one of the topics A, E, F, H, I. Students who may wish to proceed to Statistics III as a Part III subject should select topic I.

### 662400 Computer Science II

**Prerequisite** Mathematics I  
**Hours** 168 hours of lectures, tutorials and practical work as listed below  
**Examination** See component descriptions below

**Notes**  
1. Mathematics IIB is no longer offered in two parts in the Faculty of Science. Students who passed Mathematics IIB part (i) before 1971 should consult Note 1 on page 90 of the 1971 handbook.  
2. Mathematics IIA is a corequisite or prerequisite for Mathematics IIC.  
3. Students whose course includes Physics IIA are advised to include topics CO, B and one of D, F and H in their Part II Mathematics subject/subjects. This may require the use of the substitution rules.  
4. Students who passed a Part II Mathematics subject prior to 1974 and who wish to take further Part II Mathematics subjects should note that the topic codes "L" in 1974-1978 corresponds to the topic coded "A" in previous years. Such students may require special permission for their selection of Part II topics, and should consult with the Head of Department.  
5. Topics C and E existing before 1978 are no longer offered as separate topics.

**Texts for Part II Topics**

### 662101 Topic A — Mathematical Models

Nil

### 662102 Topic B — Complex Analysis

Spiegel, M. R.  
*Theory and Problems of Complex Variables*  
(McGraw-Hill 1966)
662109 Topic CO — Vector Calculus and Differential Equations

Either
Greenberg, M. D. Foundations of Applied Mathematics (Prentice-Hall 1978)

662104 Topic D — Linear Algebra
Lipschutz, S. Linear Algebra (Schaum 1974)

662201 Topic E — Topic in Applied Mathematics
e.g. Mechanics, Potential Theory and Fluid Dynamics

Nil

662202 Topic F — Numerical Analysis and Computing
Nil

662204 Topic H — Probability and Statistics

662301 Topic I — Applied Probability and Statistics
or

662303 Topic K — Topic in Pure Mathematics
e.g. Group Theory
Nil

662304 Topic L — Analysis of Metric Spaces
Giles, J. R. Analysis of Metric Spaces (University of Newcastle 1974)

Topic ML — Introduction to Logic and Assembly Languages

Topic SI — Introduction to Structuring of Information
Nil

Topic SP — Systematic Programming
Grogono, P. Programming in PASCAL 2nd edn (Addison-Wesley 1980)

Part III Subjects

The Mathematics Department offers two Part III Mathematics subjects, each comprising four topics chosen from the list below and the subject Statistics III.
Passes in both Mathematics IIA and IIC are prerequisite for entry to Mathematics IIIA. It will be assumed that students taking a Part III subject in 1981 have already studied topics CO, D, K and L in 1978 to 1980 (or C, D, E, K and L if done prior to 1978) in their Part II subjects.

Students wishing to enrol in Statistics III should avoid taking topics R, U and Y as Mathematics IIIA topics.

Summaries of the Part III topics together with extended booklists will appear in the handbook of the Faculty of Mathematics and will also be available from the Department.

LIST OF TOPICS FOR PART III MATHEMATICS

<table>
<thead>
<tr>
<th>Topic</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>FM</td>
<td>Foundations of Mathematics</td>
</tr>
<tr>
<td>M</td>
<td>General Tensors</td>
</tr>
<tr>
<td>N</td>
<td>Variational Methods and Integral Equations</td>
</tr>
<tr>
<td>O</td>
<td>Mathematical Logic</td>
</tr>
<tr>
<td>P</td>
<td>Ordinary Differential Equations</td>
</tr>
<tr>
<td>PD</td>
<td>Partial Differential Equations</td>
</tr>
<tr>
<td>PL</td>
<td>Programming Languages and Systems</td>
</tr>
<tr>
<td>Q</td>
<td>Fluid Mechanics</td>
</tr>
<tr>
<td>QRS</td>
<td>Quantum, Relativistic and Statistical Mechanics</td>
</tr>
<tr>
<td>R</td>
<td>Theory of Statistics</td>
</tr>
<tr>
<td>S</td>
<td>Geometry</td>
</tr>
<tr>
<td>ST</td>
<td>Stochastic Processes</td>
</tr>
<tr>
<td>T</td>
<td>Group Theory (not offered in 1980)</td>
</tr>
<tr>
<td>TC</td>
<td>Theory of Computing</td>
</tr>
<tr>
<td>U</td>
<td>Regression, Design and Analysis of Experiments</td>
</tr>
<tr>
<td>V</td>
<td>Measure Theory and Integration</td>
</tr>
<tr>
<td>W</td>
<td>Functional Analysis</td>
</tr>
<tr>
<td>X</td>
<td>Rings and Fields</td>
</tr>
<tr>
<td>Y</td>
<td>Theory of Probability</td>
</tr>
<tr>
<td>Z</td>
<td>Mathematical Principles of Numerical Analysis</td>
</tr>
</tbody>
</table>

* If demand is insufficient, some topics may not be offered in any one year.
† In 1982 Topic F will probably be an additional prerequisite.

The selection rules and definitions of the Part III subjects follow.

663100 Mathematics IIIA

Prerequisites Mathematics IIA & IIC

Hours 4 lecture hours and 2 tutorial hours per week

Examination Each topic is examined separately
Content
A subject comprising four topics, which must include at least one of P, PD, Q, QRS, R, ST, U or Y. In addition, students taking this subject will be required to complete an essay on a topic chosen from the history or philosophy of Mathematics. Students should consult members of the academic staff regarding their choice of topics.

663200 Mathematics IIIA
Pre- or Corequisite Mathematics IIIA
Hours 4 lecture hours and 2 tutorial hours per week
Examination Each topic is examined separately

Content
A subject comprising four topics chosen from the topics above. Students should consult members of the academic staff regarding their choice of topics.

663300 Statistics III
Prerequisites Mathematics II A & IIC (including topics CO, H and l)
Hours 4 lecture hours and 2 tutorial hours per week
Examination Each topic is examined separately

Content
A subject comprising four topics: Topics R, U, Y and one other Part III Mathematics topic. (Topic ST is particularly recommended). Before selecting a particular topic as the optional fourth topic in Statistics III, students should seek advice from a lecturer giving one of the compulsory topics, or from the Head of the Department.

Texts for Part III Topics
663210 Topic FM — Foundations of Mathematics
Enderton, H. B. Elements of Set Theory (Academic 1977)
663101 Topic M — General Tensors
Nil
663102 Topic N — Variational Methods and Integral Equations
Nil
663103 Topic O — Mathematical Logic
Mendelson, E. Introduction to Mathematical Logic 2nd edn (Van Nostrand 1979) paperback
663104 Topic P — Ordinary Differential Equations
Nil

663108 Topic PD — Partial Differential Equations
Nil
663211 Topic PL — Programming Languages and Systems
Pratt, T. W. Programming Languages: Design and Implementation (Prentice-Hall 1975)
663105 Topic Q — Fluid Mechanics
Nil
663212 Topic QRS — Quantum, Relativistic and Statistical Mechanics
Nil
663106 Topic R — Theory of Statistics
Nil
663107 Topic S — Geometry
Nil
663129 Topic ST — Stochastic Processes
Feller, W. An Introduction to Probability Theory and its Applications (Wiley)
663209 Topic TC — Theory of Computing
Nil
663202 Topic U — Regression, Design and Analysis of Experiments
Nil
663203 Topic V — Measure Theory and Integration
Bartle, R. G. The Elements of Integration (Wiley 1966)
663204 Topic W — Functional Analysis
Giles, J. R. Analysis of Normed Linear Spaces (University of Newcastle 1976)
663205 Topic X — Rings and Fields
Nil
663206 Topic Y — Theory of Probability
Nil
Mathematical Principles of Numerical Analysis

Transition Arrangements
A student who has passed some Part II or III Mathematics subjects prior to 1970 and who wishes to continue with Mathematics should proceed according to the pattern set out on p.120 of the 1973 handbook.

Part IV Subject

Mathematics IV

Prerequisites
Mathematics IIIA and at least one of Mathematics IIIB, Computer Science III or Statistics III, and additional work as prescribed by the Head of the Department of Mathematics.

A student desiring admission to this subject must apply in writing to the Head of Department before 7th December of the preceding year.

Hours
At least 8 lecture hours per week over one full-time year or 4 lecture hours per week over two part-time years.

Examination
At least eight 2-hour final papers.

Content
A selection of topics, each of about 2 lectures, will be offered. Summaries of topics which may be offered in 1981 will appear in the handbook of the Faculty of Mathematics and will also be available from the Department.

RESEARCH IN THE FACULTY OF SCIENCE

Current experiments in the field of mammalian reproduction involve assessing the interactions between spermatocytes and ova during fertilization in the rat and mouse and also the induced fusions of human spermatozoa with rodent ova.

The differentiation of the cleaving mouse embryo is also being studied along with the influence of uterine fluids on the activation of the embryo at the time of implantation.

The biology of spermatozoa and comparative structure and function of the vertebrate epididymis.

Current research efforts involve studies of the enzymology, biochemistry and surface properties of uterine decidual cells during early pregnancy. Elucidation of the nature of the stimulus responsible for the induction of the decidual cell reaction is a prime objective of the research.

Cell-free system analyses of the translational efficiencies of various uterine messenger RNA molecules are currently being developed in order to increase our understanding of biochemical and molecular events occurring in the uterus during implantation of the conceptus.

Within the field of immunological influences on fertility, the following topics are currently under investigation: the radioimmunoassay technique for detection of antibodies to LDH-X in human sera. The study of non-immunological spermagglutinins in human sera.

Studies are being conducted on proteins of boar seminal plasma with a view to developing an effective method for the cryopreservation of boar semen.

Preservation by freezing of human spermatozoa for artificial insemination. Reproductive biology of fish.

The topics under investigation in the field of population genetics include the effect of parental age on heritability of quantitative traits in different species of Drosophila and the development of selection indices based on factors affecting growth rates in swine.

A transmissible factor capable of inducing sterility in Drosophila is being studied.

The ecology and genetics of populations, geographic variation and hybrid zones in Lepidoptera are currently being studied.

The effects of fluorides upon plant communities and fluoride uptake and transfer within ecosystems.

The role of phytohormones as regulators of long-distance carbon transfer and distribution within plants. Unloading of carbon from the phloem.

Strategies of phosphorus acquisition by and distribution within eucalypt seedlings growing under conditions of phosphorus limitation. The relationship between chloroplast ultrastructure and photosynthetic capacity in low light grown eucalypt seedlings.

In the area of chloroplast development and chloroplast DNA in plant cells, research is being carried out into the organisation of chloroplast DNA in chloroplasts and chloroplast development and multiplication in protoplasts. Chloroplasts are being examined as possible vehicles for genetic change in plants.
The research interests of members of the Department are as follows.

**Analytical and Environmental Chemistry** (Professor W. F. J. Pickering)
- Trace analysis studies; sorption of heavy metal ions by clays; metal glaucophane complexes; heterogeneous oxidation mechanisms.

**Analytical Chemistry: Wine Science** (Dr G. L. Orr)
- Instrumental methods of chemical analysis; application to oenology.

**Aliphatic, Aromatic and Heterocyclic Chemistry** (Associate Professor L. A. Summers)
- Synthesis, with particular reference to the preparation of new fungicides and plant growth regulators and studies of their mode of action; mass spectral fragmentation of organic molecules.

**Chemical Education; and Molecular Studies** (Dr R. R. Titre)
- Development of new experiments for undergraduate courses in Chemistry; X-ray structure determination of selected inorganic crystalline solids.

**Electrochemistry** (Dr R. A. Fredelein)
- Mechanisms of electrode reactions; semiconductor electrochemistry; double-layer structure and electroosorption at solid electrodes; electrochemistry of oxide bronzes.

**Molecular Spectroscopy** (Associate Professor R. P. Coveney)
- Laser Raman and infrared spectroscopy applied to metal complexes, molecules adsorbed on oxide surfaces of catalytic interest, species at metal electrode surfaces, polymers, and chemistry of coal.

**Metal Complexes** (Associate Professor W. R. Walker)
- Studies of interaction of metal ions (especially copper and zinc) with biologically important molecules such as purines and pyrimidines, both in vivo and in vitro; the role of copper in health and disease.

**Natural Products** (Associate Professor H. D. Darwell)
- Elucidation of the components of Xanthorrhoea resin and the synthesis of related compounds. Pericyclic reactions, oxygen heterocycles.

**Organic Reaction Mechanism** (Associate Professor L. K. Dallal)
- Studies on the mechanism of oxidations which involve a neighbouring group in a cyclization process; the chemistry of N-chloro compounds.

**Organic Synthesis and Stereochemistry** (Dr K. H. Bell)
- Development of new synthetic reactions; synthesis of potential local anaesthetics and strong analgesics; chemical methods for determining absolute configurations.

**Radiochemistry** (E. B. Jacobs)
- Applications of tracers in studies of equilibria in solvent extractions and kinetics of transport of inorganic ions in plants and plant tissue.

**Surface Chemistry** (Associate Professor G. C. Colour)
- Absorption on solids from gaseous and liquid phases; structure, surface acidity, and catalytic properties of zeolites.

**DEPARTMENT OF GEOLOGY**

**Carboniferous Stratigraphy/ Palaeontology**
- Carboniferous palaeogeographic and tectonic evolution of the Tasman Mobile Zone. Evolutionary and ecological variation in Carboniferous marine invertebrate zones of Eastern Australia. Studies of Carboniferous trilobites, fenestrate brachiopods, and brachiopods. (Associate Professor B. A. Engel)

**Coalfield Geology**
- Coal formation and sedimentology of associated clastic sediments. Coal petrology, reflectance of coalfied and graphitized dispersed organic matter in sediments and its application to the metamorphic grade and petroleum exploration. Petrographic studies of the reactivity of so-called inert macerals during carbonization. (Associate Professor C. F. K. Diesel)

**Coal and Oil Shale Mineralogy**
- Investigations into the development and application of advanced mineralogical techniques to mineral mixtures in and associated with coal and oil shales and their technological implications. (Associate Professor S. St.J. Warne)

**Economic Geology**
- Geochemistry and ore genesis, with a special emphasis on the study of sulphur isotope distributions in ore minerals. Current projects include sulphur isotope studies of copper and nickel deposits in Western Australia, Kuroko ores of Japan and base metal mineralization in New South Wales. (Dr P. K. Seccombe)

**Engineering Geology**
- Application of geology to engineering problems, directional mining and foundation stability. (Associate Professor K. H. R. Moelle)

**Geology of the Hunter Valley**
- Detailed geology, including stratigraphy, structural geology, petrology, sedimentology, palaeontology and palaeoecology. (All staff)

**Metamorphic Petrology**
- Mineralogy and geochemistry of low-grade metamorphic rocks, north of Newcastle, and Central Peru, South America; and the structure and metamorphism of rocks south-east of Mudgee, New South Wales. (Dr R. Olfer)

**Mineralogy**
- Detailed studies of mineral species, groups, mixtures and isomorphous substitution series with emphasis on applications of thermal analysis and infrared techniques to their composition and decomposition products. (Associate Professor S. St.J. Warne)

**Structural Geology**
- Assessment of brittle deformation features and their interpretation in a regional setting; aspects of faulting in the northern fringe area of the Sydney Basin, New South Wales. (Associate Professor A. H. R. Moelle)

**DEPARTMENT OF PHYSICS**

Broadly, the research interests of the Department may be divided into two main areas — the physics of the surfaces of solids (surface physics) and the physics of the earth and near earth region (geophysics). In addition, there are special interest topics of individual staff members. A brief description of these topics is set out below.

**Surface Physics — Ion-surface Interaction** (Professor R. J. MacDonald, Dr F. T. Bagnall)
- The group is interested in both the use of scattering and sputtering as a means of analysing the structure and composition of a surface and the basic collision processes leading to the creation or ionization of particles involved in the ion-surface interaction event.

**Surface Physics — Electron-surface Interaction** (Associate Professor J. A. Ramsey, Mr R. H. Roberts, Dr P. V. Smith, Mr J. E. Cleary)
- The use of electron beams in surface studies is concerned particularly with Low Energy Electron Diffraction (LEED) and Auger Electron Spectroscopy (AES). The use of these techniques is directed towards the study of the structure and composition of clean metal surfaces and the adsorption of other species thereon. In particular, one area of special interest is the initial stages of oxidation, specifically the interaction of oxygen with aluminium. A fast scanning TV system adapted for the quantitative LEED study of adsorption is being developed.

**Geophysics — Geomagnetic Pulsaions** (Associate Professor B. J. Fraser)
- The time of occurrence, velocity, and orientation of travel of geomagnetic waves in an isometric duct is being extensively investigated. The phenomenon is studied at the surface of the Earth as geomagnetic pulsations recorded at Newcastle, Woomera, Launceston, Perth, Macquarie Island and Auckland.

**Geophysics — Radar Meteor Studies** (Associate Professor C. S. L. Kley)
Digital techniques employing high speed multiple microcomputers have been developed to enable signal processing to be carried out in real time. These and a new HF pulse transmitter, are being developed for a fully automated radar meteor detection system at a new field station established north of Newcastle, with communication to the campus by a radar relay link.

Geophysics — Fireball Studies
(Associate Professor C. S. L. Keay)
Investigations of anomalous phenomena connected with the atmospheric entry of very large meteor fireballs is continuing with laboratory studies of some of the mechanisms involved, particularly low frequency electromagnetic production of acoustic waves.

Theoretical Solid State Physics
(Dr P. V. Smith)
Investigations in theoretical solid state physics include the study of the electronic properties of dilute substitutional and interstitial impurities in both simple and transition metal hosts. The energetics and diffusion of hydrogen impurities in nearly free electron and transition metal hosts are also being studied.

Internal Friction in Metals (Mr J. E. Cleary)
A project being carried out in collaboration with the Department of Metallurgy and concerned with the development of electronic equipment for measuring frictional loss of samples vibrating at constant amplitude.

Electromagnetic Wave Propagation and Instrumentation
(Dr P. A. McGovern)
A study of electromagnetic wave propagation in non-uniform structures and transverse electromagnetic (TEM) cells using time-domain measurement techniques. Also analog IC techniques for simple solutions for some microwave instrumentation problems.

Medical Physics Related to Vision
(Mr J. D. Balle)
Work is continuing on cataractous lenses and also on kinematic stereopsis.

DEPARTMENT OF PSYCHOLOGY
The research activities of the department may be grouped under different broad headings reflecting the special interests of the staff members. However, there is sufficient overlap among the groups to maintain communication at a high level.

Abnormal Psychology
A programme of research is being carried out on the effects of stress on the function of the hypothalamic-pituitary-adrenal system in early infantile autism. Also the use of biofeedback as a therapeutic technique is being investigated in a variety of disorders.

Cognitive Processes
Research into the development of cognitive processes has continued with particular emphasis on factors associated with the acquisition of concepts. Several theoretical formulations are being explored as part of this research.

Cross-Cultural Research
The development of values and the relationship between norms, behaviour, alcohol and the youth culture are being studied with an international team from U.S.A., Norway and France. Research on the role of language in concept acquisition is being carried out with bilingual children in Australia and Malaysia.

Developmental Psychology
The efficacy of various types of treatments on behavioural development in infancy is being studied.

Educational Psychology
A programme of research is being carried out on the social psychology of the classroom. In the programme the development of social skills, the social learning of isolated children and small group interaction are being studied.

Perception and Performance
The Perception and Performance Laboratory is currently conducting research in the areas of image processing, filtering, models for reaction time and motion perception.

Psycholinguistics
Language behaviour is being investigated in terms of linguistic models and reductancy measures. The effects of language in acquiring concepts and on measures of motivation are being studied. Specific problems in reading are also being identified.

Mathematical Psychology
In mathematical psychology, experimental studies of new methods of measuring abilities and personality are continuing. Geometric and network approaches to the structure and processing of images and motion perception are of current interest, in conjunction with scaling procedures relevant to the analysis of perceptual data. Also work on stochastic models for reaction time is being carried out.

Phylogenetic and Comparative Psychology
Phylogenetic and biochemical systems involved in behaviour are being investigated with both human and infrahuman subjects. Both human and infrahuman subjects are being used to investigate the role of the autonomic nervous system in stress and emotion. Several parameters of the cardiac response during a range of behaviours, e.g., aversive conditioning, open field activity, are being investigated using biofeedback and telemetry devices. The infrahuman subjects and other effects of early experience on adult behaviour are being examined.

Neuropsychology
Developmental norms for evoked responses and other electrophysiological measures are being assembled for children of primary school age. Cerebral lateralisation of response is the focus of interest. Studies in progress include the electrophysiology of post-concussive states, validation of neuro-psychological tests, and event-related potentials in linguistic and other complex stimulation schedules.

DEPARTMENT OF GEOGRAPHY
Biogeography
Alitudinal gradation of rainforest at Barrington Tops. Vegetation on lime-rich rocks of the Upper Hunter (J. C. Turner)
Climate
Microclimatology in vineyards (G. N. McIntyre)
Air pollution on a meso and micro scale: solar radiation; climatic change (H. A. Bridgman)
Development Geography
The economic development of less developed countries, with specific reference to the role of forestry production (W. J. A. Jones)
The change from a tribal to a peasant economy by the small-holder rubber growers in Papua New Guinea (P. G. Irwin)
Impact of a High Yielding Varieties Package on a Malay rice producing community, Kedah, Malaysia (R. E. Barnard)
Geographical theory and philosophy
Explanation in Geography (Mary R. Hall)
Time-space and socio-technical systems, with particular emphasis on shiftwork systems (K. W. Lee)
Development of theory and applications in chronogeography (D. N. Parkes)
Geomorphology
Sediment erosion, storage and transport in a small steep drainage basin at Pokolbin, N.S.W. (R. J. Loughran)
Historical Geography
Population geography of the Hunter Valley in the 19th century (J. C. R. Cann)
Agricultural development in southeastern Queensland, 1890-1915 (J. C. R. Cann)
Political Geography
Political geography and regional planning in New South Wales and the Hunter Region (K. W. Robinson)
Geographical aspects of the Australian federal movement (K. W. Robinson)
Settlement
Human activity structures in remote and especially arid and tropical settlements in Australia (D. N. Parkes)

DEPARTMENT OF MATHEMATICS

Algebra
Associate Professor W. Brisley is working on some problems in group theory which arise from graph theory, and also on some applications of algebra to data-processing problems.

Biomathematics
Dr. W. Summerfield is currently studying fluid mechanical features of the cardiovascular circulatory system. He is interested in the mathematical modelling of all functions of the human body.

Chemical Kinetics
Dr. D. L. S. McElwain is working on the mathematical modelling of non-equilibrium phenomena in gases, using the Master Equation approach.

Combinatorial Theory and Operations Research
Dr. R. B. Eggleton is interested in all aspects of combinatorial mathematics, particularly graph theory.
Professor R. W. Robinson is applying combinatorics to the counting of various structures, such as graphs and search trees.
Dr. R. J. Vaughan is interested in the application of optimization methods to industrial production problems.
Associate Professor W. D. Wallis is carrying out research on block designs and arrays and graph theory.

Computer Science and Numerical Analysis
Dr. D. W. E. Blatt is working on models of computer referencing behaviour and studying performance of memory management systems. He is also interested in analysis of algorithms and computational complexity, and the development of programming languages and systems.
Associate Professor A. J. Guttmann is interested in methods of function approximation, particularly from the viewpoint of using a differential equation representation. He is also interested in the analysis of theoretical and experimental data.
Dr. W. Summerfield is working on ways of determining the "condition" of linear systems of equations. Further, he is interested in the solution by linear algebra of the global problems of ordinary differential equations, in particular "stiff" systems. He is also investigating the finite element method of solution for partial differential equations.

Differential Geometry and Relativity
Associate Professor P. K. Smrz is working on generalizations of Einstein's theory of relativity using modern differential geometry — in particular, the theory of Lie groups and fibre bundles.

Dynamical Systems
Dr. J. G. Cooper is working on stable and generic properties of flows and diffeomorphisms.

Environmental and Urban Studies
Dr. R. W. Gibberd is studying the art of population projections and various models of urban structure and urban development. He is also interested in urban sociology, voting patterns and urban demographic models.
Dr. R. J. Vaughan is investigating mathematical models in urban geography.
Associate Professor W. D. Wallis is working on mathematical models in urban geography, urban sociology and meteorology.

Fluid Mechanics
Associate Professor A. J. Guttmann is studying the problem of extrapolating regular perturbation series in fluid mechanics.
Dr. W. T. F. Lau is concerned with viscous flow problems. Meniscus profiles are also of current interest.
Dr. W. Summerfield is interested in all phenomena in which fluid dynamics plays a significant role; for example, ocean waves, turbulence, estuarine-dynamics, weather prediction, sailing vessels, surfing, animal propulsion.

Functional Analysis
Associate Professor J. R. Giles is carrying out research in the particular area of the geometry of Banach spaces, and interest there is focused on various smoothness and rotundity properties of the norm and their implications for the space. This work is being generalised to a study of differentiation of convex functions on Banach spaces. Particular attention is being given to characterising Banach spaces where the continuous convex functions have various differentiability properties.
Dr. V. Ficker and Mr. C. J. Ashman are working in measure theory, particularly in some problems of families of sets.

History of Mathematics
Mr. R. F. Berghout is pursuing research into the development of algebra, notably modern algebra, as well as the relations between this and classical occidental and oriental algebra.
Mr. Berghout is working on Greek algebra.

Information Theory
Professor R. G. Keats and Dr. A. J. Dobson are continuing to work in cooperation with research scientists at the Defence Research Centre at Salisbury, S.A. Current work is concerned with processing clipped data from a number of receivers arrayed in various geometric patterns.

Lexicostatistics
Dr. A. J. Dobson studies the historical and geographical relationships between languages by statistical analysis of their vocabularies. Stochastic models of language evolution are developed.

Mathematical Biology
Dr. D. L. S. McElwain is developing mathematical models of biological systems including solid tumours, transporting epithelia and leucocyte chemotaxis.

Mathematical Models of Tumour Growth
Dr. D. L. S. McElwain is investigating models for the growth of solid isolated tumours.

Medical Statistics and Epidemiology
Dr. A. J. Dobson and Dr. R. W. Gibberd collaborate with the Faculty of Medicine to investigate various problems in epidemiology and biostatistics. Current research includes: regional variations in mortality and morbidity; age and sex specific death rates from ischaemic heart disease in Australia; collection and analysis of data from the Hunter Valley Heart Attack Study; design and analysis for a survey of smoking habits of schoolchildren and the evaluation of an intervention programme; development and validation of an index of quality of life in patients with chronic diseases.

Number Theory
Dr. R. B. Eggleton is interested in number theory, particularly in combinatorial aspects of the subject.

Statistical Mechanics
Associate Professor C. A. Croxton is working on the statistical mechanics of liquids, polymers and liquid interfaces.
Dr. R. W. Gibberd is interested in most aspects of statistical mechanics.
Associate Professor A. J. Guttmann is working on the theory of equilibrium critical phenomena. He is particularly interested in the analysis of power series expansions which are frequently used to study systems exhibiting phase transitions.
Associate Professor A. J. Guttmann and Dr. J. S. Reeve are using renormalisation group methods to study the critical behaviour of systems with free surfaces.

Transportation Problems
Dr. R. J. Vaughan is continuing his work in the application of mathematics to traffic engineering, traffic accidents and transportation planning.
### Subject Computer Numbers for the B.Sc. Degree Course

The subjects selected should be written on the enrolment form in the following manner.

<table>
<thead>
<tr>
<th>Computer Number</th>
<th>SUBJECT NAME</th>
<th>Computer Number</th>
<th>NAMES OF COMPONENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>711100</td>
<td>Biology I</td>
<td>712100</td>
<td>Biochem. &amp; Mol. Genetics</td>
</tr>
<tr>
<td>721100</td>
<td>Chemistry I</td>
<td>712101</td>
<td>Cell Biology</td>
</tr>
<tr>
<td>731100</td>
<td>Geography I</td>
<td>712102</td>
<td>Comp. Street. &amp; Function</td>
</tr>
<tr>
<td>741200</td>
<td>Physics IA</td>
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<td>Biochem. &amp; Mol. Genetics</td>
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<td>741300</td>
<td>Physics IB</td>
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<td>Comp. Street. &amp; Function</td>
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<tr>
<td>722100</td>
<td>Geography II B</td>
<td>713101</td>
<td>Biochem. &amp; Mol. Genetics</td>
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<tr>
<td>662400</td>
<td>Computer Science II</td>
<td>713102</td>
<td>Comp. Street. &amp; Function</td>
</tr>
<tr>
<td>742200</td>
<td>Electronics &amp; Instrumentation II</td>
<td>713103</td>
<td>Comp. Street. &amp; Function</td>
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<td>Geography II A</td>
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<td>713201</td>
<td>Biochem. &amp; Mol. Genetics</td>
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<td>Geology IIA</td>
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<td>Comp. Street. &amp; Function</td>
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<td>Geology IIB</td>
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<td>Comp. Street. &amp; Function</td>
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<td>Mathematics IIA</td>
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<td>Mathematics IIC</td>
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<td>Physics II</td>
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(Arrange Topics with Department)