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THE UNIVERSITY OF NEWCASTLE
NEW SOUTH WALES

FACULTY OF SCIENCE
HANDBOOK 1984

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NEW SOUTH WALES 2308

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Recommended price
FOREWORD

I bid a hearty “Welcome” to both the “Freshers” and the “Old Hands.” It is our general wish that your sojourn at the University should be a period of mental stimulation and social enjoyment; a time in which preparation for a future career is intertwined with the development of a sense of responsibility and concern for the world around us.

The rapid advances in science and technology of past decades have led to unsurpassed standards of living and personal comfort, but the social and economic problems that follow in their wake are only currently becoming apparent. Your enrolment in the Faculty of Science indicates that you desire to contribute to the tasks of controlling and developing our environment; and whether you choose to be a prospecting geologist, research physicist, industrial chemist or one of the many other careers open to science graduates, each career carries with it a moral obligation to consider the impact of your actions on others.

I therefore urge you to adopt the University motto, and “LOOK AHEAD”. During your undergraduate period think beyond the narrow confines of individual subjects and courses; try to relate the knowledge you are accumulating with the problems that surround us.

Broaden your outlook by joining one or more of the social clubs or societies that exist on the campus, and if possible have a circle of friends drawn from other Faculties and other walks of life.

By wisely balancing study and social activities it is possible to achieve academic success and evolve the social characteristics required for your roles in the future.

The degree of success achieved depends primarily upon you. In fact, it is useful to remember that in a majority of cases success can be equated to the product of two factors, intelligence and effort. Intelligence is a natural gift that varies from person to person; effort is the variable that is completely under student control. For maximum effectiveness, the effort should be continual and sustained, not intermittent and short-lived.

The role of the academic staff is to stimulate your sense of critical evaluation, guide your reading, advance your knowledge, excite your interest and act as general mentors. Their aim is to help you to help yourself.

With a balanced programme of work and play, coupled with sustained effort, your period at the University should prove to be both rewarding and enjoyable.

W. F. J. PICKERING,
Dean of Science.
FACULTY OF SCIENCE

The Faculty of Science comprises the Departments of Biological Sciences, Chemistry, Geology, Physics and Psychology. The Departments of Geography and Mathematics, Statistics & Computer Science 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/Demonstrators 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, Statistics & Computer Science;
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 2.4.4:

"Subject to the authority of the Council and the Senate and to any resolution thereof, 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 5.9.1;
(f) deal with any matter referred to it by the Senate;
(g) make recommendations to the Senate on any matter affecting the Faculty;
(h) exercise such other powers and duties as may from time to time be delegated to it by the Council".
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A. Nyemeyer, BMah, DipCompSc

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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 three professional organisations which graduates in geology may join — the Geological Society of Australia, Inc., the Australian Institute of Geoscientists 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 Australian Institute of Geoscientists is a newly formed professional body charged with enhancing the status and welfare of geoscientists in Australia. It also has categories of membership based upon qualifications and experience.

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 1984. However, Science students taking subjects from other faculties must examine the timetable to ensure that clashes do not exist in their proposed courses.

<table>
<thead>
<tr>
<th>Subject Timetable Clashes</th>
</tr>
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<tbody>
<tr>
<td>Biology IIB with</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Biology IIA with</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Math (some topics)</td>
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<td></td>
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<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td>Chemistry IIA with</td>
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<tr>
<td></td>
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<tr>
<td>Chemistry IIIA with</td>
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<tr>
<td>Chemistry IIIB with</td>
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<tr>
<td>Biology with</td>
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<tr>
<td>Chemistry IIB with</td>
</tr>
<tr>
<td>Chemistry IIIA</td>
</tr>
<tr>
<td>Mathematics III (some topics)</td>
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</tbody>
</table>

12

13
N.B. Although the timetable for one particular subject may clash with that of another, this may not
be necessarily mean that this combination cannot be done. Often an arrangement can be made by
one or both Departmental representatives to overcome this problem. THEREFORE, SEE
YOUR REPRESENTATIVE BEFORE DECIDING UPON YOUR FINAL SUBJECT
COMBINATIONS.

**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. The Faculty Board has determined that a student who fails a subject twice
shall not be permitted to include that subject in his future programme, and that a
student who fails two subjects twice shall be excluded from further enrolment in the
Faculty, in each case unless he shows cause to the satisfaction of the Faculty Board
why he should be permitted to do so.
4. Notwithstanding paragraphs 1, 2 and 3, 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.

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**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 I A</td>
<td>Mathematics (3-unit course) and Physics (2-unit course).</td>
</tr>
<tr>
<td>Physics I B</td>
<td>Physics (2-unit course) or Multistrand (4-unit) Science.</td>
</tr>
<tr>
<td>Chemistry I</td>
<td>Chemistry (2-unit course), or Multistrand (4-unit) Science.</td>
</tr>
<tr>
<td>Mathematics I</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
reading 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 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 whose courses of study have included subjects which are deemed for this
purpose to provide an equivalent foundation may be admitted to the Diploma course as
special cases.
In the Diploma course the Curriculum and Method units, now known as Group C, are grouped as follows:

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

**Prerequisites**

For secondary methods a Part III subject in the main teaching area and a Part II subject in another teaching area.

For primary method 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.

**REGULATIONS RELATING TO THE DEGREE OF BACHELOR OF SCIENCE**

1. These Regulations prescribe the requirements for the degree of Bachelor of Science of the University of Newcastle and are made in accordance with the powers vested in the Council under By-law 5.2.1.

2. **Definitions**

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

- "course" means the total requirements prescribed from time to time to qualify a candidate for the degree.
- "Dean" means the Dean of the Faculty.
- "the degree" means the degree of Bachelor of Science.
- "Department" means the Department offering a particular subject and includes any other body so doing.
- "Faculty" means the Faculty of Science.
- "Faculty Board" means the Faculty Board of the Faculty.
- "subject" means any part of the course for which a result may be recorded.

3. **Grading of Degree**

The degree may be conferred either as an ordinary degree or as an honours degree.

4. **Omitted 1983**

5. **Withdrawal**

   (1) A candidate may withdraw from a subject or 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.

   (2) A candidate who withdraws from a subject after the last Monday in second term shall be deemed to have failed in the subject save that, after consulting with the Head of Department, the Dean may grant permission for withdrawal without penalty.

6. **Prerequisites and Corequisites**

Except with the permission of the Faculty Board granted after considering any recommendation made by the Head of the Department, no candidate may enrol in a subject unless he has passed any 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 any subjects prescribed as its corequisites.

7. **Subject**

   (1) To complete a subject a candidate shall attend such lectures, tutorials, seminars, laboratory classes and field work and submit such written or other work as the Department shall require.

   (2) To pass a subject a candidate shall complete it and pass such examinations as the Faculty Board shall require.

8. **Omitted 1983**

9. **Relaxing Provision**

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

10. **Omitted 1983**

11. **Enrolment**

   (1) A candidate's enrolment in any year must be approved by the Dean or his nominee.

   (2) 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.

12. **Qualification for Admission to the Degree**

To qualify for admission to the ordinary degree a candidate shall pass nine subjects presented in accordance with the provisions of Regulations 14 and 15 of these Regulations.

13. **Standing**

   (1) The Faculty Board may grant standing in specified and unspecified subjects to a candidate, on such conditions as it may determine, in recognition of work completed in this university or another institution.

   (2) A candidate may not be granted standing in more than four subjects which have already counted towards a degree to which he has been admitted or is eligible for admission.

14. **Choice of Subjects**

   (1) The nine subjects presented for the degree shall include:

      (a) not fewer than six subjects selected from the Schedule of Subjects to these Regulations;

      (b) at least three of the following:

      Biology I, Chemistry I, Geography I, Geology I, Mathematics I, Physics I or Physics IB, and Psychology I;

      (c) (i) at least one Part III subject and two Part II subjects from the Schedule of Subjects to these Regulations; or

      (ii) at least two Part III subjects and one Part II subject from the Schedule of Subjects to these Regulations.

   (2) A candidate may select up to three subjects 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.
20. Qualification for Admission to the Degree

18. Admission to Candidature

17. Results

15. Degree Pattern

14. Classes of Honours

13. Combined Honours

12. Science/Mathematics

11. Admission to a Combined degree course:

10. Science/Arts

9. Combined Degree Courses

8. General

7. To qualify for admission to the two degrees a candidate shall satisfy the requirements for both degree except as provided in Regulations 26, 27 and 28 of these Regulations.

6. To qualify for admission to the honours degree a candidate shall have completed the requirements for admission to the ordinary degree;

5. The work undertaken by a candidate in a combined degree course shall be no less in quantity and quality than if the two courses were taken separately as shall be certified by the Deans of the two Faculties.

4. A candidate may not present for the degree subjects which have previously been counted towards another degree or diploma obtained by the candidate, except to such extent as the Faculty Board may permit.

3. The subjects presented for the degree shall conform with one of the following degree patterns:

2. To qualify for admission to the two degrees a candidate shall satisfy the requirements for both degree except as provided in Regulations 26, 27 and 28 of these Regulations.

1. The subjects presented for the degree shall not include:

---

(3) The subjects presented for the degree shall not include:

(a) more than one of Physics IIA and Physics IIB;
(b) more than four subjects listed in Schedule A to the Regulations relating to the degree of Bachelor of Mathematics;
(c) more than five subjects from any one Department;
(d) Psychology III if either Psychology IIA or Psychology IIB is included;
(e) Geology III if either Geology IIA or Geology IIB is included;
(f) Psychology III if either Psychology IIA or Psychology IIB is included.

(4) A candidate may not present for the degree subjects which have previously been counted towards another degree or diploma obtained by the candidate, except to such extent as the Faculty Board may permit.

<table>
<thead>
<tr>
<th>Part I subjects</th>
<th>Part II subjects</th>
<th>Part III subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) 4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>(b) 4</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>(c) 5</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

OR

(d) in exceptional circumstances, with the permission of the Dean

|        | 4 | 4 | 1 |

16. Results

The result obtained by a successful candidate in a subject shall be: Terminating Pass, Pass, Credit, Distinction or High Distinction.

THE HONOURS DEGREE

17. Admission to Candidature

In order to be admitted to candidature for the honours degree an applicant shall:

(a) have completed the requirements for admission to the ordinary degree;
(b) have completed any additional work prescribed by the Head of the Department offering the honours subject; and
(c) have obtained approval to enrol given by the Dean on the recommendation of the Head of the Department offering the honours subject.

18. Qualification for Admission to the Degree

To qualify for admission to the honours degree a candidate shall, in one year of full-time study or two years of part-time study, pass one of the following subjects:

- Biology IV
- Geology IV
- Chemistry IV
- Physics IV
- Geography IV
- Psychology IV

19. Classes of Honours

There shall be three classes of honours: Class I, Class II and Class III. Class II shall have two divisions, namely Division I and Division 2.

20. Combined Honours

A candidate may qualify for admission to a combined honours degree by passing, in one year of full-time study or two years of part-time study, one of the following combined subjects, namely:

- Geology/Mathematics IV,
- Physics/Mathematics IV,
- Geology/Mathematics IV.

\( \text{Subject offered in the Faculty of Mathematics} \)
(c) a candidate counting Psychology IIIC shall not be entitled to count either Psychology IIIA or Psychology IIIB;
(d) a candidate counting Psychology IIIC shall not be entitled to count either Psychology IIIA or Psychology IIIB;
(e) a candidate counting Economics IIIC shall not be entitled to count either Economics IIIA or Economics IIIB;
(f) a candidate counting Geology IIIC shall not be entitled to count either Geology IIIA or Geology IIIB.

28. 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.

SCHEDULE OF SUBJECTS

<table>
<thead>
<tr>
<th>Subject</th>
<th>Remarks, Prerequisites, Corequisites, Preparatory Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PART I</strong></td>
<td></td>
</tr>
<tr>
<td>Biology I</td>
<td></td>
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<tr>
<td>Chemistry I</td>
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<tr>
<td>Geography I</td>
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<td>Geology I</td>
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<tr>
<td>Mathematics I</td>
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<tr>
<td>Physics IA</td>
<td></td>
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<tr>
<td>Physics IB</td>
<td>Only one of these two subjects may be taken.</td>
</tr>
<tr>
<td>Psychology I</td>
<td></td>
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<tr>
<td><strong>PART II</strong></td>
<td></td>
</tr>
<tr>
<td>Biology II A</td>
<td></td>
</tr>
<tr>
<td>Biology II B</td>
<td></td>
</tr>
<tr>
<td>Chemistry II A</td>
<td></td>
</tr>
</tbody>
</table>
| **Chemistry II B** | Preerequisite: Chemistry I

Preparatory Subjects:
Mathematics I & either Physics IA or Physics IB
Chemistry II A (Advisory)

Corequisite: Mathematics I

Prerequisite: Physics IA or IB

Prerequisite: a Part II subject offered by the Faculty Board on the recommendation of the Head of the Dept. of Physics.

Geography II A | Prequisite: Geography I
Geography II B | |
Geology II A | |
Mathematics II A | Prequisite: Mathematics I
Mathematics II B | |

1 Preparatory subjects are those which students are strongly advised to have completed before enrolling in the subject for which a preparatory subject is recommended.
2 Before enrolling in a Part II subject a candidate who intends proceeding to the honours degree should consult with the Head of Department.
3 Not being offered in 1984.

### POSTGRADUATE COURSES

Studies may be undertaken for the following postgraduate qualifications:
- Diploma in Coal Geology
- Diploma in Psychology
- Diploma in Science
- Master of Psychology (Clinical)
- Master of Psychology (Educational)
- Master of Science
- Master of Scientific Studies
- Doctor of Philosophy

1 Not being offered in 1984.
REGULATIONS RELATING TO THE DIPLOMA IN COAL GEOLOGY

1. These Regulations prescribe the requirements for the Diploma in Coal Geology of the University of Newcastle and are made in accordance with the powers vested in the Council under by-law 5.2.1.

2. In these Regulations, unless the context or subject matter otherwise indicates or requires:
   “Department” for candidates for the Diploma means the Department of Geology;
   “Diploma” means the Diploma in Coal Geology;
   “Faculty Board” means the Faculty Board of the Faculty of Science.

3. An applicant for admission 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 given on the recommendation of the Head of the Department, the programme shall be completed in not less than two years of part-time enrolment.

6. 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.

7. In cases where a candidate's performance in the programme has reached a level determined by the Faculty Board the Diploma may be awarded with merit.

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 with honours 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 provisionally under the provisions of subsection (a) of this Section shall complete such work and pass such examinations 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 RELATING TO THE DIPLOMA IN SCIENCE

1. These Regulations prescribe the requirements for the Diploma in Science of the University of Newcastle and are made in accordance with the powers vested in the Council under By-law 5.2.1.

2. In these Regulations, unless the context or subject matter otherwise indicates or requires:
   “Department” means the Department offering the subject in which a person is enrolled or is proposing to enrol;
   “Diploma” means the Diploma in Science;
   “Faculty Board” means the Faculty Board of the Faculty of Science;
   “a Part IV subject” means a Part IV subject offered in the course leading to the degree of Bachelor of Science.

3. (1) An applicant for admission to candidacy for the diploma shall 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 any other tertiary institution.
   (2) An applicant shall have met such requirements for entry to a Part IV subject as may be prescribed from time to time by the Head of the Department and approved by the Faculty Board or have achieved at another tertiary institution a standard of performance deemed by the Head of the Department to be equivalent.

4. (1) To qualify for the Diploma, a candidate shall enrol and shall complete the Part IV subject to the satisfaction of the Faculty Board.
   (2) Except with the permission of the Faculty Board, the Part IV subject shall be satisfactorily completed in not less than one year of full-time study or not less than two years of part-time study.

5. To complete the Part IV subject a candidate shall attend such lectures, tutorials, seminars and laboratory classes, and submit such written and other work as the Faculty Board may require and pass such examinations as the Faculty Board may prescribe.

6. (1) A candidate may withdraw from the subject only by notifying the Secretary to the University in writing and the withdrawal shall take effect from the date of receipt of such notification.
   (2) A candidate who withdraws from the subject after the last Monday in second term shall be deemed to have failed in that subject unless granted permission by the Dean to withdraw without penalty.

7. The Diploma shall be awarded in one of three classes, namely Class I, Class II and Class III. Class II shall have two divisions. The Classes shall indicate a level of achievement comparable with that of a candidate for the degree of Bachelor of Science (Honours).

8. The Diploma shall specify the Part IV subject completed.

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

REGULATIONS GOVERNING MASTERS DEGREES

PART I — GENERAL

1. (1) These Regulations 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 Science, Master of Science (Educational), Master of Science, Master of Medical Science and Master of Scientific Studies.
   (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 of Science;
      “Schedule” means the Schedule of these Regulations pertaining to 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;
      “thesis” means any thesis or dissertation submitted by a candidate.

2. An application for admission to candidature 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 candidature 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.

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

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

6. 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.

7. 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 candidature 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 7(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 7(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 THESIS

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.\(^1\)

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 of any other tertiary institution; and
(ii) a certificate signed by the supervisor indicating whether the candidate has completed the programme and whether the thesis is of sufficient academic merit to warrant examination; and
(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 (Com), may issue it in whole or any part in photostat 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.

\(^1\) At present there is no fee payable.
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 II 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 3(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 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 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 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 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 II 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 3(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 II — 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:
3. To qualify for admission to the degree a candidate shall complete to the satisfaction of the Faculty Board a programme consisting of:

(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; 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. (I) To qualify for admission to the degree the candidate shall complete to the satisfaction of the Faculty Board a programme prescribed by the Dean on the recommendation of the Heads of the Departments offering the units comprising the programme.

(2) The programme shall consist of 12 units of work of which not less than 2 nor more than 4 shall comprise the investigation of and report on a project specified by the Dean.

(3) Units of work, other than those comprising the project, shall require attendance at lectures, seminars and tutorials and the completion to the satisfaction of the Faculty Board of such examinations as the Faculty Board may determine.

4. Except with the permission of the Faculty Board the programme shall be completed in not less than 3 terms and not more than 12 terms.

Combined Degree Courses

Any student contemplating enrolment in a combined degree course under BSc degree Regulations 22-28 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 subject if no Arts Group I subject has been passed.

Year III At least one Science Part III subject and two 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 BSc 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 BSc 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.
Students should note that degree and diploma regulations and requirements are intended to supplement the general regulations and are in their turn supplemented by the general regulations. Attention is particularly drawn to the following groups of regulations:

(a) Admission and Enrolment

The most important of these Regulations are listed below.

Undergraduate Admission

3. (1) In order to be considered for admission for any qualification other than a postgraduate qualification an applicant shall be required to:

- (a) attain such aggregate of marks in approved subjects at the one New South Wales Higher School Certificate examination as may be prescribed by the Senate from time to time; or
- (ii) otherwise satisfy the Admissions Committee that he has reached a standard of education sufficient to enable him to pursue his approved course; and

- (b) satisfy any prerequisites prescribed for admission to the course leading to that qualification.

(2) The aggregate of marks prescribed by the Senate shall be determined by aggregating the marks gained in up to 10 units or, where more than 10 units are presented, the 10 units having the highest marks.

Record of Failure

4. An applicant who has a record of failure at another tertiary institution shall not be admitted unless he first satisfies:

- (a) the Admissions Committee, in the case of a postgraduate qualification; or
- (b) the Admissions Committee, in the case of any other qualification;

that there is a reasonable prospect that he will make satisfactory progress.

Enrolment

5. (1) In order to be admitted an applicant shall:

- (a) satisfy Regulation ... 3 of these Regulations;
- (b) receive approval to enrol;
- (c) complete the prescribed enrolment procedures; and
- (d) pay any fees and charges prescribed by the Council.

(2) An applicant may be admitted under such conditions as the Admissions Committee may determine after considering any advice offered by the Dean of the Faculty.

6. (1) Except with the approval of the Faculty Board a candidate for a qualification shall not enrol in a subject which does not count towards that qualification.

(2) A candidate for a qualification shall not enrol in a course or part of a course for another qualification unless he has first obtained the consent of the Dean of the Faculty and, if another Faculty is responsible for the course leading to that other qualification, the Dean of that Faculty; provided that a student may enrol in a combined course approved by the Senate leading to two qualifications.

(3) A candidate for any qualification other than a postgraduate qualification who is enrolled in three quarters or more of a normal full-time programme shall be deemed to be a full-time student whereas a candidate enrolled in either a part-time course or less than three-quarters of a full-time programme shall be deemed to be a part-time student.

Enrolment Status

10. (1) A candidate for a qualification shall enrol as either a full-time student or a part-time student.

Non-Degree Students

11. Notwithstanding anything to the contrary contained in these Regulations, the Admissions Committee may on the recommendation of the Head of a Department offering any part of a course permit a person, not being a candidate for a qualification of the University, to enrol in any year in that part of the course on payment of such fees and charges as may be prescribed by the Council. A person so enrolling shall be designated a “non-degree” student.

Re-enrolment

13. A candidate for a qualification shall be required to re-enrol annually during the period of this candidature. Upon receiving approval to re-enrol the candidate shall complete the prescribed procedures and pay the fees and charges determined by the Council not later than the date prescribed for payment under Regulation 7 of these Regulations.

Limit on Admission

14. Where the Council is of the opinion that a limit should be placed upon the number of persons who may in any year be admitted to a course or part of a course or to the University, it may impose such a limit and determine the manner of selection of those persons to be so admitted.

(b) Examination

A summary of the contents of these Regulations is included in the centre pages of this Handbook.

(c) Unsatisfactory Progress

These Regulations are reprinted in the centre pages of this Handbook.
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 enrols 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.

Note regarding SM III
Entry to Mathematics subjects at the part II level requires successful completion of two full Mathematics subjects at the part II level. In order to increase the range of choice available to students in the Faculty of Science at the part II level, a special Science subject has been introduced at the part III level, which will allow students in the Faculty of Science to choose topics from the List of Topics for Part III Mathematics, after successful completion of only one Mathematics subject at the part II level. This subject, SM III, will consist of 4 topics suitably chosen from the List of Topics for Part III Mathematics and will count as a full Science subject at the part III level. The subject SM III will in general provide mathematical backup to other Science subjects chosen at the part III level, so that students intending to enrol in SM III should discuss their choice of topics from the List of Topics for Part III Mathematics with the Head of the Department in the Faculty of Science offering the other part III subject.

663500 SM III (Calculus, Differential Equations and Related Topics)

Prerequisites
Mathematics HIA or HIB plus a Part II subject offered by a Department in the Faculty of Science.

Corequisite
A Part III subject offered by a Department in the Faculty of Science. (This condition is to be suitably interpreted in the case of part-time students taking two years to complete their third year requirements for the degree).

Hours
4 lecture hours plus 2 tutorial hours per week.

Examination
Each topic will be examined separately.

Content
Four topics chosen from the list of Part III topics offered by the Department of Mathematics, having regard to topic prerequisites and approved by the Head of the Department offering the co-requisite subject, and the Head of the Department of Mathematics. For list see Subject Computer numbers at the end of this Handbook. For further information see under "Mathematics" in this book. For details see Faculty of Mathematics Handbook.

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 20th to 24th February, 1984, between 10.00 a.m. and 12.00 noon 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
Two 3-hour papers

Content
Cells, Molecules and Organelles
Proteins, carbohydrates, lipids.
Organisation of cells, cell cycle.

Biological Energy Processes
Photosynthesis, Glicolysis. Fermentation. Respiration. 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
Population control.
The practical classes will present exercises relevant to these topics.

Texts
Curtis, H.
Martin, E. A.
Biology 4th edn (Worth 1983)
A Dictionary of Life Sciences (Pan 1976)

References
Ayala, F. M. & Kiger, J. A.
Modern Genetics (Benjamin Cummings 1980)
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)
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
  Carbohydrates, lipids, amino acids, proteins and nucleic acids, Vitamins and coenzymes.
  Enzymes, Intermediary metabolism, Gene replication, transcription, translation and regulation in prokaryotes and eukaryotes.
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.

Tests
  Statistical Methods in Biology (English U.P. 1964)
  Cell and Molecular Biology 7th edn (Holt-Saunders 1980)
  Principles of Biochemistry (Worth 1982)

References
  Plant Biochemistry 3rd edn (Academic 1976)
  Outline of Biochemistry 4th edn (Wiley 1976)
  Cell Physiology 5th edn (Saunders 1979)
  Genetics 2nd edn (Holt, Rinehart & Winston 1978)
  Biochemistry - A Functional Approach 2nd edn (Holt-Saunders 1979)
  Genetic Structure and Function (Macmillan 1979)
  Minibab Student Handbook (Duxbury Press 1976)

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
  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.

Tests
  Bailey, N. T. J.
  Gordon, M. S.
  Krebs, C. J.
  Nuttall, L. & Stewart, J. (ed.)
  Sutcliffe, J.
  Wallace, B.

References
  Modern Genetics (Benjamin/Cummings 1980)
  Transport Phenomena in Plants (Chapman & Hall 1978)
  The Diversity of Green Plants 2nd edn (Edward Arnold 1971)
  A Textbook of Histology 10th edn (W. B. Saunders 1975)
  The Ecology of Insect Populations in Theory and Practice (Methuen)
  Organism and Environment (Freeman)
  Evolutionary Ecology (Harper & Row)
  A Natural Legacy — Ecology in Australia (Pergamon Press 1979)
  Physiology and Biophysics. II. Circulation Respiration and Fluid Balance 20th edn (Saunders 1974)

Parker, R. E.
  Introductory Statistics for Biology (Edward Arnold 1973)
Rayle, D. & Wedberg, L.
  Botany: A Human Concern (Houghton Miflin 1975)
Conn, E. E.
  712100
Cellular processes.
Cell Biology
  Biochemistry and Molecular Genetics

Baker, D. & Stewart, J. (ed.)
  Principles of Biochemistry (Worth 1982)
Bonner, J. & Varner, J. E. (eds)
  Plant Biochemistry 3rd edn (Academic 1976)
Conn, E. E. & Stumpf, P. K.
  Outline of Biochemistry 4th edn (Wiley 1976)
Giese, A. C.
  Cell Physiology 5th edn (Saunders 1979)
Goodenough, V.
  Genetics 2nd edn (Holt, Rinehart & Winston 1978)
McGilvery, R. W.
  Biochemistry - A Functional Approach 2nd edn (Holt-Saunders 1979)
Metzler, D. E.
Smith-Keery, P. F.
  Genetic Structure and Function (Macmillan 1979)
Ryan Jr, T. A., Joiner, B. L. & Ryan, B. F.
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 IIIIB for either of these Biology IIIA units, allowing flexibility of choice of topics.

Biology IIIA, Topic 1

713101 Developmental Biology

Prerequisite
Biology II

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

Examination
One 3-hour paper

Content

Animals
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

References

713200 Biology IIIIB
Biology IIIIB consists of two units, Environmental Physiology, and Ecology and Quantitative Genetics. It is possible to substitute a unit from Biology IIIA for either of these Biology IIIIB units, allowing flexibility of choice of topics.

Biology IIIIB, Topic 3

713201 Environmental Physiology

Prerequisite
Biology II

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
713204  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

Texts
Falconer, D. S.  Introduction to Quantitative Genetics 2nd edn (Longman 1981)
Krebs, C. J.  Ecology 2nd edn (Harper & Row)
Stewart, J. (ed.)  S299 Genetics, Units 11, 12, 13 (Open University Press 1976)

References
Daubenmire, R. F.  Plants and Environment 3rd edn (Wiley 1974)
Ford, E. B.  Ecological Genetics (Methuen 1975)

714100  Biology IV

Prerequisite  Nil

Hours  To be advised

Examination  To be advised

GENERAL INFORMATION
The University of Newcastle Calendar consists of the following volumes:

Volume 1 — Legislation:
   Part 1 — The University of Newcastle Act,
   Part 2 — By-laws and Regulations,
   Part 3 — Bodies Established by Resolution of Council,
   Part 4 — Scholarships, Prizes and Financial Assistance.

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 1982.

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

**CONTENTS**

I PRINCIPAL DATES 1984

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
   Confirmation of Enrolment
   Indebtedness
   Leave of Absence
   Attendance at Classes
   General Conduct
   Notices
   Student Matters Generally

III EXAMINATIONS
   Examination Periods
   Sitting for Examinations
   Rules 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
   Extension of time to pay charges
   Refund of Charges
   Higher Degree Candidates

VI CAMPUS TRAFFIC & PARKING

Undergraduate Prospectus
Postgraduate Prospectus
An ABC for New Students
University News
Gazette

Other Publications

Payment of Charges
Scholarship Holders and Sponsored Students
Extension of time to pay charges
Refund of Charges
Higher Degree Candidates
I PRINCIPAL DATES 1984

January
1 Sunday New Year's Day
2 Monday Public Holiday
6 Friday Last day for return of Re-Enrolment Forms — Continuing Students
16 Monday Deferred Examinations begin
27 Friday Deferred Examinations end
30 Monday Public Holiday
31 Tuesday Closing date for applications for residence in Edwards Hall

February
6 Monday New students attend in person to enrol and pay charges
15 Wednesday Late enrolment session for new students
22 Wednesday First Term begins

April
20 Friday Good Friday — Easter Recess commences
25 Wednesday Public Holiday — Anzac Day
26 Thursday Lectures resume
30 Monday Last day for withdrawal without academic penalty from first half year subjects (See page (vii) for Dean’s discretion)

May
4 Friday First Term ends
21 Monday Examinations begin
25 Friday Examinations end
28 Monday Second Term begins

June
11 Monday Public Holiday — Queen’s Birthday
15 Friday Last day for return of Confirmation of Enrolment forms
30 Saturday Closing date for Applications for Admission to the Bachelor of Medicine course in 1985

July
2 Monday Examinations begin
6 Friday Examinations end

August
6 Monday Last day for withdrawal without academic penalty from full year subjects (See page (vii) for Dean’s discretion)
10 Friday Second Term ends
13 Monday Examinations begin
17 Friday Examinations end

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

October
1 Monday Public Holiday — Eight Hour Day

November
2 Friday Third Term ends
5 Monday Annual Examinations begin
23 Friday Annual Examinations end

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

1985

January
14 Monday Deferred Examinations begin
25 Friday Deferred Examinations end

February
25 Monday First Term begins
II GENERAL INFORMATION

Enrolment of New Students

Persons offered admission are required to attend in person at the Great Hall early in 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 1984 and who are eligible to do so (see Regulations Governing Unsatisfactory Progress) should complete the enrolment form as soon as possible after the release of the 1983 annual examination results, and forward it to the Secretary, University of Newcastle, N.S.W., 2308.

Enrolment forms from continuing students are due by 6 January 1984 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.

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 a.m. to 12 noon and 2 p.m. to 4 p.m. Monday to Friday. At least 14 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 Borrower Number. This card, with its 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 1983, 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 1983.

Attendance Status

A candidate for any qualification other than a postgraduate qualification who is enrolled in three quarters or more of a normal full-time programme shall be deemed to be a full-time student whereas a candidate enrolled in either a part-time course or less than three-quarters of a full-time programme shall be deemed to be a part-time student.

A candidate for a postgraduate qualification shall enrol as either a full-time or a part-time student as determined by the Faculty Board.

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.

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

Application to withdraw from a subject should be made on a Variation of Programme form and lodged at the Student Administration Office or mailed to the Secretary.

Applications received by the appropriate date listed below will be approved for withdrawal without a failure being recorded against the subject or subjects in question.

<table>
<thead>
<tr>
<th>Withdrawal Dates</th>
<th>Full Year Subjects</th>
<th>Second Half-Year Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Half-Year Subjects</td>
<td>Monday</td>
<td>Monday</td>
</tr>
<tr>
<td>6 August 1984</td>
<td>30 April 1984</td>
<td>24 September 1984</td>
</tr>
</tbody>
</table>

Withdrawal after the above dates will normally lead to a failure being recorded against the subject or subjects unless the Dean of the Faculty grants permission for the student to withdraw without a failure being recorded.

(vii)
If a student believes that a failure should not be recorded because of the circumstances leading to his withdrawal, it is important that full details of these circumstances be provided with the application to withdraw.

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
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 secrnly 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 to 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 those 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:

- End of First Term: 21 to 25 May, 1984
- Mid Year: 2 to 6 July, 1984
- End of Second Term: 13 to 17 August, 1984
- End of Year: 5 to 23 November, 1984

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 hand held, battery operated and non-programmable* and students should note that no concession will be granted:

- to a student who is prevented from bringing into a room a programmable calculator;
- to a student who uses a calculator incorrectly; or
- 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;

* A programmable calculator will be permitted provided program cards and devices are not taken into the examination room.
Any student who considers deferred examinations. Such examinations, if granted, will be held in January-February and who wishes to apply for special consideration should write to the Secretary explaining and candidates will be advised by mail of the times and results of the examinations.

Special Review

Forms together with the prescribed review charge by assessment of students' performances and that, amongst other things, marginal failures are reviewed before results are released.

There is a charge of $100 per subject, which is refundable in the event of an error being discovered. Applications for review must be submitted on the appropriate form together with the prescribed review charge by 1 January 1985. However, it should be noted that examination results are released only after careful review. Any infringement of these rules constitutes an offence against discipline.

Examination Results

Each student will be advised in December by mail of his annual examination results. No results will be given by telephone.

After the release of the annual examination results a student may apply to have a result reviewed. There is a charge of $8.00 per subject, which is refundable in the event of an error being discovered. Applications for review must be submitted on the appropriate form together with the prescribed review charge by 11 January 1985. However, it should be noted that examination results are released only after careful review. Any infringement of these rules constitutes an offence against discipline.

Deferred Examinations

The Boards of the Faculties of Architecture, Engineering, and Mathematics may grant deferred examinations. Such examinations, if granted, will be held in January-February and candidates will be advised by mail of the times and results of the examinations.

(x)

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 6 January 1984.

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 shall 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 of 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 the University.
4. Where the progress of a student who is enrolled in a combined course or who has been excluded from enrolment in another course or Faculty is considered to be unsatisfactory, the Faculty Board shall refer the matter to the Admissions Committee together with a recommendation for such action as the Admissions Committee 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 posting to the student of the notification of the decision or such further period as the Admissions Committee may accept.

(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 thinks fit concerning the academic record of the appellant and the making of the determination by the Faculty Board. Notice of any such appeal shall be given to the appellant and to the Dean or his nominee. The appellant and the Dean or his nominee shall have the right to be heard in person by the Admissions Committee.

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

6. (1) The Admissions Committee shall consider any appeal 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 the course or Faculty; 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.

The Admissions Committee may substitute for any other decision which the Admissions Committee is empowered to make pursuant to these Regulations.

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 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.
Students who notify the University Cashier by the Due Date prescribed for charges due or written evidence that a sponsor will meet these charges. Payment by mail is encouraged. Money Orders, Warrants or other written 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 that they have paid. 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, 27 February, 1984 ...................... 100%
Notification on or before Friday, 23 March, 1984 ...................... 90%
Notification on or before Friday, 29 June, 1984 ...................... 50%

No refund will be made before 31 March 1984.

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.

Scholarship Holders and Sponsored Students

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

Payment of Charges

Enrolment is completed by lodging with the University Cashier the approved Authority to Complete Enrolment Form with a remittance to cover all charges due or written evidence that a sponsor will meet these charges. Payment by mail is encouraged. Money Orders, Warrants or other written evidence that charges will be paid by sponsors. Sponsors must provide a separate voucher, warrant or letter for each student sponsored.

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. A pass in the laboratory course is required in order to pass the subject.

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

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.

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

Texts
Ayward, G. H. & Findlay, T. J. V. Hart, H. & Schuetz, R. D.
Brown, T. L. & LeMay, H. E.


722200 Chemistry IIA

Prerequisite
Chemistry I

Preparatory Subjects
Mathematics I & either Physics IA or IB

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

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

**Analytical Chemistry**
Basic principles; spectroscopic procedures; separation methods.

**Inorganic Chemistry**
Symmetry, structure and bonding; main group chemistry; transition metal chemistry and co-ordination complexes; structure elucidation; π acceptor complexes and organometallic compounds.

**Dynamics**
Kinetics; chemical affinity; electrochemical cells.

**Organic Chemistry**
Aliphatic and aromatic chemistry.

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

**Texts**
- Hendrickson, J., Cram, D. J. & Hammond, G. S.

Also advisable, particularly if proceeding to Chemistry IIIA:

722300 Chemistry IIIA
This subject is offered in alternate years. It will not be given in 1984.

**Prerequisites**
Chemistry I

**Corequisites**
Chemistry II A(advisory)

**Hours**
3 lecture hours and 6 laboratory hours per week. The subject is divided into 5 or 6 units.

**Examination**
One hour examination for each unit. The laboratory mark counts 20% towards the final grading. A pass in the laboratory course is required in order to pass the subject.

**Content**
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

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**CHEMISTRY — PART III SUBJECTS**

**Prerequisites**
Mathematics I; Chemistry II A. Chemistry III A is a pre- or corequisite for Chemistry III B.

**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 III A must select nine topics from the list provided by the Department. Likewise, students enrolling in Chemistry III B must nominate nine topics from the III B listing.

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.

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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 part-time 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 course 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 Australia.

**Texts**

Black, R. M.

EITHER

Press, F. & Siever, R.

OR

Strahler, A. N.

EITHER

Read, H. H.

OR

Mason, B. & Berry, L. G.

Uyeda, S.

- *The Elements of Palaeontology* (Cambridge U.P. 1970)
- *Earth* (Freeman 1982)
- *Rutley's Elements of Mineralogy* 24th edn (Murby 1960)
- *Mineralogy* (Freeman 1959)
- *The New View of the Earth* (Freeman 1978)

**732200 Geology II A**

**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**

**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**

Concept of stress and strain; mechanical behaviour of rocks; fold mechanisms; cleavage; faulting.

**Texts**

Bishop, A. C.

Brown, D. A. et al.

Clarkson, E. N. K.

Nockolds, S. R. et al.

Hobbs, B. E. et al.

Kerr, P. F.

- *An Outline of Crystal Morphology* (Hutchinson 1967)
- *Invertebrate Palaeontology and Evolution* (Allen & Unwin 1979)
- *Petrology* (Cambridge 1978)
- *An Outline of Structural Geology* (Wiley Int. 1976)
- *Optical Mineralogy* (McGraw-Hill 1977)

**732300 Geology II B**

**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**

**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-, 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.

**Texts**

Francis, P.

Till, R.

- *Volcanoes* (Penguin 1976)

**733100 Geology III A**

**Prerequisites**

Geology I & IIA

**Preparatory Subjects**

Chemistry I & either Physics IA or IB
Examination Content

**Petroleum**
Petroleum of igneous rock associations; petrogenesis of metamorphic rocks.

**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**
Stanton, R. L.  *Ore Petrology* (McGraw-Hill 1972)
For others, consult lecturers concerned.

733200  Geology III B

**Prerequisites**
Geology I & II A

**Corequisite**
Geology III A

**Hours**
5 lecture hours and 6 laboratory hours per week and 8 days field work. (Includes Geophysics lectures which are given during one week of the first vacation).

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

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**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 lithostratigraphy (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, micrometric 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**
Mathewson, C. C.  *Engineering Geology* (Merrill 1981)
Consult lecturers concerned for other courses.

734100  Geology IV

**Prerequisites**
Geology III A, 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.

664500 Geology/Mathematics IV
Prerequisites
Geology IIIA or IIIC and Mathematics IIIA and such additional work as is required for combined honours students by the Department of Mathematics. A student desiring admission to this subject must apply in writing to the Dean of the Faculty of Science before 7th December of the preceding year.

Hours
Examination
Content
To be advised
At least four topics chosen from those available to honours students in Mathematics for the current year together with work offered by the Department of Geology for that year. The subject will also include a major thesis which embodies the results of a field research project involving the application of mathematical studies to a particular geological problem. Other work e.g. seminars and assignments may be required by either Department.

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 3 hours laboratory or demonstration per week.

Examination
One paper after the end of each term, together with laboratory and problem work assessment.

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, oscillations and waves, electrostatics, current electricity and electromagnetism, thermal physics, geometrical and physical optics, and quantum physics. The treatment throughout will assume some knowledge of calculus.

Texts
Refer to Physics Department Noticeboard.

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 paper after the end of each term, together with laboratory and problem work assessment.

Content
For students who in general do not intend to proceed with further studies in Physics. The treatment will require a minimum of mathematics 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 1983.

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.

Text
Malmstadt, H. V. Instrumentation for Scientists Series. Texts with Experiments Modules 1, 2, 3 & 4 (Benjamin).
Mathematics I, Physics IA or normally a pass at the level of credit or better in Physics IB.

While Mathematics II is not an essential corequisite for 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.

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

Equivalent of 6 hours total examination.

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.

Approximately 120 lecture hours and 240 laboratory and tutorial hours.

Assessment to the equivalent of 12½ hours of examination time.

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. Quantum 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.

Refer to the Physics Department notice board.

Students should retain their Physics II texts.
In 1984, these aims will be achieved by offering topics from the following list: Quantum Mechanics, Relativity, Statistical Physics, Plasma Physics, Applied Nuclear Physics, Surface Physics, Atomic Collisions in Solids, Radio Astronomy, Fast Atomic Processes, Fourier Transforms. Additional topics may be added depending on visitors to the Department and all topics need not 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.

664300 Physics/Mathematics IV

Prerequisites
Physics IIIA & Mathematics IIIA

Hours
To be advised and, in addition, a research project of mathematical and physical significance jointly supervised.

Examination
Assessment will be in the appropriate Physics IV and Mathematics IV topics selected. In addition the research project will be evaluated and normally an oral examination will be conducted.

Content
Four topics from Mathematics IV chosen for relevance to Physics, and topics from Physics IV, as approved by the Head, Department of Physics. Project work will normally begin in the first week of February.

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

752100 Psychology II A

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
Will examine topics such as Experimental Methodology, Developmental Psychology, Individual Differences, Information Processing, Learning and Conditioning, Social Psychology, Animal Behaviour and Behavioural Neurosciences. Statistical Methods will be taught and tested during the year.

Texts
To be advised

752200 Psychology IIB

Prerequisite
Psychology I

Corequisite
Psychology II A

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
Will examine topics which complement and/or are supplementary to Psychology IIA. Such topics may include Quantitative Methods, Developmental Psychology, Personality, Abnormal and Clinical Psychology, Neurosciences, Cognition, Self Awareness and Interpersonal Skills.

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
Will examine topics such as Methodology and Quantitative Psychology, Information Processing and Perception, Behavioural Neurosciences, Learning and Conditioning, Social and Developmental Psychology and Individual Differences. Statistical methods will be taught and tested during the year.

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.
To be advised

**Psychology IIB**

**Prerequisite**
Psychology IIB

**Corequisite**
Psychology IIIA

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

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

**Content**
Will examine topics which complement and/or are supplementary to Psychology IIIA. Such topics may include Developmental Psychology and Psychobiology, Neurosciences, Social Psychology, Quantitative Methods, Personality, Abnormal and Clinical Psychology, Self Awareness and Interpersonal Skills. Practical work comprises workshop and laboratory work for up to 3 hours per week plus a supervised independent experimental project.

**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 III 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.

**Psychology/Mathematics IV**

**Prerequisites**
Mathematics IIIA & Psychology III 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).

Mathematical 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 II 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 human information processing. 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 9 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; Psychopathology; Psychological Assessment and Clinical Decision Making; Therapy; Preventive Psychology; Programme Development; Clinical Child Psychology; Psychotropic Drugs.
(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 practice 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 professional competence and progress 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 is devoted to seminar and workshop activities and thesis supervision continues 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. Work continues on the thesis begun in the previous year.

DEPARTMENT OF GEOGRAPHY

351100 Geography I (Assoc. Professor P. G. Irwin, K. W. Lee, Dr G. N. McIntyre)

Prerequisites
Nil

Hours
4 hours of lectures/tutorials/methods per week, 1 day of field work per year.

Examination
To be advised

Content
The lecture component studies 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 tutorial/ methods programme is designed to supplement the material presented in the lecture course and to introduce the student to the methods employed in geographical study.

Texts

352100 Geography IIIA: Human Geography

Prerequisite
Geography I

Hours
5 hours per week of lectures, practicals and tutorials, one hour per week of Methods; and up to 6 days of fieldwork. (Note: Students also enrolled in Geography IIIB must undertake both Methods and *Environmental Issues in Australia in IIIB only).

Examination
To be advised

Content
A study of human activities within the context of space and time. In 1984 themes will be established round the following specific fields of interest:
Development Geography (Dr W. J. Jonas): principles, issues in world development; measures and models; dualism; modernisation; trickle-down hypothesis; regional development; colonialism; capitalism; imperialism; the development of underdevelopment.
East Asia (Dr R. E. Barnard): selected aspects of the geography of China and Japan, including population, agriculture and manufacturing; contrasting patterns emerging from development in the two countries; sub-national studies to illustrate differences in national development within the two countries.
Economic Geography (Miss M. R. Hall): key questions in economic geography; trends in the location of economic activity; for example, in food availability and deficit patterns; in the location of coal mining; international development strategies.
Historical and Political Geography (Dr J. C. R. Cambray): Study of aspects of the historical and political geography of the cultural area of Western Europe with particular reference to the British Isles.
A study of man's physical environment. In 1984 themes will be established round the following specific fields of interest:

- **Geumorphology** (Dr R. J. Loughran): An introduction to the study of landforms, including some basic geology, weathering, soils, mass movement, river processes, landforms of arid and cold climate zones, and coastal geomorphology.
- **Climatology** (Dr H. A. Bridgman, Mr G. N. McIntrye): An introduction to the study on a synoptic and meso-climatic scale including radiation and heat budgets; thermodynamics; precipitation processes; climates of the world; climatic change; agricultural climatology; applied climatology.
- **Biogeography** (Dr J. C. Turner): An introduction to biogeography. Definitions and scope of the subject will be examined and its inter-disciplinary nature emphasized. Ways of describing and analysing the geographical ranges of organisms will be explored.

### Texts

- Attenborough, D. *Life on earth* (Fontana paperback, 1981)
- Kellman, M. C. *Plant geography* 2nd edn (Methuen paperback, 1980)

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### Notes

- **Methods** (to be taken by all students) — 1 hour per week (Assoc. Prof. D. N. Parkes)
  Further development of geographical techniques: introduction to computer-aided mapping and geographical analysis. No previous experience with computers is assumed.

- **Environmental issues in Australia** (to be taken only by those students taking both IIA and IIB) — 1 hour per week (Mr K. W. Lee)
  The aim of this strand is to acquaint students with some of the major issues related to the Australian environment. The issues, while being based on the fundamental characteristics of climate, soils, vegetation and other physical phenomena, also have a significant human element. Thus the study, by focusing on the linkages between man and his environment through particular cases, emphasizes the links which exist between the two broad fields of physical and human geography.
Biogeography (Dr J. C. Turner) A continuation of the study of Biogeography, emphasizing the botanical side of the subject which is seen as part of the broader field of Ecology. As well as the exploration of the major themes of Kellman's book (see Texts below), attention is paid to (i) Australian vegetation and its history; (ii) rainforest; and (iii) case studies of field research on Australian plants and animals.

Advanced Climatology (Dr H. A. Bridgman, Mr G. N. McIntyre) The application of principles studied in Geography IIB to (i) processes in agricultural climatology; and (ii) meso- and macroscale pollution problems and their relationship to climatic change.

Drainage Basin Hydrology (Dr R. J. Loughran) Precipitation, runoff, soil erosion, and sediment and solute transport within the context of the drainage basin system.

Texts


A coral island (Collins 1981)

Plant geography. (Methuen paperback, 2nd edn. 1980)

A sand country almanac, with other essays on conservation from Round River (Oxford paperback, 1966)

Introduction to the scientific study of atmospheric pollution (Reidel Publishing 1971)

Never cry wolf (Pan paperback, 1979)

Climate, irrigation and agriculture (Angus and Robertson, 1970)

• Strands common to Geography IIIA and IIIB.

(a) Methods (to be taken by all students) - 1 hour per week (Assoc. Prof. D. N. Parkes).

This is a continuation of the Methods programme taken in Geography II.

Further development of principles and practice in computer-aided mapping and graphics; an introduction to non-parametric statistics and multivariate methods used in geography. The emphasis is upon the use and interpretation, rather than the theory, of statistics.

Texts Nil

(b) Environmental issues in Australia (to be taken only by those students enrolled in both Geography IIIA and IIIB). 1 hour per week (Dr J. C. R. Camm).

This is a continuation of the strand which was commenced in Geography II. It includes the study of the Australian and zone and of the conservation of Australia's environments and cultural heritage.

Texts 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 As prescribed by the Head of the Department

Examination To be advised

Content A thesis embodying the results of an original investigation on a topic approved by the Head of the Department and coursework as prescribed.

Texts To be advised

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

DEPARTMENT OF MATHEMATICS, STATISTICS & COMPUTER SCIENCE

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 Statistics III 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 this arrangement of subjects was introduced should consult the "transition arrangements" set out on 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 subjects Computer Science II and III are taught and examined jointly by this Department and other Departments. There is no choice of topics in Computer Science II. Students should take particular note of Clause 14(3)(b) of the regulations for the 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 better than that student's performance in the final examination, then the year's work will be taken into account in determining that student's final result. On the other hand, when a student's performance during the year has been worse than that student's performance in the final examination, then the year's work will be ignored in determining the final result.

Part I Subject

661100 Mathematics I

Prerequisites Nil

Hours 4 lecture hours and 2 tutorial hours per week

Examination Two 3-hour papers

Content Topics AL - Algebra

AN - Real Analysis

CA - Calculus

SC - Statistics and computing
Part 1 Topics

Algebra (Topic AL) — G. W. Southern

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. Vector geometry in two and three dimensions. Vector spaces, basis and dimension, subspaces. Linear maps, matrix representation, rank and nullity. Determinants. Eigenvectors and eigenvalues. Applications are illustrated throughout the course.

Text

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

References

Brisley, W. A Basis for Linear Algebra (Wiley 1973)
Kolman, 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) — C. J. Ashman

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

References

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

Calculus (Topic CA) — R. F. Berghout and W. P. Wood

Prerequisites Nil

Hours 1 lecture hour and ½ tutorial hour per week


Text


References

Ayres, F. Calculus (Schaum 1974)


Prerequisites Nil

Hours 1 lecture hour and ½ tutorial hour per week


A requirement is the writing of successful computer programmes to solve problems in statistical and numerical analysis.

Text

References

Hine, J. & Wetherill, G. B. A Programme in Statistics Vols. 1, 2, 3 (Chapman & Hall 1975)
Hoel, P. G. Introduction to Mathematical Statistics (Wiley 1971)
Koffman, E. B. Problem Solving and Structural Programming in PASCAL (Addison-Wesley 1981)

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 IIB or Computer Science II. The subject Mathematics IIA is a pre-requisite 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.

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).

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.
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></td>
</tr>
<tr>
<td>B</td>
<td>Complex Analysis</td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>Vector Calculus &amp; Differential Equations (Double topic)</td>
<td>M, N, P, PD, Q, ORS, TC, Y, Z</td>
</tr>
<tr>
<td>D</td>
<td>Linear Algebra</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Topic in Applied Mathematics e.g., Mechanics, Potential Theory and Fluid Dynamics</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Numerical Analysis &amp; Computing</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>Probability &amp; Statistics</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>Applied Probability</td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>Topic in Pure Mathematics e.g., Group Theory</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>Analysis of Metric Spaces</td>
<td></td>
</tr>
<tr>
<td>M1</td>
<td>Introduction to Computer Architecture and Assembly Language</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>
<td></td>
</tr>
</tbody>
</table>

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.

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.

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, SP, K or L may be included.

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**
The topics H, I, K, L or A, H, K, L or A, E, K, L or H, F, K, L. Students who may wish to proceed to Statistics III as a Part III subject should select topic I. In exceptional circumstances, and with the consent of the Head of the Department, some substitution may be allowed.

662400 Computer Science II

**Prerequisite**
Mathematics I

**Hours**
168 hours of lectures, tutorials and practical work as listed below

**Examination**
See component descriptions below

**Content**

**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 I on page 90 of the 1971 handbook.
2. Mathematics IIA is a corequisite or prerequisite for Mathematics IIC.
3. Students whose course includes Physics II A 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.

Part III Subjects

In the Faculty of Science this Department offers Mathematics III A comprising four topics chosen from the list below, and the subject Statistics III. See also the separate entry in this Handbook for SM III (page 34).

Passes in both Mathematics IIA and IIC are prerequisite for entry to Mathematics III A. It will be assumed that students taking a Part III subject have already studied topics CO, D, K and L (or C, D, F, 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 III A 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 Foundations of Mathematics</td>
<td>K, L</td>
</tr>
<tr>
<td>GT Applied Graph Theory</td>
<td></td>
</tr>
<tr>
<td>M General Tensors and Relativity</td>
<td>CO</td>
</tr>
<tr>
<td>N Variational Methods and Integral Equations</td>
<td>CO</td>
</tr>
<tr>
<td>O Mathematical Logic and Set Theory</td>
<td>K, L</td>
</tr>
<tr>
<td>P Ordinary Differential Equations</td>
<td>CO, D, L</td>
</tr>
<tr>
<td>PD Partial Differential Equations</td>
<td>CO</td>
</tr>
<tr>
<td>PL Programming Languages and Systems</td>
<td></td>
</tr>
<tr>
<td>Q Fluid Mechanics</td>
<td></td>
</tr>
<tr>
<td>QS Quantum, and Statistical Mechanics</td>
<td>CO</td>
</tr>
<tr>
<td>R Theory of Statistics</td>
<td></td>
</tr>
<tr>
<td>S Geometry</td>
<td></td>
</tr>
<tr>
<td>SS Survey Sampling Methods</td>
<td>H</td>
</tr>
<tr>
<td>T Group Theory</td>
<td>D, K</td>
</tr>
<tr>
<td>TC Theory of Computing</td>
<td>CO, F</td>
</tr>
<tr>
<td>U Regression, Design and Analysis of Experiments</td>
<td>H</td>
</tr>
<tr>
<td>V Misure Theory and Integration</td>
<td>L</td>
</tr>
<tr>
<td>W Functional Analysis</td>
<td></td>
</tr>
<tr>
<td>X Rings and Fields</td>
<td>D, K</td>
</tr>
<tr>
<td>Y Theory of Probability</td>
<td>CO, H</td>
</tr>
<tr>
<td>Z Mathematical Principles of Numerical Analysis</td>
<td>CO, D, D</td>
</tr>
</tbody>
</table>

Some topics will be offered only in alternate years. Students should consult the Department for the current status, and in particular for which topics are offered in first or second half-year.

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

663100 Mathematics IIIA

**Prerequisites**

Mathematics II A & II C

**Hours**

4 lecture hours and 2 tutorial hours per week

**Examination**

Each topic is examined separately

**Content**

A subject comprising Topic O, together with three other topics, at least one of which should be from the set (M, N, Q, QS, SS, U, R), and at least one from the set (S, X, T, V, W). The final choice of topics must be approved by the Head of the Department. The topic PL will not normally be included in this subject. 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.

663300 Statistics III

**Prerequisites**

Mathematics II A & II C (including topics CO, H and I)

**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, SS and Y.

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.

RESEARCH IN THE FACULTY OF SCIENCE

DEPARTMENT OF BIOLOGICAL SCIENCES

Current experiments in the field of mammalian reproduction involve studies of the enzymology and biochemistry 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. The biology of spermatozoa and comparative structure and function of the vertebrate epididymis are being studied. Within the field of immunological influences on fertility, the following topics are currently under investigation: the detection of antispermatozoal antibodies in sera from infertile and vasectomized men; the isolation and characterization of human spermatozoal auto- and iso-antigens; early pregnancy factor. The correlation between HLA antigens and hepatitis B virus carrier status is being studied.

In a study on a hypothesis on the initiation of cancer, histones H III are being compared in chromatin from normal and malignant cells. Investigation into infertility in humans resulting from auto- and isoinmunity to spermatozoa. The study of non-immunological spermagglutinins in human sera. The preservation by freezing of human spermatozoa for artificial insemination is being studied.

Current topics in genetics include chemical mutagenesis in Drosophila and the application of quantitative genetics to pig improvement. The ecology and genetics of populations, geographic variation and hybrid zones in Lepidoptera are currently being studied. The effects on plants and ecosystems of fluoride and sulphur dioxide are being investigated and fluoride fluxes within ecosystems are being quantified. Research in carbon partitioning within plants is focused on elucidating the cellular pathway and mechanisms of phloem unloading together with assessing the regulatory role served by phytohormones. Strategies of phosphorus acquisition by and distribution within eucalypt seedlings growing under conditions of phosphorus limitation are being examined.

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 genetic interaction 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, and selective extraction, of heavy metal ions (or from) soil components; metal-organic acid 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; mass spectral fragmentation of organic molecules; electron transfer agents for the solar conversion of water to hydrogen.

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

**Molecular Spectroscopy** (Associate Professor R. P. Cooney)
- Laser Raman, Fourier-transform infrared spectroscopy and electron microscopy applied to metal complexes, molecules adsorbed on oxide surfaces of catalytic interest, species at metal electrode surfaces, polymers, and surfactants.

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

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

**Organic Reaction Mechanism** (Associate Professor L. K. Dyal)
- Studies on the mechanism of oxidations which involve a neighbouring group in a cyclization process; reactions of nitrenes.

**Organic Synthesis and Stereochemistry** (Dr K. H. Bell)
- Development of new synthetic reactions; synthesis of potential local anaesthetics and strong analgetics; 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.

**Transition Metal Chemistry** (Dr G. A. Lawrance)
- Kinetics and mechanisms of reactions of co-ordination and organometallic compounds; synthetic and biomimetic chemistry of co-ordination complexes, particularly with macrocyclic ligands; electrochemistry of metal amine complexes.

**Carboniferous Stratigraphy/Palaeontology**
- Carboniferous palaeogeographic and tectonic evolution of the Tasman Mobile Belt. Evolutionary and ecological variation in Carboniferous marine invertebrate zones of eastern Australia. Studies of Carboniferous trilobites, crustaceans, brachiopods, and bivalves. (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 metamorphic grade and petroleum exploration. Petrographic studies of the reactivity of coaled 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**

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

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

**Igneous Petrology**
- Petrology of hypabyssal and intrusive rocks, petrology of alkaline igneous rocks of the Gunnedah region; geochemistry of Archaean granitoids, Canada. (Dr D. R. Mason)

**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. Offer)

**Mineralogy**
- Detailed studies of mineral species, groups, mixtures and isomorphous substitution series with emphasis on applications of thermal analysis and X-ray 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 K. H. R. Moole)

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 D. J. O'Connor, Dr F. T. Bagnall)
- When an energetic ion beam interacts with a solid surface, a complex collisional situation develops which includes elastic and inelastic scattering events. The research of the ion-surface interaction...
group involves studies of the interaction and the collisional and atomic processes leading to scattering, sputtering, ionisation and excitation of the particles involved in the event. The application of ion-surface interaction to studies of the structure and composition of surfaces is an important part of the work of the group. Finally work is beginning on the way in which the properties of a surface may be modified by ion implantation.

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 principally 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. A low spatial resolution (~5 μm) Auger Electron Microscope system for the study of surfaces and their modifications is also being developed.

Geophysics — Geomagnetic Pulsations (Associate Professor B. J. Fraser)

The time of occurrence, velocity, polarisation and direction of travel of hydromagnetic waves in an isomorphous dielectric is being extensively investigated. The phenomenon is studied at the surface of the Earth as geomagnetic pulsations recorded at Newcastle, Woora, Laureastor, Broken Hill, Perth, Macquarie Island and Auckland. A microprocessor system for recording and analysing data is under development.

Geophysics — Radar Meteor Studies (Associate Professor C. S. L. Keay)

A fully automated radar meteor system at a field site on the north of Newcastle has been established. A new HF pulse transmitter is soon to be installed, and data is communicated to the Department on campus by a radar relay link. Digital techniques employing ganged high speed micro-computers have been developed to allow signal processing to be carried out in real time.

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

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.

Electron-surface interaction

Currently, interests in electron-surface interaction are being developed. These include development of low energy electron diffraction theory, to be applied to results obtained with the fast TV scanning LEED system. The emphasis here is on the theory of diffraction associated with disulces-axler transitions, and on the theory of Auger processes in solids.

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. This programme includes development of analog IC techniques to enable the simplification of solutions to some microwave instrumentation problems.

Medical Physics Related to Vision

Work is continuing on a joint project with the department of Psychology involving studies and characterisation of kinematic stereopsis.

DEPARTMENT OF PSYCHOLOGY

Infant Perception

Research is currently examining various perceptual and attentional abilities in infants. The studies incorporate autonomic system measures as well as the more usual behavioural measures.

Animal Learning

Research is being conducted to examine the stimulus control of behaviour with particular attention being paid to phenomena such as conditioned inhibition, blocking and overshadowing.

Mathematical Psychology

In mathematical psychology, experimental studies of new methods of measuring abilities and personality are continuing. Geometric and filtering 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. Work on stochastic models for reaction time is also being carried out.

Physiological and Comparative Psychology

Physiological and biochemical systems involved in behaviour are being investigated with both human and infrahuman subjects. Central neurochemical and autonomic nervous system correlates of physiological stress are under investigation. Several parameters of the cardiac response during a range of behaviours, e.g., aversive conditioning, open field activity, are being investigated using biofeedback and telemetric devices. The infrahuman subjects 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, event-related potentials in linguistic and other complex stimulation schedules and evoked potential indices of stereopsis using random-dot patterns.
DEPARTMENT OF GEOGRAPHY

Biogeography
Altitudinal gradation of rainforest at Barrington Tops. Vegetation on lime-rich rocks of the Upper Hunter (J. C. Turner)

Climate
Agricultural climatology with special reference to viticulture (G. N. McIntyre)
Air pollution on a meso and micro scale; solar radiation; climatic change (H. A. Bridgman)

Development Geography
Impact of a high yielding varieties package on a Malay rice producing community, Kedah, Malaysia (R. E. Barnard)
Development issues in Sri Lanka (M. R. Hall) Aboriginal housing and problems and issues in inner-city land use, basic needs of Aborigines (W. J. A. Jonas).

DEPARTMENT OF MATHEMATICS, STATISTICS & COMPUTER SCIENCE

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

Astrophysics
Dr W. P. Wood is investigating the structure and internal dynamics of the oblique rotator model of magnetic stars. The problem of magneto-acoustic waves in the atmosphere of Ap stars is also being studied.

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.

Geographical theory and philosophy
Explanation in Geography (Mary R. Hall)
Assessment in Geography (P. G. Irwin)
Time-space and socio-technical systems, with particular emphasis on shiftwork systems (K. W. Lee)
Development of theory and applications in chronogeography and behaviour ecology (D. N. Parkes)

Geomorphology
Hillocks erosion and sedimentation using the environmental tracer caesium-137 (R. J. Loughran)

Historical Geography
Australia 1788-1988 Bicentennial History Project - historical geography atlas of Australia (J. C. R. Camm)
The historical geography of Queensland, 1890-1915 (J. C. R. Camm)

Settlement
Human activity structures in remote and especially arid and tropical settlements in Australia (D. N. Parkes)

Biostatistics
Theoretical problems which arise from consulting in medical statistics are considered. Current research includes: measures of agreement between observers, methods for analysing clustered prevalence data, prognostic indicators.

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 optimisation 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 programme referencing behaviour and studying performance of memory management systems. He is also working on realtime computer techniques for protection and monitoring of high voltage switchyards. In addition, he is developing concurrent programming systems and techniques for writing software for multiprocessor systems.
Associate Professor A. J. Guttman 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 interested in the solution by linear marching schema of ordinary differential equations, in particular, "stiff" systems. He is also investigating the finite element method of solution for partial differential equations.

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 urban planning, particularly in the design of urban areas. He is also investigating the use of computer techniques in urban planning.

Fluid Mechanics
Associate Professor A. J. Guttman is studying the problem of extrapolating regular perturbation series in fluid mechanics.

Dr W. T. F. Lau is concerned with viscous flow problems, particularly those involving free boundaries.
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. Berghou 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 Berghou is working on Greek algebra.

Integral Geometry
Dr T. K. Sheng studies the power of distances between random points in convex and non-convex regions in IR.

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

Mathematical Models of Tumour Growth
Dr D. L. S. McElwain is investigating models for the growth of solid isolated tumours.
Epidemiology
Assoc. Prof. A. J. Dobson and R. W. Gibberd collaborate with the Faculty of Medicine to investigate various problems in epidemiology. 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 surveys of smoking habits of schoolchildren; validation of routinely collected data on ischaemic heart disease; spatial behaviour of hospital patients in the Hunter Region, doctor patient interactions; use of antibiotics; evaluation of intervention programmes.

Number Theory
Dr R. B. Eggleton is interested in number theory, particularly in combinatorial aspects of the subject.
Dr T. K. Sheng studies the application of dispersive and explosive linear operators, distribution of algebraic numbers in the complex plane, and functions defined on rational numbers. Lines determined by lattice points and application of the results obtained to statistical mechanics are studied. Convexity indices and their applications to transport networks, etc.

Problems in Biostatistics
Mathematical problems arising from analysis of epidemiological data are investigated theoretically. For example Mrs D. O'Connell and Assoc. Prof. A. J. Dobson are studying measures of agreement between judges.

Statistical Mechanics
Associate Professor C. A. Croxton is working on the statistical mechanics of liquids, polymers and liquid interfaces.
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
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<thead>
<tr>
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<th>SUBJECT NAME</th>
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<th>NAMES OF COMPONENTS</th>
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(Not offered in 1984)
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<td>Topic P — Ordinary Differential Equations</td>
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663300 Statistics III  
714100 Biology IV  
724100 Chemistry IV  
354100 Geography IV  
734100 Geology IV  
664100 Mathematics IV  
744100 Physics IV  
754100 Psychology IV  
664500 Geology/Mathematics IV  
664300 Physics/Mathematics IV  
664200 Psychology/Mathematics IV