THE UNIVERSITY OF NEWCASTLE
NEW SOUTH WALES

LEGEND

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DESIGNATION

THE UNIVERSITY OF NEWCASTLE
NEW SOUTH WALES

FACULTY OF SCIENCE
HANDBOOK 1983

THE UNIVERSITY OF NEWCASTLE
NEW SOUTH WALES 2308

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Recommended price
This Volume is intended as a reference handbook for students enrolling in courses conducted by the Faculty of Science.

The colour band, Topaz BCC 4, on the cover is the lining colour of the hood of Bachelors of Science of this University.

The information in this Handbook is correct as at 20 August 1982.

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

The Faculty Board, Faculty of Science, consists of the Professors, Associate Professors, Readers, Senior Lecturers, Lecturers, Senior Tutors/Demonstrators and Tutors/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;
- 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.

"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; and
(h) exercise such other powers and duties as may from time to time be delegated to it by the Council".
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Senior Tutor

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Research Fellow

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Computer Programmers

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A. Nyman, BMath, 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 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 1982. 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>Biological Sciences</th>
<th>Chemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology IIA with</td>
<td>Chemistry IIIB</td>
</tr>
<tr>
<td>Chemistry IIB</td>
<td>Biology IIIA</td>
</tr>
<tr>
<td>Geology IIIB</td>
<td>Biology IIIA</td>
</tr>
<tr>
<td>Physics IIIA</td>
<td>Geology IIIB</td>
</tr>
<tr>
<td>Geology IIIA</td>
<td>Mathematics III (some topics only)</td>
</tr>
<tr>
<td>Chemistry IIIB with</td>
<td>Biology IIA</td>
</tr>
<tr>
<td>Chemistry IIIA with</td>
<td>Biology IIIA</td>
</tr>
<tr>
<td>Chemistry IIIA</td>
<td>Physics IIIA</td>
</tr>
<tr>
<td>Geology IIIA</td>
<td>Geology IIIB</td>
</tr>
<tr>
<td>Chemistry IIIIB with</td>
<td>Mathematics III (some topics only)</td>
</tr>
<tr>
<td>Biology IVIA</td>
<td>Biology IIA</td>
</tr>
<tr>
<td>Biology IVIB</td>
<td>Biology IIIA</td>
</tr>
<tr>
<td>Chemistry IIB</td>
<td>Physics IIIA</td>
</tr>
<tr>
<td>Geology IIIB</td>
<td>Geology IIIA</td>
</tr>
<tr>
<td>Chemistry IIIIB</td>
<td>Mathematics III (some topics only)</td>
</tr>
<tr>
<td>Geology IVIB</td>
<td>Biology IIA</td>
</tr>
<tr>
<td>Chemistry IIIB</td>
<td>Biology IIIA</td>
</tr>
<tr>
<td>Chemistry IIIIB</td>
<td>Physics IIIA</td>
</tr>
<tr>
<td>Geology IIIB</td>
<td>Mathematics III (some topics only)</td>
</tr>
</tbody>
</table>

Geology

Geology IIA with Chemistry IIIA
Geology IIB with Chemistry IIIA
Geology IIIA with Chemistry IIIA
Geology IIIB with Chemistry IIIA
Chemistry IIIB
Chemistry IIIA
Chemistry IIIB
Chemistry II
Mathematics II
Psychology IIIB
Mathematics III with Mathematics (some topics only)
Physics IIIA
Physics IIIB
Chemistry IIIB
Chemistry IIIA
Computer Science III (some topics only)
Mathematics III (some topics only)
Chemistry III (some topics only)

Mathematics
Psychology II
Psychology IIIA
Psychology IIIB
Physics IIIA
Chemistry IIIB
Chemistry IIIA
Geology IIIB
Mathematics III (some topics only)
Computer Science III (some topics only)

Physics
Biology IIIB
Biology IIIA
Biology IIIA
Chemistry IIIB
Chemistry IIIA
Chemistry IIIB
Chemistry II

N.B. Although the timetable for one part!cular subject may clash with that of another, this may not 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.

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</td>
<td>Mathematics (3-unit course) and Physics (2-unit course).</td>
</tr>
<tr>
<td>Physics II</td>
<td>Mathematics (2-unit course) or Science (Multistrand).</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 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 with qualifications from other universities, or in 1981 or 1982 from this University, whose courses of study have included subjects which are deemed for this purpose to provide an equivalent foundation, may be admitted by the Dean on the recommendation of the Head of the Department of Education.
In the Diploma course the Curriculum and Method units, now known as Group C, are grouped as follows:

- Primary
- Humanities (English, History)
- Social Science
  - (Geography, Commerce, Social Science)
- Mathematics and 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. **Examinations**

   The examining of candidates for the degree shall be carried out in accordance with the Examination Regulations approved by the Council from time to time.

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 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 enrolled in or is already enrolled in any subjects prescribed as its corequisites.

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7. **Subject**

   (1) To complete a subject a candidate shall attend such lectures, seminars, laboratory classes and field work and submit such written or oral 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. **Unsatisfactory Progress**

   The Regulations Governing Unsatisfactory Progress shall apply where a candidate fails to maintain a rate of progress considered satisfactory in a subject of the course.

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.

### THE ORDINARY DEGREE

10. **Admission to Candidature**

    Admission to candidature shall be governed by the Regulations Governing Admission and Enrolment made by the Council from time to time.

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.

    (3) Except with the permission of the Dean given only if he is satisfied that the academic merits of the candidate so warrants:

        (a) a candidate shall not enrol in more than four subjects in any one academic year;

        (b) a candidate enrolling in four subjects in any one academic year shall not enrol in a Part III subject nor more than two Part II subjects in that year; and

        (c) a candidate enrolling in three subjects in any one academic year shall not enrol in more than one Part III subject in 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 A 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.

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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,
- or Psychology/Mathematics IV.

21. Regulations 17 and 19 of these Regulations shall apply to a combined honours degree. The references in Regulation 17 to the Head of Department shall be construed as references to the Head of each Department offering a component part of the combined subject.

### COMBINED DEGREE COURSES

22. **General**

A candidate may complete the requirements for the degree in conjunction with another Bachelor's degree by completing a combined course approved by the Faculty Board and also the Faculty Board of the Faculty offering that other Bachelor's degree.

23. **Admission to a combined degree course:**

(a) shall be subject to the approval of the Deans of the two Faculties.

(b) shall, except in exceptional circumstances, be at the end of the candidate's first year of enrolment for the ordinary degree; and

(c) shall be restricted to candidates with an average of at least credit level.

24. 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.

25. 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.

26. **Science/Arts**

To qualify for admission to the ordinary degrees of Bachelor of Science and Bachelor of Arts, a candidate shall complete all the requirements for the degree of Bachelor of Arts other than those prescribed in Clause 12 and all the requirements for the degree of Bachelor of Science other than those prescribed in Regulations 11(3) and 13, and shall pass fourteen subjects chosen from the Schedule of Subjects approved for the two degrees, provided that:

(a) at least six subjects, including at least one Part III subject, shall be chosen from Group I of the Schedule of Subjects approved for the degree of Bachelor of Arts;

(b) at least six subjects, including at least one Part III subject and one Part II subject in a different department, shall be chosen from the Schedule of Subjects approved for the degree of Bachelor of Science, the Part III subject selected to be from a department other than that offering the Part III subject mentioned in (a); and

(c) the maximum total number of Arts Part I subjects and Science Part I subjects shall not exceed six.

27. **Science/Mathematics**

(1) A candidate shall qualify for admission to the ordinary degrees of Bachelor of Science and Bachelor of Mathematics by passing fourteen subjects, as follows:

(a) five subjects, being Mathematics I, Mathematics II A, Mathematics IIC, Mathematics III A and another Part III subject chosen from the Schedule of Subjects approved for the degree of Bachelor of Mathematics; and

(b) six subjects chosen from the other subjects listed in the Schedule of Subjects approved for the degree of Bachelor of Science; and
(c) three subjects chosen, with the approval of the Deans of the Faculties of Mathematics and Science, from the subjects approved for any of the degree courses offered by the University.

(2) The following restrictions shall apply to a candidate's choice of subjects, namely —
(a) the number of Part I subjects shall not exceed six;
(b) the minimum number of Part III subjects shall be three;
(c) a candidate counting Psychology IIC shall not be entitled to count either Psychology IIA or Psychology IIIB;
(d) a candidate counting Psychology IIC shall not be entitled to count either Psychology IIA or Psychology IIIB;
(e) a candidate counting Economics IIC shall not be entitled to count either Economics IIA or Economics IIIB;
(f) a candidate counting Geography IIC shall not be entitled to count either Geography IIIA or Geography 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

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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 1983.

4 See note at beginning of subject description.

Subject | Remarks, Prerequisites, Corequisites, Preparatory Subjects
---------|------------------------------------------------------------|
Geography IIA | Corequisite: a Part III subject approved by the Faculty Board on the recommendation of the Head of the Dept. of Physics.
Geography IIB | Prerequisite: Geography I
Geology IIA | Prerequisite: Mathematics I
Geology IIB | Prerequisite: Mathematics IIA
Geography IIIA | Prerequisite: Geography IIA
Geography IIIB | Prerequisite: Geography IIB
Geology IIIA | Prerequisite: Geology IIA
| Preparatory Subjects: Chemistry I & either Physics I A or Physics I B |
Geology IIIB | Prerequisite: Geology IIA
| Preparatory: Mathematics IIA and IIC |
Mathematics IIA | Prerequisite: Mathematics II and at least one Part II |
Mathematics IIB | Prerequisite: Physics II, and at least one Part II |
Physics IIA | Mathematics subject which shall include, in addition to Topic CO (which counts as two topics), Topic B and one of the Topics D, F, and H. |
Physics IIB | |
| Prequisite: Physics I |
| Corequisite: Physics IIA |

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

Psychology IIA | Prerequisite: Psychology IIA |
Psychology IIB | Prerequisite: Psychology IIB |
SM III (Calculus, Differential Equations & Related Topics) | Prerequisite: Mathematics I or I B 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 |
Statistics III | Prerequisite: Mathematics IIA and Mathematics IIC |
| (including topics CO, H and I). |

Not being offered in 1983.

POSTGRADUATE COURSES

Studies may be undertaken for the following postgraduate qualifications:

- Diploma in Coal Geology
- Diploma in Psychology
- Master of Psychology (Clinical)
- Master of Psychology (Educational)
- Master of Science
- Doctor of Philosophy

See note at beginning of subject description.
Equivalent Honours/*Diploma in Science

In the past people wishing to take the fourth or "Honours" year in any science discipline but who were ineligible to proceed to the Honours degree itself because they had already been admitted to an ordinary degree used to enrol in "Equivalent Honours". Successful completion of the full-time year (or two part-time years) led to a statement of achievement in terms equivalent to the Honours scale, but to no certificate. The Faculty has now proposed to replace this "equivalent honours" with a Diploma in Science. As the Handbook goes to press the proposal is being considered by the University's various legislative bodies. Interested people are invited to enquire of the Faculty Secretary who will be able to provide full details as soon as a decision has been made (probably about mid-October 1982).

REQUIREMENTS FOR THE DIPLOMA IN COAL GEOLOGY

1. In these Requirements, unless the context or subject matter otherwise indicates or requires:
   "the Department" means the Department of Geology;
   "the Diploma" means the Diploma in Coal Geology;
   "the Faculty Board" means the Faculty Board of the Faculty of Science.

2. An application for admission to candidature for the Diploma shall be made on the prescribed form and lodged with the Secretary to the University by the prescribed date.

3. An applicant shall:
   (a) have satisfied the requirements for admission to a degree of the University of Newcastle or a degree, approved for this purpose by the Faculty Board, or any other tertiary institution, provided that the course completed for that degree by the applicant included a major sequence in Geology; or
   (b) have other qualifications and professional experience deemed appropriate by the Faculty Board on the recommendation of the Head of the Department.

4. Admission to candidature shall require the approval of the Faculty Board on the recommendation of the Head of the Department. Such approval shall be subject to such conditions as the Faculty Board may determine on the recommendation of the Head of the Department.

5. (1) To qualify for the Diploma a candidate shall enrol and shall complete to the satisfaction of the Faculty Board a programme consisting of:
   (a) lectures, tutorials and practical work as determined by the Faculty Board on the recommendation of the Head of the Department; and
   (b) two reports, each embodying the result of a project, at least one of which shall be field-oriented.
   (2) Except with the permission of the Faculty Board on the recommendation of the Head of the Department, the programme shall be completed in not less than two years of part-time enrolment.

6. The programme shall include periods of attendance at the University of Newcastle as prescribed by the Faculty Board on the recommendation of the Head of the Department.

7. A candidate's programme shall require approval by the Faculty Board on the recommendation of the Head of the Department.

8. 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.

9. 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 as a provisional candidate a person who has satisfied all of the requirements for admission to a degree of the University of Newcastle or another university approved for this purpose by the Faculty Board, provided that the course completed for that degree at least one subject in Psychology.
   (b) A candidate permitted to register provisionally under the provisions of subsection (a) of this Section shall complete such work and pass such examinations at Bachelor's degree honours level as may be prescribed by the Faculty Board before his registration may be confirmed by the Faculty Board.

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

Educational Specialisation

10. An applicant for registration as a candidate for the Diploma in the Educational Specialisation shall:
   (a) (i) have satisfied all of the requirements for admission to a Bachelor's degree in the University of Newcastle and have included in the qualifying course for that degree at least one Part III Psychology subject; or
   (ii) have satisfied all of the requirements for admission to an equivalent qualification in another university recognised for this purpose by the Faculty Board;
   (b) have satisfied all of the requirements for the award of the Diploma in Education in the University of Newcastle or another teaching qualification approved for this purpose by the Faculty Board;
(c) have at least two years teaching or other relevant practical experience approved by the Board of Studies; and
(d) be selected for admission to the course by the Board of Studies which shall, in making this determination, take account of the applicant's academic qualifications; experience; and the report of an interview which shall be conducted by a selection committee which the Board shall appoint.

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

REGULATIONS GOVERNING MASTERS DEGREES

PART I — GENERAL

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

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

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

"programme" means the programme of research and study prescribed in the Schedule;

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

"thesis" means any thesis or dissertation submitted by a candidate.

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

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

2. An application for admission to 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.

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

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

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

5. The programme shall be carried out:—

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

(b) as the Faculty Board may otherwise determine.

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

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

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

The relevant date shall be:

(a) in the case of a subject offered in the first half of the academic year — the eighth Monday in first term;

(b) in the case of a subject offered in the second half of the academic year — the second Monday in third term;

(c) in the case of any other subject — the sixth Monday in second term.

8. (1) If the Faculty Board is of the opinion that the candidate is not making satisfactory progress towards the degree then it may terminate the 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 12(1) of these Regulations may appeal to the Vice-Chancellor against any decision made following the review under Regulation 12(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) to recommend that the candidate be admitted to the degree, in which case the candidature shall be terminated.
PART III — PROVISIONS RELATING TO THESES

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

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

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

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

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

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

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

(i) a certificate signed by the candidate that the main content of the thesis has not been submitted by the candidate for a degree 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 photocopy 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.

At present there is no fee payable.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

SCHEDULE 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 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 another university and have satisfactorily completed a Part III Psychology subject or reached a standard in Psychology deemed by the Board to be equivalent; and
   (b) have satisfied all the requirements for the award of the Diploma in Education of the University of Newcastle or another teaching qualification approved for this purpose by the Faculty Board; and
   (c) have at least two years teaching or other relevant practical experience approved by the Board.

4. (1) The Board shall consider each application for admission to candidature and shall make a decision thereon.
   (2) Before an application for admission to candidature is approved, the Board shall be satisfied that adequate supervision and facilities are available.
   (3) In considering an application, the Board shall take account of the applicant’s academic qualifications and experience, and also the report of an interview with the applicant and any other selection procedures applied to the applicant as determined by the Board, which shall be conducted by a Selection Committee approved by the Board.

5. To qualify for admission to the degree the candidate shall:
   (a) in not less than 2 years, attend such lectures, seminars and tutorials, and complete to the satisfaction of the Board such written and practical work and examinations as may be prescribed by the Board; and
   (b) submit a thesis embodying the results of an empirical investigation.

6. (1) Examiners shall be appointed by the Faculty Board on the recommendation of the Board.
   (2) One examiner appointed pursuant to Regulation 16(1) of these Regulations shall be an internal examiner being a member of the staff of the University.

7. Before a decision is made under Regulation 11 of these Regulations the Board shall consider:
   (a) the examiners’ reports on the thesis; and
   (b) a report of the internal examiner made in consultation with the course controller on the candidate’s performance in the work prescribed under section 5(a) of this Schedule;
   and shall submit these to the Faculty Board together with its recommendation. The Faculty Board shall make its decision in the light of these reports and on the recommendation of the Board.

SCHEDULE 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:
   (a) have satisfied the requirements for admission to a degree with honours in the University of Newcastle or other university approved for this purpose by the Faculty Board in the area in which he proposes to carry out his research; OR
   (b) have satisfied the requirements for admission to a degree in the University of Newcastle or other university approved for this purpose by the Faculty Board and have completed to the satisfaction of the Faculty Board such work and examinations as determined by the Faculty Board; OR
   (c) in exceptional cases produce evidence of possessing such other qualifications as may be approved by the Faculty Board on the recommendation of the Head of the Department in which the candidate proposes to carry out his programme.

3. To qualify for admission to the degree a candidate shall complete to the satisfaction of the Faculty Board a programme consisting of:
   (a) such work and examinations as may be prescribed by the Faculty Board; and
   (b) a thesis embodying the results of an original investigation or design.

4. The programme shall be completed:
   (a) in not less than two academic years except that, in the case of a candidate who has completed the requirements for a degree of Bachelor with honours or a qualification deemed by the Faculty Board to be equivalent or who has had previous research experience, the Faculty Board may reduce this period to not less than one academic year; and
   (b) except with the permission of the Faculty Board, in not more than 5 years.

5. (1) Except with the permission of the Faculty Board, which shall be given only in special circumstances, a part-time candidate enrolled in the Faculty of Science shall:
   (a) conduct the major proportion of the research or design work in the University; and
   (b) take part in research seminars within the Department in which he is carrying out his research.

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

Combined Degree Courses

Any student contemplating enrolment in a combined degree course under 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.
Normally the combined degree programme would be pursued as in either (a) or (b):

(a)  
Year I  Four Science Part I subjects passed with an average performance of credit level or higher.
Year II  Three Science Part II subjects and an additional subject which will be an Arts Group I Part I subject if no Arts Group I subject has been passed.
Year III  At least one Science Part III subject and 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 B.Sc Schedule if no subject included in that Schedule has been passed.
Year III  At least one Arts Part III subject and two other subjects including a Science Part II subject if no Science Part II subject has so far been passed. By the end of this year at least three subjects from the B.Sc Schedule of Subjects must be passed.
Year IV  One subject, which is a Science Part III subject if this requirement has not already been met (and is from a department different from that providing the Arts Part III subject), and two other subjects to complete the Requirements for the degree of Bachelor of Science.

Science/Arts

Normally the combined degree programme would be pursued as follows:
Year I  Mathematics I and three Part I subjects passed with an average performance of credit level or higher.
Year II  Three Part II subjects including Mathematics IIA and Mathematics IIC, and another Part I subject.
Year III  Mathematics IIIA plus two other subjects which must include at least one Part III subject.
Year IV  Either Mathematics IIIB or a schedule B subject from the requirements for B.Math, plus two other subjects which will complete the requirements for the Science degree.

Science/Engineering

See details in Faculty of Engineering Handbook

The Faculty Board is willing to grant standing to Diplomates of Teachers Colleges and Colleges of Advanced Education who have taken an approved course. The minimum requirements for the award of the ordinary degree of Bachelor of Science would be satisfied by the completion of two major sequences, i.e. two Part I subjects, two Part II subjects and two Part III subjects.

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. Prerequisites are subjects which must be passed before a candidate enrols in a particular subject.
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 III 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 part III Schedule of the Department of 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 part III Schedule of the Department of 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 Part III Mathematics Schedule 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 IIA or IIB plus a Part II subject offered by a Department in the Faculty of Science.

Co-requisite  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 (21st to 25th February, 1983, between 9.30 and 11.30 a.m. each day in the Department of Biological Sciences lecture theatre, JLG08) for those students enrolling in Biology I who have done little chemistry. Attendance at the lectures is optional.

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

Examination
Two 3-hour papers

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

Biological Energy Processes
Photosynthesis, Glycolysis, Fermentation, Respiration. Production of ATP.

Diversity of Organisms
Origins of life, Classification of organisms.

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

Animal Classification and Processes

Immunology
Antigens and antibodies. Blood groups.

Genetics and Development

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

Human Biology

The practical classes will present exercises relevant to these topics.

Texts
Martin, E. A.  
Kirk, D.  
A Dictionary of Life Sciences (Pan 1976)  
Biology Today 3rd edn (Random House 1980)

References
Ayala, F. M. & Kiger, J. A.  
Clarke, R. B. & Panchen, A. L.  
Holloway, B. W.  
Moroney, M. J.  
Modern Genetics (Benjamin Cummings 1980)  
Synopsis of Animal Classification (Chapman & Hall)  
Genes and Chromosomes in Action (Thomas Nelson)  
Facts from Figures (Penguin)

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Parker, R. E.  
Introductory Statistics for Biology (Edward Arnold 1973)

Rayle, D. & Wedberg, L.  
Botany: A Human Concern (Houghton Mifflin 1975)

712100  Biology II A
712101  Biochemistry & Molecular Genetics
712102  Cell Biology
Molecular and Cellular Biology

Prerequisites
Biology I

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

Examination
Two 3-hour papers

Content
Biochemistry and Molecular Genetics

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

Cellular processes.

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

Texts
Bailey, N. T. J.  
De Robertis, E. D. P. & De Robertis, E. M.  
Goodenough, V.  
McGlyvary, R. W.  
Smith-Keary, P. F.  
Statistical Methods in Biology (English V.P. 1964)  
Cell and Molecular Biology 7th edn (Holt-Saunders 1980)  
Genetics 2nd edn (Holt, Rinehart & Winston 1978)  
Biochemistry - A Functional Approach 2nd edn (Holt-Saunders 1979)  
Genetic Structure and Function (Memillan 1979)

References
Bonner, J. & Varner, J. E. (eds)  
Conn, E. E. & Stumpf, P. K.  
Giese, A. C.  
Metzler, D. E.  
White, A. et al.  
Plant Biochemistry 3rd edn (Academic 1976)  
Outline of Biochemistry 4th edn (Wiley 1976)  
Cell Physiology 5th edn (Saunders 1979)  

712200  Biology II B
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
713101 Developmental Biology

**Prerequisite**
Biology IIA

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

**Examination**
One 3-hour paper

**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 include are the development, architecture and nucleic acids of chloroplasts, and the application of cell and molecular biology and genetic engineering to plant improvement.

**Texts**


Zar, J. H. *Biostatistical Analysis* (Prentice-Hall)

**References**


**Biological**

713103 Immunology and Cell Processes

**Prerequisites**
Biology IIA

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

**Examination**
One 3-hour paper

**Content**

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

713100 Biology IIA

Biology IIA consists of two units, Developmental Biology, and Immunology and Cell Processes.
It is possible to substitute a unit from Biology IIB for either of these Biology IIA units, allowing flexibility of choice of topics.
Immunology
Molecular and cellular aspects. Emphasis will be on understanding at a molecular level both cellular and humoral immunity.

Texts
Cunningham, A. J. Understanding Immunology (Academic Press 1978)
Zar, J. H. Biostatistical Analysis (Prentice-Hall)

References
Martin, C. R. Textbook of Endocrine Physiology (Williams & Wilkins 1976)

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

Biology IIIB, Topic 3

713201 Environmental Physiology
Prerequisites Biology IIA or IIB
Hours 4 lecture hours and 8 hours tutorial and laboratory classes per week for 14 weeks
Examination One 3-hour paper

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

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

Texts
Baker, D. A. Transport Phenomena in Plants (Chapman & Hall 1978)
Nalbandov, A. V. Reproductive Physiology 3rd edn (Freeman 1976)

References
Bloom, W. & Fawcett A Textbook of Histology 10th edn (Saunders 1975)

Biology IIIB, Topic 4

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)
Stewart, J. (ed.) S299 Genetics, Units 11, 12, 13 (Open University Press 1976)
Zar, J. H. Biostatistical Analysis (Prentice-Hall)

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

DEPARTMENT OF CHEMISTRY

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.

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


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

Dynamics
Kinetics; chemical affinity; electrochemical cells.

Organic Chemistry
Aliphatic and aromatic chemistry.

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

Texts

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

OR

Pine, S. H., Hendrickson, J. B., Cram, D. J. & Hammond, G. S.
Modern Methods of Chemical Analysis 2nd edn (J. Wiley & Sons (Sydney) 1976)


722300 Chemistry IIB

This subject will not be offered in 1984, 1986, 1988 etc. There may be staffing difficulties in 1983 and students wishing to enrol in this year should first confirm with the Department of Chemistry that the subject is being offered.

Prerequisites
Chemistry I

Corequisites
Chemistry IIA (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

CHEMISTRY — PART III SUBJECTS

Prerequisites
Mathematics I; Chemistry IIA. Chemistry IIA is a pre- or corequisite for Chemistry IIB.

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.
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.

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

To be advised: see departmental topic summaries.

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

To be advised

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.

To be advised

DEPARTMENT OF GEOLOGY

Nil

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

Two 3-hour papers, class assignments and practical examinations

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

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

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### I PRINCIPAL DATES 1983

**January**  
1 Saturday  New Year's Day  
3 Monday  Public Holiday  
7 Friday  Last day for return of Re-Enrolment Forms — Continuing Students  
17 Monday  Deferred Examinations begin  
28 Friday  Deferred Examinations end  
31 Monday  Public Holiday  

**February**  
7 Monday  New students attend in person to enrol and pay charges  
14 Monday  Late enrolment session for new students  
21 Monday  First Term begins  
25 Friday  Last day for withdrawal without academic penalty from first half year subjects  

**April**  
1 Friday  Good Friday — Easter Recess commences  
6 Wednesday  Lectures resume  
25 Monday  Public Holiday — Anzac Day  
26 Tuesday  Last day for withdrawal without academic penalty from full year subjects  

**May**  
7 Saturday  First Term ends  
23 Monday  Examinations begin  
27 Friday  Examinations end  
30 Monday  Second Term begins  

**June**  
17 Friday  Last day for return of Confirmation of Enrolment forms  
13 Monday  Public Holiday — Queen's Birthday  
30 Thursday  Closing date for Applications for Admission to the Bachelor of Medicine course in 1984  

**July**  
4 Monday  Examinations begin  
8 Friday  Examinations end  

**August**  
8 Monday  Last day for withdrawal without academic penalty from full year subjects  
13 Saturday  Second Term ends  
15 Monday  Examinations begin  
19 Friday  Examinations end  

**September**  
5 Monday  Third Term begins  
26 Monday  Last day for withdrawal without academic penalty from second half year subjects  

**October**  
1 Saturday  Closing date for Applications for Admission 1984 (Undergraduate courses other than Medicine)  
3 Monday  Public Holiday — Eight Hour Day  

**November**  
5 Saturday  Third Term ends  
7 Monday  Annual Examinations begin  
25 Friday  Annual Examinations end  

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

**1984**  

**January**  
16 Monday  Deferred Examinations begin  
27 Friday  Deferred Examinations end  

**February**  
27 Monday  First Term begins  

**March**  

**April**  

**May**  

**June**  

**July**  

**August**  

**September**  

**October**  

**November**  

**December**  

(iv)
II GENERAL INFORMATION

Enrolment of New Students

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

Enrolment of Continuing Students

The University makes arrangements for continuing students to enrol by mail. There are two steps involved:

— Lodging the Enrolment form with details of your proposed programme.
— Completing enrolment by lodging the Authority to Complete Enrolment form with the cashier with charges payable.

1. Lodging Enrolment Forms

Re-enrolment materials will be mailed to all undergraduate students in mid-December. Those who wish to enrol in 1983 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 1982 annual examination results, and forward it to the Secretary, University of Newcastle, N.S.W., 2308. Enrolment forms from continuing students are due by 7 January 1983 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 am to 12 noon and 2 pm to 4 pm 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 Administration Office when seeking a replacement card.

A student who withdraws completely from studies should return the Student Card to the Administration Office.

Library Cards

Students should present their Student Card to the Library desk to be issued with their Library Borrowers 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 1982, 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 1982.

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 changes in their address. A Change of Address form should be used and is available from the Student Administration Office.

Failure to notify changes could lead to important correspondence or course information not reaching the student. The University cannot accept responsibility if official communications fail to reach a student who has not notified the Student Administration Office of a change of address.

It should be noted that examination results, re-enrolment and other correspondence will be mailed to students in December and January. Students who will be away during the long vacation from the address given to the University for correspondence should make arrangements to have mail forwarded to them.

Change of Name

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

Change of Programme

Approval must be sought for any changes to the programme for which a student has enrolled. This includes adding or withdrawing subjects, changing attendance status (for example from full-time to part-time) or transferring to a different degree or faculty.

All proposed changes should be entered on the Variation of Programme form available at the Student Administration Office. Reasons for changes and where appropriate documentary evidence in the form of medical or other appropriate certificates must be submitted.

Withdrawal

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>Full Year Subjects</th>
<th>First Half-Year Subjects</th>
<th>Second Half-Year Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Withdrawal Dates</td>
<td>First Half-Year Dates</td>
<td>Second Half-Year Dates</td>
</tr>
<tr>
<td>Monday 8 August 1983</td>
<td>Tuesday 26 April 1983</td>
<td>Monday 26 September 1983</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.
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 ensure 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;
- 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-enroll 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 from attendance at classes.

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

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

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

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

Members of the academic staff of the University, senior administrative officers, and other persons authorised for the purpose have authority 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 BOI 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: 23 to 27 May, 1983
- End of Second Term: 15 to 19 August, 1983
- End of Year: 7 to 26 November, 1983

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

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 available on a noticeboard outside the room.

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

Calculators may be used, if permitted by the examiner in any examination. They must be hand held, battery operated and non-programmable* and students should note that no concession will be granted:
(a) to a student who is prevented from bringing into a room a programmable calculator;
(b) to a student who uses a calculator incorrectly; or
(c) because of battery failure.

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

* A programmable calculator will be permitted provided program cards and devices are not taken into the examination room.
(a) candidates shall comply with any instructions given by a supervisor relating to the conduct of the examination;
(b) before the examination begins candidates shall not read the examination paper until granted permission by the supervisor which shall be given ten minutes before the start of the examination;
(c) no candidate shall enter the examination room after thirty minutes from the time the examination has begun;
(d) no candidate shall leave the examination room during the first thirty minutes or the last ten minutes of the examination;
(e) no candidate shall re-enter the examination room after he has left it unless during the full period of his absence he has been under approved supervision;
(f) a candidate shall not bring into the examination room any bag, paper, book, written material, device or aid whatsoever, other than such as may be specified for the particular examination;
(g) a candidate shall not by any means obtain or endeavour to obtain improper assistance in his work, give or endeavour to give assistance to any other candidate, or commit any breach of good order;
(h) a candidate shall not take from the examination room any examination answer book, graph paper, drawing paper or other material issued to him for use during the examination;
(i) no candidate may smoke in the examination room.

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 13 January 1984.

However, it should be noted that examination results are released only after careful assessment of students' performances and that, amongst other things, marginal failures are reviewed before results are released.

Special Examinations
When considering the examination results Faculty Boards take into consideration any circumstances such as illness or personal problems which may have seriously affected a student's work during the year or during the examinations. Any student who considers that his work has been affected in this way or who is unable to attend for any examination and who wishes to apply for special consideration should write to the Secretary explaining the circumstances and, in the case of illness, enclosing a medical certificate (see Regulation 12 (2) of the Examination Regulations, Calendar Volume 1).

If a student is affected by illness during an examination, and wishes to ask for a Special Examination he must report to the supervisor in charge of the examination and then make written application to the Secretary as soon as possible after the examination (see Regulation 12 (3) of the Examination Regulations, Calendar Volume 1).

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.

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 7 January 1983.

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

Regulations Governing Unsatisfactory Progress

1. (1) These Regulations are made in accordance with the powers vested in the Council under By-law 5.1.2.
(2) These Regulations apply to all students of the University except those who are candidates for a degree of Master or Doctor.
(3) In these Regulations, unless the context or subject matter otherwise indicates or requires:
"Admissions Committee" means the Admissions Committee of the Senate constituted under By-law 2.3.5.
"Dean" means the Dean of a Faculty in which a student is enrolled.
"Faculty Board" means the Faculty Board of a Faculty in which a student is enrolled.

2. (1) A student's enrolment in a subject may be terminated by the Head of the Department offering that subject if that student does not maintain a rate of progress considered satisfactory by the Head of the Department. In determining whether a student is failing to maintain satisfactory progress the Head of Department may take into consideration such factors as:
(a) unsatisfactory attendance at lectures, tutorials, seminars, laboratory classes or field work;
(b) failure to complete laboratory work;
(c) failure to complete written work or other assignments; and
(d) failure to complete field work.
(2) The enrolment of a student in a subject shall not be terminated pursuant to regulation 2 (1) of these Regulations unless he has been given prior written notice of the intention to consider the matter with brief particulars 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

(x)
7. Where there is an appeal against any decision of the Admissions Committee together with a recommendation for such action as the Faculty Board considers appropriate.

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

(II)

V CHARGES

Enrolment is completed by lodging with the Cashier the approved Authority to Complete Enrolment Form with a remittance to cover all charges due or written evidence that a sponsor will meet all charges. New students are required to pay all charges when they attend to enrol. For re-enrolling students at least 14 days notice is allowed from the date of mailing the Authority to Complete Enrolment form to the date by which charges must be paid if late charges are to be avoided. The actual date, which will not be before mid February, will be printed on the form. A later date will be set if approval of the proposed programme has been delayed or if the student has taken Special or Deferred examinations.

Charges

1. General Services Charge
   (a) Students Proceeding to a Degree or Diploma
      Full-time students ........................................ $135
                                                                 Per annum
      Part-time students ........................................ $130
                                                                 Per annum
   Plus Students joining Newcastle University Union for the first time ........................................ $10
   (b) Non-Degree Students
      Newcastle University Union charge ........................ $61
                                                                 Per annum
   The exact amount must be paid in full by the prescribed date.

2. Late Charges
   (a) Late Lodgement of Enrolment Form
      Where a continuing student does not lodge the Enrolment form by Friday, 7 January, 1983 ............ $14
      where a candidate for a special or deferred examination in January does not lodge the Enrolment form by Monday, 14 February, 1983 ............ $14
   (b) Late Lodgement of Authority to Complete Enrolment Form with Cashier
      Where the Authority to Complete Enrolment Form together with
      (i) General Services Charge payable; or
      (ii) evidence of sponsorship (e.g. scholarship voucher or letter from Sponsor); or

3. Cashier's Complete Enrolment Form with a remittance to cover all charges due or written evidence that a sponsor will meet these charges. Students who notify 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.

Enrolment is completed by lodging with the University Cashier the approved 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 should be made payable at the Newcastle University Post Office, N.S.W. 2308. The Cashier's Office is located on the First Floor of the McMullin Building, and is open from 10 am to 12 noon, and 2 pm to 4 pm.

Students are urged to pay charges by mail and a pre-addressed envelope will be forwarded with the Authority to Complete Enrolment Form.

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.

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, 28 February, 1983: 100%
- Notification on or before Friday, 25 March, 1983: 90%
- Notification on or before Friday, 24 June, 1983: 50%

No refund will be made before 31 March 1983.

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.

Tuition Fees
The Commonwealth Government has announced its intention that tuition fees be payable in some circumstances. At the time of printing, the necessary legislation was still to be passed. If tuition fees are introduced a statement will be sent to those students who are affected.

VI CAMPUS TRAFFIC AND PARKING
Persons wishing to bring motor vehicles (including motor cycles) on to the campus are required to obtain and display on the vehicle a valid permit to do so. Permits may be obtained from the Attendant (Patrol) Office which is located off the foyer of the Great Hall. Permit holders must comply with the University's Traffic and Parking Regulations including parking in approved parking areas, complying with road signs and not exceeding 35 k.p.h. on the campus.

If the Vice-Principal, after affording the person a period of seven days in which to submit a written statement is satisfied that any person is in breach of Regulations, he may:
(a) warn the person against committing any further breach; or
(b) impose a fine; or
(c) refer the matter to the Vice-Chancellor.

The range of fines which may be imposed in respect of various categories of breach include:
- Parking in areas not set aside for parking: $4
- Parking in special service areas, e.g. loading bays, by fire hydrants, etc.: $10
- Failing to display a valid permit: $4
- Driving offences - including speeding and dangerous driving: up to $25
- Failing to stop when signalled to do so by an Attendant (Patrol): up to $25
- Refusing to give information to an Attendant (Patrol): up to $25
- Failing to obey the directions of an Attendant (Patrol): up to $25

The Traffic and Parking Regulations are stated in full in the Calendar, Volume 1.
Physical Geology
Erosion cycle; agents of erosion; diastrophism; structural geology; marine geology; geomorphology.

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

Texts
Price, F. & Siever, R. Either
EITHER
Read, H. H. Rusley's Elements of Mineralogy 24th edn (Murby 1960)
OR
Mason, B. & Mineralogy (Freeman 1959)
Berry, L. G. (for students intending to proceed beyond Geology I)
Uyeda, S. The New View of the Earth (Freeman 1978)

732200 Geology IIA

Prerequisite
Geology 1

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. An Outline of Crystal Morphology (Hutchinson 1967)
Clarkson, E. N. K. Invertebrate Palaeontology and Evolution (Allen & Unwin 1979)
Kerr, P. F. Optical Mineralogy (McGraw-Hill 1977)

732300 Geology IIB

Prerequisite
Geology 1

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.

Contents:

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.

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

Texts
Francis, P.
Mathewson, C. C.
Till, R.

733100 Geology IIIA
Prerequisites
Geology I & II
Preparatory Subjects
Chemistry I & either Physics 1A or 1B
Hours
5 lecture hours and 6 laboratory hours per week and 4 days field work
Examination
Two 3-hour papers, class assignments and practical examinations.

Content

Petrology
Petrology of igneous rock associations; petrogenesis of metamorphic rocks.

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, orogeny; 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
Carmichael, I. S. E. et al.
Hobbs, B. E. et al.
Stanton, R. L.

For others, consult lecturers concerned.

733200 Geology IIIB
Prerequisites
Geology I & II
Preparatory Subject
Geology IIIA

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

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

Content

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

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

Sedimentology
Lithological 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 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 IIIA, completion of ordinary degree requirements and permission of the Head of Department.

Hours
To be advised

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

Content
Part A
Lecture-tutorial work with directed reading in two of the following fields of geology: mineralogy and crystallography; geochemistry; igneous petrology; metamorphic petrology; coal petrology; sedimentology; stratigraphy; palaeontology; structural geology; economic geology.

Part B
A research project, the results of which are to be embodied in a thesis.

741200 Physics IA

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

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

Examination
One paper after the end of each term together with laboratory and tutorial 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, 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 1A or 1B

**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**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Basic Theory of Techniques; Instrumentation Practice; Specialist Instrumentation.</td>
</tr>
<tr>
<td>B</td>
<td>Instrumentation Theory.</td>
</tr>
<tr>
<td>C</td>
<td>Electrical Measurement Principles; Digital and Linear Integrated Circuits; Instrumentation Systems.</td>
</tr>
<tr>
<td>D</td>
<td>Basic Device Physics; Measurement Devices.</td>
</tr>
</tbody>
</table>

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. et al. *Instrumentation for Scientists Series, Texts with Experiments Modules 1, 2, 3 & 4* (Benjamin).

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### 743100 Physics IIIA

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

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

**Examination**
Assessment to the equivalent of 12½ hours of examination time.

**Content**

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

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

**B. 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.

**Texts**
Refer to the Physics Department notice board.

Students should retain their Physics II texts.

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### 743200 Physics IIIB

This subject will not be offered in 1983.

**Corequisite**
Physics IIIA

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

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

**Content**

The subject emphasizes the experimental and applied aspects of Physics. The Department considers it desirable that some mathematical studies should be continued through this level, so two mathematics topics are included in Physics IIIB, to be selected in consultation with the Physics Department.
The Physics lecture course will treat the following topics:

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

Physics IV

**Prerequisite**
Physics IIIA. Attention is drawn to degree requirements for Honours, p.18. Normally a grade in Physics IIIA of a credit or better is required.

**Hours**
100-120 lecture hours and a research project.

**Examination**
Assessment on each topic in the lecture course will be by agreement between the lecturer and students. It may take the form of formal examinations, essays, problems, open-book examinations etc. As a guide, for each ten lectures in a topic there will be a 1½ to 2 hour formal examination, or equivalent. The research project is also assessed on the basis of the written report, a seminar on the project and in general an oral examination.

**Content**
Physics IV is intended to give students an advanced understanding of the fundamentals of modern physics appropriate for an Honours graduate in the discipline as well as an exposure to the current interests of the Department viz. solid state theory, surface physics, geophysics, biophysics, and aspects of applied physics.

In 1983, 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.

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**DEPARTMENT OF PSYCHOLOGY**

**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.

**Psychology II**

**Prerequisite**
Psychology I

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

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

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

**Texts**
To be advised
Two 3-hour papers and an assessment of practical work

Content
Such topics as developmental psychobiology, drugs and behaviour, clinical neuropsychology, personality, social psychology, abnormal psychology, the development of relationships, dreams, fantasy and body-awareness, and test construction. Statistical methods will be taught and tested during the year.

Texts
To be advised

753100 Psychology IIIA
Prerequisite
Psychology IIA
Hours
4 lecture hours and up to 5 hours practical work per week
Examination
Two 3-hour papers and an assessment of practical work

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

Texts
To be advised

753200 Psychology IIIB
Prerequisite
Psychology IIIB
Hours
4 lecture hours and approximately 5 hours practical work per week
Examination
Two 3-hour papers and an assessment of practical work

Content
Such topics as abnormal and clinical psychology, animal behaviour, developmental psychology, learning and cognition, motivation, perception, personality, physiological psychology, quantitative psychology, and social psychology.

Practical work comprises workshop and laboratory work for up to 3 hours per week plus a supervised independent experimental project.

Texts
To be advised

664200 Psychology/Mathematics IV
Prerequisites
Mathematics IIIA & Psychology IIIIC
Hours
To be advised
Examination

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

(i) Psychological Measurement — J. A. Keats
Prerequisites
Nil
Hours
1½ hours per week
Examination
To be advised

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

Text
Nil

(ii) Mathematical Models in Perception and Learning — R. A. Heath
Prerequisites
Part II Mathematics Topic H recommended
Hours
1½ hours per week
Examination
To be advised

Content
An introduction to the application of stochastic process models to the analysis of psychological processes involved in 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; Preventative 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 practical experience approved by the Board of Studies in Psychology.

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

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

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 1 — (Assoc. Professor P. G. Irwin, K. W. Lee, 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

Texts
Haggett, P.

352100 Geography IIA: Human Geography

Prerequisite
Geography 1

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 IIB must count Methods in IIA only, and count the alternative strand, *Environmental Issues in Australia in IIB only).
Examination
To be advised

Content
A study of human activities within the context of space and time. In 1983 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 of economic geography; trends in the location of economic activity; for example, food availability and deficit patterns; a review of the "new international economic order".

**History and Political Geography** (Dr J. C. R. Camm): Study of aspects of the historical and political geography of the cultural area of Western Europe with particular reference to the British Isles.

**Text**

**352200 Geography IIB**

**Prerequisite** Geography I

**Hours**
5 hours of lectures/practicals/tutorials and one hour of Methods per week; up to 6 days of fieldwork.

(Note: Students also enrolled in Geography IIA must count Methods in IIA only, and count the alternative strand, Environmental Issues in Australia in IIB only.)

**Examination**
To be advised

**Content**
A study of man's physical environment. In 1983 themes will be established round the following specific fields of interest:

**Geomorphology** (Dr R. J. Loughran): An introduction to the study of landforms, including some basic geology, weathering, soils, mass movement, river processes and valley formation, landforms of arid and cold climate zones, coastal geomorphology, and applied and climatic geomorphology.

**Climatology** (Dr H. A. Bridgman, Mr G. N. McIntyre). 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)

*Strands common to Geography IIA and IIB*

(a) **Methods** (to be taken by all students) — 1 hour per week (Assoc. Prof. D. N. Parkes and other members of staff).
This consists of further development of geographical techniques appropriate to geographical and environmental studies. It includes the study of topographic and thematic maps, introduction to measures of association; scattergraphs, correlation and regression analysis; the measurement, description and interpretation of points, lines and areas; introduction to the computer and computer mapping.

**Nil**

(b) **Environmental issues in Australia** (to be taken only by those students taking both IIA and IIB) — 1 hour per week (Assoc. Prof. P. G. Irwin).

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, emphasises the links which exist between the two broad fields of physical and human geography.

Issues to be dealt with include: the environmental impact of pastoralism, agriculture and mining; the incidence and effects of droughts, floods and other natural hazards; the problems of population distribution; aboriginal land rights.

**Nil**

**353100 Geography IIIA - Human Geography**

**Prerequisite** Geography IIA

**Hours**
Five hours of lectures/practicals/tutorials, and one hour of Methods per week; up to six days of fieldwork.

(Note: Students also enrolled in Geography IIIB must count Methods in IIIA only, and count the alternative strand, Environmental Issues in Australia in IIIB only.)

**Examination**
To be advised

**Content**
A continuation of the study of human activities within the context of space and time. In 1983 themes will be established round the following specific fields of interest:

**Advanced Economic Geography** (Dr W. J. Jonas) A continuation of the principles of economic location, especially as these relate to transportation, development, and underdevelopment.


**Explanation in Geography** (Miss M. R. Hall) This strand emphasizes the study of primary sources. It consists of three basic sections: (i) knowing the world - the relevant tools for interpretation; (ii) the known world - sample studies of the development of Western geography through the history of cartography and the study of sample texts from the mid-19th century and from the period since 1960; (iii) professional literacy for the 1980s.

**Historical Geography** (Dr J. C. R. Camm) An investigation and interpretation of the main themes in Australian development, including rural settlement, attitudes to and appraisals of the natural environment, urbanization, and transport and industrialization from the beginning of settlement in 1914.

55
Southeast Asia (Dr. R. E. Barnard) The geography of development in Southeast Asia, particularly Malaysia and Indonesia, changes in agriculture, manufacturing, marketing and distribution, and their social and economic impact.

353200 Geography IIIB - Physical Geography

Prerequisite
Geography IIIB

Hours
Five hours of lectures/practicals/tutorials, and one hour of Methods* per week; up to six days of fieldwork. (Note: Students also enrolled in Geography IIIA must count Methods in IIIA only, and count the alternative strand, Environmental Issues in Australia* in IIIB only.)

Examination
To be advised

Content
A continuation of the study of man's physical environment. In 1983 themes will be established around the following specific fields of interest.

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 macro-scale 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
Kellman, M. C. *Plants geography*, (Methuen paperback, 2nd edn. 1980)
Leopold, A. & *A sand country almanac, with other essays on conservation from Round River* (Oxford paperback, 1966)
Mowat, F. *Never cry wolf* (Pan paperback, 1979)
Wiesner, C. J. *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, Dr W. J. Jonas, Mr G. N. McIntyre, and other members of staff).

This is a continuation of the Methods programme taken in Geography II. It includes the study of thematic maps and diagrams; introduction to probability distributions and sampling; multivariate methods; and computer mapping.

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 (Assoc. Pros. P. G. Irwin, D. N. Parkes).

This is a continuation of the strand which was commenced in Geography II. It includes (i) the study of settlements in remote areas; and (ii) the submission of a report on the study of an environmental issue in the Hunter Region.

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
See below under Coursework

Examination
To be advised

Content
I. Research
A thesis embodying the results of an original investigation on a topic approved by the Head of the Department of Geography.

II. Coursework - 4 hours per week, Terms I and II.
A. Knowing the world - an explanation component.
B. Seminars on Big Issues
C. Seminars on methodological problems
D. Work experience inputs from other-than-academic area

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 1983, 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

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 IIIB, IIIA 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 the Department of Mathematics 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 his performance in the final examination, then the former will be taken into account in determining his final result. On the other hand, when a student's performance during the year has been worse than his performance in the final examination, then his performance during the year will be ignored in determining his 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 I Topics

Algebra (Topic AL) — W. Brisley
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
Brisley, W. A Basis for Linear Algebra (Wiley 1973)

References
Anton, H. Elementary Linear Algebra 2nd edn (Wiley 1977)
Kolman, B. Elementary Linear Algebra (Mcgraw-Hill 1975)
Liebeck, H. Linear Algebra (Holt 1963)
Lipschutz, S. Algebra for Scientists and Engineers (Wiley 1971)

Real Analysis (Topic AN) — J. G. Couper
Prerequisites Nil
Hours 1 lecture hour and ½ tutorial hour per week
Content Real Numbers. Sequences and series. Functions of one real variable, continuity, differentiability, integrability. Power series, Taylor Series.

Text

References

Calculus Vol. 1 2nd edn (Blaisdell 1967)
Calculus (Benjamin 1967)

Calculus (Topic CA) — G. W. Southern
Prerequisites Nil
Hours 1 lecture hour and ½ tutorial hour per week
Content

Part

Statistics and Computing (Topic SC) — D. L. S. McElwain
Prerequisites Nil
Hours 1 lecture hour and ½ tutorial hour per week
Content


Text
University of Newcastle Statistical Tables

References

A Programmed Text in Statistics Vols. 1, 2, 3 (Chapman & Hall 1975)
Introduction to Mathematical Statistics (Wiley 1971)
Elements of Statistical Inference (Allyn & Bacon 1981)
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- or corequisite for Mathematics IIC, and IIA and IIC together a prerequisite for any Part III subject, so students wishing to take two Part II subjects would normally choose Mathematics IIA and IIC.

Summaries and extended booklists for these topics will appear in the handbook of the Faculty of Mathematics and will also be available from the Department.

When selecting topics for Part II subjects, students are advised to consider the prerequisites needed for the various Part III subjects offered by the Department of Mathematics (Mathematics IIA, Mathematics IIB and Statistics III).

LIST OF MATHEMATICS PART II TOPICS

<table>
<thead>
<tr>
<th>Topic</th>
<th>Corequisite or Prerequisite Topic</th>
<th>Part III Topic</th>
<th>Part II Topic</th>
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<tbody>
<tr>
<td>A</td>
<td>Mathematical Models</td>
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<tr>
<td>B</td>
<td>Complex Analysis</td>
<td>CO</td>
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<tr>
<td>CO</td>
<td>Vector Calculus &amp; Differential Equations (Double topic)</td>
<td>CO</td>
<td>M, N, P, PD, Q, QRS,</td>
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<td>D</td>
<td>Linear Algebra</td>
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<td>TC, Y, Z</td>
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<tr>
<td>E</td>
<td>Topic in Applied Mathematics</td>
<td>CO</td>
<td>P, T, X, Z</td>
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<tr>
<td>F</td>
<td>Numerical Analysis &amp; Computing</td>
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<td>H</td>
<td>Probability &amp; Statistics</td>
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<td>I</td>
<td>Applied Probability</td>
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<td>K</td>
<td>Topic in Pure Mathematics</td>
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<tr>
<td>L</td>
<td>Analysis of Metric Spaces</td>
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<tr>
<td>ML</td>
<td>Introduction to Computer Architecture and Assembly Language</td>
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<tr>
<td>SI</td>
<td>Introduction to Structuring of Information</td>
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<tr>
<td>SP</td>
<td>Systemic Programming</td>
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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 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. 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**: Topics SI — Introduction to Structuring of Information, SP — Systemic Programming, ML — Introduction to Computer Architecture and Assembly Language, F — Numerical Analysis and Computing

Notes

1. Mathematics IIB is no longer offered in two parts in the Faculty of Science. Students who passed Mathematics IIB part (i) before 1971 should consult Note 1 on page 90 of the 1971 handbook.
2. Mathematics IIA is a corequisite or prerequisite for Mathematics IIB.
3. Students whose course includes Physics IIIA 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.

Texts for Part II Topics

For further details see Faculty of Mathematics Handbook.

662101 Topic A — Mathematical Models

Nil
The Mathematics Department offers two Part III Mathematics subjects, each comprising four topics chosen from the list below and the subject Statistics III. Passes in both Mathematics II A and II C are prerequisite for entry to Mathematics III A. It will be assumed that students taking a Part III subject in 1982 have already studied topics CO, D, K and L in 1978 to 1981 (or C, D, E, K, and L if done prior to 1978) in their Part II subjects. Students wishing to enrol in Mathematics III should avoid taking topics R, U, and Y as Mathematics II 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>
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<tr>
<th>Topic</th>
<th>Prerequisites</th>
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<td>FM</td>
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Some topics will be offered only in alternate years. Students should consult the Departments for the current status.
The selection rules and definitions of the Part III subjects follow.

663100 Mathematics IIIA

**Prerequisites**
Mathematics IIA & IIC

**Hours**
4 lecture hours and 2 tutorial hours per week

**Examination**
Each topic is examined separately

**Content**
A subject comprising Topic O, together with three other topics, at least one of which should be from the set (M, Q, QRS, ST, 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 IIA & IIC (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, ST and Y.

**Texts for Part III Topics**

663210 Topic FM — Foundations of Mathematics
Enderton, H. B. *Elements of Set Theory* (Academic 1977)

663134 Topic GT — Applied Graph Theory
Nil

663101 Topic M — General Tensors and Relativity
Nil

663102 Topic N — Variational Methods and Integral Equations
Nil

663103 Topic O — Mathematical Logic and Set Theory
Notes available from the Department of Mathematics.

663104 Topic P — Ordinary Differential Equations
Nil

663108 Topic PD — Partial Differential Equations
Nil

663211 Topic PL — Programming Languages and Systems
Nil

663105 Topic Q — Fluid Mechanics
Nil

663212 Topic QRS Quantum Relativistic & Statistical Mechanics
Nil

663106 Topic R — Theory of Statistics
Nil

663107 Topic S — Geometry
Nil

663141 Topic SS — Survey Sampling Methods
Barnett, V. *Elements of Sampling Theory* (E.U.P. 1974)

663201 Topic T — Group Theory

663209 Topic TC — Theory of Computing
Nil

663202 Topic U — Regression, Design and Analysis of Experiments
Nil

663203 Topic V — Measure Theory and Integration
Nil

663204 Topic W — Functional Analysis
Giles, J. R. *Analysis of Normed Linear Spaces* (University of Newcastle 1976)

663205 Topic X — Rings and Fields
Nil

663206 Topic Y — Theory of Probability
Nil
663207  Topic Z — Mathematical Principles of Numerical Analysis

Nil

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

Current experiments in the field of mammalian reproduction involve assessing the interactions between spermatozoa and ova during fertilization in mammals and also the induced fusion of human spermatozoa with rodent ova.

The differentiation of the cleaving mouse embryo is also being studied together with the interaction of the embryo with the uterus at the time of implantation.

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

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

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 isoantigens.

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 HI are being compared in chromatin from normal and malignant cells.

Investigation into infertility in humans resulting from auto- and isoimmunity to spermatozoa. The study of non-immunological spermagglutinins in human sera.

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

Preservation by freezing of human spermatozoa for artificial insemination.

Reproductive biology of fish.

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

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

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

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

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

Strategies of phosphorus acquisition by and distribution within eucalypt seedlings growing under conditions of phosphorus limitation.

In the area of chloroplast development and chloroplast DNA in plant cells, research is being carried out into the organization of chloroplast DNA in chloroplasts and chloroplast genetic interaction in protoplasts. Chloroplasts are being examined as possible vehicles for genetic change in plants.
DEPARTMENT OF CHEMISTRY

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 by (or from) soil components; metal-organic complex formation; metal-organic analysis; application to oenology.

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

Aliphatic, Aromatic and Heterocyclic Chemistry (Associate Professor L. A. Summers)
Synthesis, with particular reference to the preparation of new fungicides and plant growth regulators and studies of their mode of action; mass spectral fragmentation of organic molecules; electron transfer agents for the solar cell; applications to metal complexes, molecules adsorbed on oxide surfaces; catalytic interest, species at metal electrode surfaces, polymers, and chemistry of coal.

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

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

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

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 equilibrium in solvent extractions and kinetics of transport of inorganic ions in plants and plant tissue.

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

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

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

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

DEPARTMENT OF GEOLOGY

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

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

Igneous Petrology
Petrology of southwest Pacific island arc 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. O'fier)

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

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

Broadly, the research interests of the Department may be divided into two main areas — the physics of the surfaces of solids (surface physics) and the physics of the earth and near earth region (geophysics).

In addition, there are special interest topics of individual staff members. A brief description of these topics is set out below.

Surface Physics — Ion-surface Interaction (Professor J. J. M. 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.

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

The time of occurrence, velocity, propagation and direction of travel of geomagnetic waves in an ionospheric duct is being extensively investigated. The phenomenon is studied at the surface of the Earth as geomagnetic pulsations recorded at Newcastle, Woomera, Launceston, Perth, Macquarie Island and Auckland.

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

Digital techniques employing high speed multiple micro-computers have been developed to enable signal processing to be carried out in real time. The development of a new HF pulse transmitter, are being developed for a fully automated radar meteor detection system at a new field station established north of Newcastle, with communication to the campus by a radar relay link.

Geophysics — Fireball Studies (Associate Professor C. L. Keay)

Investigations of anomalous phenomena connected with the atmospheric entry of very large meteor fireballs is continuing with laboratory studies of some of the mechanisms involved, particularly low frequency electromagnetic production of acoustic waves.

Theoretical Solid State Physics (Dr. P. V. Smith)

Investigations in theoretical solid state physics include the study of the electronic properties of dilute substitutional and interstitial impurities in both simple and transition metal hosts. The energetics and diffusion of hydrogen impurities in nearly free electron and transition metal hosts are also being studied.

Internal Friction in Metals (Mr. J. E. Cleary)

A project being carried out in collaboration with the Department of Metallurgy and concerned with the development of electronic equipment for measuring frictional loss of samples vibrating at constant amplitude.

Electromagnetic Wave Propagation and Instrumentation (Dr. P. A. McGovern)

A study of electromagnetic wave propagation in non-uniform structures and transverse electromagnetic (TEM) cells using time-domain measurement techniques. Also analog I.C. techniques for simple solutions for some microwave instrumentation problems.

Medical Physics Related to Vision (Dr. D. J. O'Connor)

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

DEPARTMENT OF PSYCHOLOGY

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

Cognitive Processes

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

Cross-Cultural Research

Current research includes work on cognitive processes, the role of language in concept development, the cultural bases of concepts of intelligence and the development of values. Cultural groups studied are from Malaysia, the People's Republic of China and migrant groups in the Newcastle area.

Developmental Psychology

The efficacy of various types of experiences throughout the lifespan on patterns of human development and change.

Social Development

A programme of research is being carried out on developmental aspects of children's friendship patterns. In the programme the development of social skills, the social learning of isolated children and group interaction are being studied.

Perception and Performance

The Perception and Performance Laboratory is currently conducting research in the areas of image processing, filtering, associative memory, models for reaction time and motion perception. New techniques for computer-assisted diagnosis of information processing abilities are being investigated.

Transpersonal Psychology

The investigation of conscious experience including the study of meditations, fantasy and daydreams, and dreams.

Infant Perception

Research is currently examining various perceptual and attentional abilities of 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. 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
Microclimatology in vineyards (G. N. McIntyre)
Air pollution on a meso and micro scale; solar radiation; climatic change (H. A. Bridge)

Development Geography
Impact of a High Yielding Varieties Package on a Malay rice producing community, Kedah, Malaysia (R. E. Bridgman)

Development issues in Sri Lanka (M. R. Hall) spatial and economic aspects of the timber industry in the Hunter Valley; problems and issues in inner-city land use (W. J. A. Jonas).

DEPARTMENT OF MATHEMATICS

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

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 system. He is interested in the mathematical modelling of all functions of the human body.

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.

Dr W. Summerfield 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.

Associate Professor A. J. Guttmann is interested in methods of function approximation, particularly from the viewpoint of using a differential equation representation. He is also interested in the analysis of theoretical and experimental data.

Dr W. Summefield 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. Couper is working on stable and generic properties of flows and diffeomorphisms.

Dr R. W. Gibberd is investigating problems of families of sets.

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 W. D. Wallis 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, estuarian-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.

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

Mr Berghout is working on Greek algebra.

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 R. D. L. 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**

Dr A. J. Dobson and Dr 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 Dr A. J. Dobson are studying measures of agreement between judges.

**Statistical Mechanics**

Associate Professor C. A. Croston 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.

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**Subject Computer Numbers for the B.Sc. Degree Course**

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

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