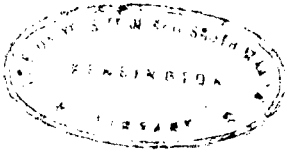
FACULTY OF BIOLOGICAL SCIENCES AND FACULTY OF SCIENCE

COMBINED 1969 HANDBOOK

THE UNIVERSITY OF NEW SOUTH WALES

50 CENTS



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FACULTY OF BIOLOGICAL SCIENCES AND FACULTY OF SCIENCE

1969 HANDBOOK

FIFTY CENTS

THE UNIVERSITY OF NEW SOUTH WALES
P.O. Box 1, Kensington, N.S.W., 2033
Phone: 663 0351

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TABLE OF CONTENTS

INTRODUCTION

During 1968, the Science Faculty was divided to form a separate Faculty of Biological Sciences in addition to a Faculty of Science. The new Faculty of Science incorporates the Schools of Applied Physics and Optometry, Chemistry, Mathematics and Physics, while the Faculty of Biological Sciences incorporates the Schools of Applied Psychology, Biochemistry, Biological Technology, Botany, Microbiology and Zoology. Despite this administrative reorganization, the existing Science Course leading to a Bachelor of Science degree will continue to operate, and students may select subjects offered by either Faculty in accordance with the Science Course regulations which are listed in this handbook.

The subjects offered by the various Schools, together with the prescribed textbooks are listed under the appropriate school. Description of the subjects offered by the Faculty of Science and the School of Applied Psychology may be found in the University Calendar. Syllabuses for the remaining subjects offered by the Faculty of Biological Sciences are included in this handbook.

Students should note that there has been a change in the presentation of subjects within the Science course. Whole-subjects will be replaced by units and the minimum total of units required for graduation will be 23, in place of the previous nine Science subjects.

Units appropriate to the 1st, 2nd and 3rd years of a subject will be designated Level I, Level II and Level III respectively. *However, in 1969 only Level II Units will operate,* and the Group I and Group III Science subjects will continue to be offered as whole-subjects.

A Level II whole-subject taken for a full year involves a maximum of 270 hours of instruction per year plus proportional assignment and private study time. Such a subject, which in most cases consists of three parts (Unit A, Unit B and Unit C), shall be assigned a value of three units so that each Level II unit comprises a maximum of 90 hours of instruction per year. Each Level II unit will be offered, subject to timetabling, generally at the rate of six hours per week for 15 weeks or three hours per week for 30 weeks.

In the previously existing whole-subject scheme, three full second year subjects, each involving up to 9 hours of instruction per week required a total of 27 hours per week or the equivalent of 9 Level II units. This represented a heavy load because it is generally agreed that 24 hours per week is a desirable maximum load.

Under the new scheme in the Science Course, cognizance has been taken of this fact, and it now becomes possible for a student to complete eight Level II units in his second year rather than the former requirement of three whole-subjects.

A word of warning! It should be remembered that most Group III subjects (or units) require pre-requisites and co-requisites and that by indiscriminately dropping one Level II unit, a student may render himself ineligible to major in the subject of

his choice. *It is therefore advised that students should follow recommended course patterns or consult the School Student Adviser if any deviation from the normal whole-subject structure is contemplated.*

For example, consider the case of a student taking Level II, units A, B and C of chemistry during 1969. He would, in effect, be completing a whole subject, or Chemistry II as it had been presented during 1968. It is recommended that a student should take all three units of Chemistry II if he intends to major in chemistry. With respect to the Biological Sciences subjects, it is *not* intended that Group II subjects be offered as whole-subjects, but that students may take a variety of course patterns made up of different units. However, each student should satisfy himself that whatever his particular choice of units might be, his progress in the Science course is not impaired by this choice. Advice may be obtained from the Education Officer associated with the relevant Schools before or during enrolment. A list appears below.

School of Applied Physics and Optometry	Professor C. J. Milner
School of Applied Psychology	Mr. A. Olley
School of Biochemistry	Dr. P. Schofield
School of Biological Technology	Professor B. J. Ralph
School of Botany	Dr. A. Wood
School of Chemistry	Mr. W. J. Dunstan
School of Geography	Professor J. A. Mabbutt
School of Geology	Professor J. J. Frankel
School of Mathematics	Mr. D. Mackenzie
School of Microbiology	Mr. G. Barbour
School of Physics	Dr. R. Lishmund
School of Physiology	Dr. R. Holland
School of Zoology	Dr. E. Russell

CALENDAR OF DATES FOR 1969

Term 1 ..... March 3 to May 17
Term 2 ..... June 2 to August 9
Term 3 ..... September 1 to November 1

JANUARY—

Monday 20	Last day for acceptance of applications to enrol by new students and students repeating first year.
Monday 27	Australia Day—Public Holiday.
Tuesday 28 to Saturday Feb. 8	Deferred examinations.

FEBRUARY—

Monday 17	Enrolment Week commences for new students and students repeating first year.
Monday 24	Enrolment Week commences for students re-enrolling (second and later years).

MARCH—

Monday 3	First Term lectures commence.
Friday 14	Last day for enrolment of new students (late fee payable).
Friday 28	Last day for later year enrolments (late fee payable).

APRIL—

Friday 4 to Monday 7	Easter.
Friday 25	Anzac Day—Public Holiday.

MAY—

Saturday 17	First Term ends.

JUNE—

Monday 2	Second Term commences.
Monday 16	Queen's Birthday—Public Holiday.
Friday 27	Last day for acceptance of applications for re-admission after exclusion under rules governing re-enrolment.

JULY—

Tuesday 1 ..... Foundation Day.

Friday 18 ..... Last day for acceptance of corrected enrolment details forms.

AUGUST—

Saturday 9 ..... Second Term ends.

SEPTEMBER—

Monday 1 ..... Third Term commences.

OCTOBER—

Monday 6 ..... Eight-Hour Day—Public Holiday.

NOVEMBER—

Saturday 1 ..... Third Term lectures cease.

Saturday 8 to Saturday 29 ..... Annual Examinations (30-week courses).

1970

Term 1 ..... March 2 to May 16

Term 2 ..... June 1 to August 8

Term 3 ..... August 31 to October 31

JANUARY—

Tuesday 27 to Saturday Feb 7 .... Deferred examinations.

FEBRUARY—

Monday 16 ..... Enrolment Week commences for new students and students repeating first year.

Monday 23 ..... Enrolment Week commences for students re-enrolling (second and later years).

MARCH—

Monday 2 ..... First Term lectures commence.

FACULTY OF BIOLOGICAL SCIENCES

Dean—Professor B. J. F. Ralph

SCHOOL OF APPLIED PSYCHOLOGY

Professor of Applied Psychology and Head of School
A. G. Hammer, MA *Syd.*

Professor of Applied Psychology
S. H. Lovibond, BA *Melb.*, MA PhD DipSocSc *Adel.*

Associate Professor (Clinical Psychology)
R. T. Martin, BA DipPubAdmin *Syd.*, MBPsychoanalSoc

Executive Assistant to Head of School
A. K. Olley, BA *Syd.*

SCHOOL OF BIOCHEMISTRY

Professor of Biochemistry and Head of School
E. O. Thompson, MSc DipEd *Syd.*, PhD *Cantab.*, ARACI

SCHOOL OF BIOLOGICAL TECHNOLOGY

Professor of Biochemistry and Head of School
B. J. F. Ralph, BSc *Tas.*, *PhD* Liv., FRACI

Associate Professor F. J. Moss, MB BS *Melb.*

SCHOOL OF BOTANY

Professor of Botany and Head of School
H. N. Barber, MA ScD *Cantab.*, PhD *Lond.*, FRS, FAA

SCHOOL OF MICROBIOLOGY

Professor of Microbiology and Head of School
J. M. Vincent, DScAgr *Syd.*, DipBact *Lond.*, FAIAS

Professor of Medical Microbiology
G. N. Cooper, MSc PhD *Melb.*

Associate Professor of Bacteriology
A. D. Brown, MSc *Syd.*, PhD *Manc.*

SCHOOL OF ZOOLOGY

Professor of Zoology and Head of School
G. B. Sharman, BSc *Tas.*, DSc *W.Aust.*

Associate Professor A. K. O'Gower, MSc PhD *Syd.*

FACULTY OF SCIENCE

SCHOOL AND ADMINISTRATIVE OFFICERS

Dean—Professor D. P. Mellor

Dean's Representative—Associate Professor G. J. Sutton, MSc PhD *N.S.W.*, ASTC, FRIC, FRACI

Graduate Assistant to the Dean—Miss E. Ayre, BA *Syd.*

SCHOOL OF APPLIED PHYSICS AND OPTOMETRY

Professor of Applied Physics and Head of School
C. J. Milner, MA PhD *Cantab*, FInstP, FAIP

Associate Professor
J. Lederer, BSc *Syd.*, MSc *N.S.W.*, ASTC, FIO

SCHOOL OF CHEMISTRY

Professor of Organic Chemistry and Head of School
S. J. Angyal, PhD *Bud.*, DSc *N.S.W.*, FAA, FRACI

Personal Professor (Organic Chemistry) and Deputy Head of School
G. W. K. Cavill, MSc *Syd.*, PhD DSc *Liv.*, FRIC, FRACI

Professor of Analytical Chemistry
L. E. Smythe, MSc *Syd.*, PhD *Tas.*, FRACI

Professor of Inorganic Chemistry
D. P. Mellor, DSc *Tas.*, FRACI

Personal Professor (Inorganic Chemistry)
S. E. Livingstone, PhD DSc *N.S.W.*, FSTC, FRACI

Professor of Physical Chemistry
R. M. Golding, MSc *Auck.*, PhD *Cantab.*, FNZIC, AInstP

Associate Professor and Head, Applied Organic Chemistry
E. R. Cole, MSc *Syd.*, PhD *N.S.W.*, FRACI

Head, Nuclear and Radiation Chemistry
D. J. Carswell, MSc PhD DipEd *Syd.*, FRACI

Associate Professors
R. A. Eade, MSc *Syd.*, PhD *Liv.*, FRACI
J. L. Garnett, MSc *N.S.W.*, PhD *Chic.*, ASTC, ARACI
D. P. Graddon, MSc PhD *Manc.*, FRIC
C. M. Harris, BSc PhD *N.S.W.*, ASTC, ARACI
R. J. L. Martin, MSc *Melb.*, PhD *Lond.*

J. J. Simes, MSc DipEd *Syd.*, PhD *Liv.*, FRACI
N. C. Stephenson, MSc *Syd.*, PhD *N.S.W.*, ARACI
G. J. Sutton, MSc PhD *N.S.W.*, ASTC FRIC FRACI

Director of First Year Studies
June C. Griffith, MSc *N.S.W.*, PhD *Syd.*

Executive Assistant to Head of School
W. J. Dunstan, MSc *Syd.*, ARACI

Graduate Assistant
Mrs. N. Merry, BA *Syd.*

SCHOOL OF MATHEMATICS

Professor of Applied Mathematics and Head of School
V. T. Buchwald, BSc *Manc.*, MSc PhD *Lond.*

Professor of Applied Mathematics
J. M. Blatt, BA *Cinc.*, PhD *Corn.* and *Prin.*, FAA, FAPS

Professor of Pure Mathematics
G. Szekeres, DiplChemEng *Bud.*, FAA

Professor of Pure Mathematics
G. M. Kelly, BSc *Syd.*, BA PhD *Cantab.*

Associate Professor of Mathematical Statistics
J. B. Douglas, MA BSc DipEd *Melb.*

Director of First Year Studies
Associate Professor A. H. Low, MSc DipEd *Syd.*, PhD *N.S.W.*

SCHOOL OF PHYSICS

Professor of Physics and Head of School
E. P. George, BSc PhD *Lond.*, DSc *N.S.W.*, FInstP

Associate Professors (Physics)
D. Haneman, MSc *Syd.*, PhD *R'dg.*, MSocSigmaXi(U.S.A.), Grad InstP, GradAIP
J. C. Kelly, BSc *Syd.*, PhD *R'dg.*, GradInstP, AAIP
J. F. McConnell, MSc *Syd.*, PhD *N.S.W.*, AInstP, AAIP

Executive Assistant to Head of School
R. E. Lishmund, BSc PhD *St. And.*, AInstP, AAIP

GENERAL INFORMATION

ADMISSIONS OFFICE

The Admissions Office which is located in the Chancellory on the upper campus provides intending students (both local and overseas) with information regarding courses, admission requirements, scholarships and enrolment. Office hours are from 9.00 a.m. to 1.00 p.m. and 2.00 p.m. to 5.00 p.m. Monday to Friday and an evening service is provided during the enrolment period.

Applications for special admission, admission with advanced standing and from persons relying for admission on overseas qualifications should be lodged with the Admissions Office. The Office also receives applications from students who wish to transfer from one course to another, resume their studies after an absence of twelve months or more, or seek any concession in relation to a course in which they are enrolled. It is essential that the closing dates for lodgment of applications are adhered to, and, for further details the sections on "Rules Relating to Students" and "Enrolment Procedure for Undergraduate Courses" should be consulted.

Applications for admission to undergraduate courses from students who do not satisfy the requirements for admission (see section on "Requirements for Admission"), from students seeking admission with advanced standing, and from students who have had a record of failure at another university, are referred by the Admissions Office to the Admissions Committee of the Professorial Board.

Students seeking to register as higher degree candidates should discuss their proposals initially with the Head of the School in which they wish to register. An application is then lodged on a standard form and the Admissions Office, after obtaining a recommendation from the Head of the School, refers the application to the appropriate Faculty or Board of Studies Higher Degree Committee.

Details of the procedure to be followed by students seeking entry to first year courses at the University may be obtained from the Admissions Office or the Metropolitan Universities Admissions Centre.

Persons seeking entry to first year courses in one or more of the three Universities in the Sydney Metropolitan Area (Macquarie University, The University of New South Wales and the University of Sydney) are required to lodge a single application form with the Metropolitan Universities Admissions Centre, First Floor, Crystal Palace Arcade, 590 George Street (near Town Hall), Sydney (P.O. Box 7049, G.P.O., Sydney, 2001). On the application form, provision is made for applicants to indicate preferences for courses available in any of the three Universities. Students are notified individually of the result of their applications and provided with information regarding the procedures to be followed in order to accept the offer of a place at this University and complete their enrolment at the Enrolment Bureau, Unisearch House, 221 Anzac Parade, Kensington.

REQUIREMENTS FOR ADMISSION

A person who seeks to become a candidate for any degree of Bachelor of the University must first have qualified for matriculation and have satisfied the requirements for admission to the particular Faculty, Course or Subject chosen.

It should be noted that compliance with these conditions does not in itself entitle a candidate to enter upon a course. While it is the policy of the University to endeavour to admit all properly qualified applicants who have lodged applications by the appropriate closing date, it may be necessary at times to restrict the entry to one or more faculties because of lack of facilities.

A candidate who has satisfied the conditions for matriculation and for admission to a course of study shall be classed as a "matriculated student" of the University, after enrolment.

A person who has satisfactorily met the conditions for admission may be provided with a statement to that effect on the payment of the prescribed fee.

SECTION A
GENERAL MATRICULATION AND ADMISSION REQUIREMENTS

(for entry to the University in 1969 and until further notice)

1. A candidate may qualify for matriculation by attaining in recognised matriculation subjects at one New South Wales Higher School Certificate Examination or at one University of Sydney Matriculation Examination a level of performance determined by the Professorial Board from time to time.

2. The level of performance required to qualify for matriculation shall be
   (a) passes in at least five recognised matriculation subjects, one of which shall be English and three of which shall be at Level 2 or higher;
   and
   (b) the attainment of an aggregate of marks, as specified by the Professorial Board, in not more than five recognized matriculation subjects, such marks being co-ordinated in a manner approved by the Board.
3. The following subjects, and such other subjects as may be approved by the Professorial Board from time to time, shall be recognized matriculation subjects:—

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

4. A candidate who has qualified to matriculate in accordance with the provisions of Clauses 1, 2 and 3 may be admitted to a particular Faculty, Course or Subject provided that:—
   (a) his qualification includes a pass at the level indicated in the subject or subjects specified in Schedule A as Faculty, Course or Subject Pre-requisites;
   or
   (b) the requirements regarding these particular Faculty, Course or Subject Pre-requisites, as specified in Schedule A, have been met at a separate Higher School Certificate or University of Sydney Matriculation Examination.
5. Notwithstanding any of the provisions of Clauses 1 to 4, the Professorial Board may grant matriculation status to any candidate at the Higher School Certificate or University of Sydney Matriculation Examination who has reached an acceptable standard and may admit him to any Faculty, Course or Subject.

NOTE

1. For the purposes of clause 2 (a), Mathematics and Science BOTH PASSED at First Level or Second Level Full Course shall together count as three subjects.
2. For the purposes of clause 2 (b), Mathematics and Science TAKEN either singly or together at First Level or Second Level Full Course shall each count as one and one half subjects.

SCHEDULE A

FACULTY OR COURSE	FACULTY OR COURSE PRE-REQUISITES
Applied Science (excl. Wool Technology course) Biological Sciences Engineering Industrial Arts Course Medicine Military Studies (Engineering course and Applied Science course) Science	(a) Science at Level 2S or higher AND (b) either Mathematics at Level 2F or higher OR Mathematics at Level 2S, provided that the candidate's performance in this subject and his general level of attainment are at standards acceptable to the Professorial Board.
Architecture Wool Technology Course (Faculty of Applied Science) Sheep and Wool Technology (Education option) course	(a) Science at Level 2S or higher AND (b) Mathematics at Level 2S or higher
Arts Military Studies (Arts course) Social Work Degree Course	English at Level 2 or higher
Commerce	(a) Mathematics at Level 2S or higher AND (b) either English at Level 2 or higher OR English at Level 3, provided that the candidate's performance in this subject and his general level of attainment are at standards acceptable to the Professorial Board.

SUBJECT	SUBJECT PRE-REQUISITES
1.011—Higher Physics I 1.001—Physics I 1.041—Physics IC	As for Faculty of Science
2.011—Higher Chemistry I 2.001—Chemistry I 17.001—General and Human Biology 25.001—Geology I	Science at Level 2S or higher
10.011—Higher Mathematics I	Mathematics at Level 2F or higher
10.001—Mathematics I	Either Mathematics at Level 2F or higher OR Mathematics at Level 2S, provided that the candidate's performance in the subject and his general level of attainment are at standards acceptable to the Professorial Board.
10.021—Mathematics IT	Mathematics at Level 2S or higher
15.102—Economics II	As for Faculty of Commerce
50.111—English I 51.111—History I	English at Level 2 or higher
56.111—French I	French at Level 2 or higher
59.111—Russian I	Russian at Level 2 or higher
64.111—German I	German at Level 2 or higher
65.111—Spanish I	Spanish at Level 2 or higher
59.001—Russian IZ 64.001—German IZ 65.001—Spanish IZ	A foreign language, other than that in which enrolment is sought, at Level 2 or higher

SECTION B

SUPPLEMENTARY PROVISIONS FOR MATRICULATION

1. Notwithstanding the provisions of Section A above, candidates may be accepted as "matriculated students" of the University under the following conditions subject to the approval of the Professorial Board:—

   (a) Any person who holds a diploma from the New South Wales Department of Technical Education, or any other Technical College which may from time to time be recognised by the University, may be admitted to the University as a "matriculated student" with such status as the Board may determine, provided that, in the opinion of the Board, the applicant's qualifications are sufficient for matriculation to the Faculty nominated.

   (b) The Board may admit as a "matriculated student" in any Faculty with such status as the Board may determine in the circumstances:

      (i) A graduate of any approved University.

      (ii) An applicant who presents a certificate from a University showing that he has a satisfactory record and is qualified for entrance to that University, provided that in the opinion of the Board there is an acceptable correspondence between the qualifying conditions relied upon by the applicant and conditions laid down for matriculation to the nominated Faculty of the University of New South Wales.

   (c) (i) Any person who has completed the first year of the course at the Royal Military College of Australia and submits a certificate from the Commandant to that effect may be admitted as a "matriculated student" of the University.

      (ii) Any person who has completed a full course of at least three years' prescribed study at the Royal Military College of Australia and produces a certificate from the Commandant to that effect may be admitted as a "matriculated student" of the University with such status as the Board may determine.

   (d) Any person who has completed satisfactorily the passing out examination of the Royal Australian Naval College and submits a certificate from the Commanding Officer may be admitted as a "matriculated student" of the University.

(e) (i) Any person who has completed the first year of the course at the Royal Australian Air Force College and submits a certificate from the Commandant to that effect, may be admitted as a "matriculated student" of the University.

(ii) Any person who has completed two years of the course at the Royal Australian Air Force College and submits a certificate from the Commandant to that effect, may be admitted as a "matriculated student" of the University with such status as the Board may determine.

(f) An applicant who presents a certificate from another University showing that he is qualified for entrance to that University and setting out the grounds of such qualification, provided that in the opinion of the Professorial Board, there is an acceptable correspondence between the qualifying conditions relied upon by the applicant and the conditions laid down for matriculation to the nominated Faculty of the University of New South Wales.

2. (a) The Professorial Board may in special cases, including cases concerning persons of other than Australian education, declare any person qualified to enter a Faculty as a "provisionally matriculated student" although he has not complied with the requirements set out above, and in so doing may prescribe the completion of certain requirements before confirming the person's standing as a "matriculated student". Students who satisfactorily complete these requirements will be permitted to count the courses so passed as qualifying for degree purposes.*

(b) Persons over the age of twenty-five years may be admitted to provisional matriculation status provided that:—

(i) they have satisfactorily completed an approved course of systematic study extending over at least three years after passing the School Certificate Examination, or

(ii) they satisfy the Professorial Board that they have reached a standard of education sufficient to enable them profitably to pursue the first year of the proposed course.

(c) Any applicant for provisional status may be required to take such examination as the Professorial Board may prescribe before such status is granted.

*The Professorial Board has determined that normally confirmation of standing as a "matriculated student" will require the successful completion of not less than half the normal programme in the first year of enrolment.

3. The Professorial Board may, at its discretion, permit a person, who does not satisfy the requirements for admission, to attend lectures in a subject or subjects at the University, on payment of the prescribed fees provided that such person shall not necessarily have the privileges of "matriculated students" and shall not be eligible to proceed to a degree.

ENROLMENT PROCEDURE FOR UNDERGRADUATE COURSES

It is the policy of the University to endeavour to admit all properly qualified applicants who have lodged applications by the appropriate closing date. In 1969, however, facilities available to the University will make it necessary to impose quotas in the faculties of Architecture, Arts, Commerce and Medicine.

The enrolment procedure for the different classes of undergraduate students is as follows:

First Enrolments

Students with Overseas Entry Qualifications

Overseas students and Australian Residents relying for admission on overseas qualifications must lodge an application for enrolment prior to 1st October of the year preceding that in which admission is sought.

Local and Interstate Residents

(a) Australian Residents including students transferring from one course to another or from another University who have undertaken qualifying examinations in 1968 must lodge an application for enrolment by 20th January, 1969.

(b) Australian Residents already qualified for admission and students wishing to resume University studies must apply for enrolment by 30th November, 1968.

First Year Repeat Students

First year students who fail all subjects at the annual examinations and who are not granted any deferred examinations must apply for re-enrolment to the Admissions Office by 20th January, 1969.

Application forms for enrolment and details of the application procedures may be obtained on application to the Registrar, P.O. Box 1, Kensington, 2033.

Students in the above categories whose applications for enrolment are accepted will be required to complete their enrolment at a specified appointment time before the start of first term. Fees

must be paid on the day of the appointment. However, in special circumstances and provided class places are still available, students may be allowed to complete their enrolment after the prescribed week subject to the payment of a late fee.

Later Year Enrolments—All students enrolling other than for the first time and not included above should do so through the appropriate school. Full-time students, other than those in the Science course, must attend at the time and place during Enrolmen Week as set out in the booklet published each year, "Enrolment Procedure for Students Re-enrolling". Enrolment forms for these students will be prepared and available at the enrolment centre.

All full-time and part-time students in the Applied Chemistry course are required to complete an enrolment form in the last fortnight of third term. The forms may be obtained from the office of the School of Chemistry (Mr. A. Funnell). An appointment will then be made to complete enrolment in accordance with the special arrangements made by the school. These arrangements are published in the booklet, "Enrolment Procedure for Later Year Students".

A late fee of $6 will be incurred by students failing to enrol during Enrolment Week.

Miscellaneous Subject Enrolments—Students may be permitted to enrol for miscellaneous subjects (i.e., as students not proceeding to a degree or diploma) provided the Head of the School offering the subject considers it will be of benefit to the student and there is accommodation available. Under no circumstances will subjects taken in this way count towards a degree or diploma.

Students who have completed the final examinations but have a thesis still outstanding are required to enrol for the period necessary to complete the thesis and to pay the requisite fees.

Course details must be completed during the prescribed Enrolment Week. For details of fee requirements, including late fee provisions, see under Fees.

Final Dates for Completion of Enrolment—No enrolments will be accepted from *new students* after the end of the second week of term (14th March, 1969) except with the express approval of the Registrar and the Head of the School concerned; no *later year enrolments* will be accepted after 31st March without the express approval of the Registrar which will be given in exceptional circumstances only.

UNIVERSITY UNION CARD

All students other than miscellaneous students are issued with a University Union membership card. This card must be carried during attendance at the University and shown on request.

The number appearing on the front of the card in the space at the top right-hand corner is the student registration number used in the University's records. This number should be quoted in all correspondence.

The card must be presented when borrowing from the University libraries, when applying for travel concessions and when notifying a change of address. It must also be presented when paying fees on re-enrolment each year when it will be made valid for the year and returned. Failure to present the card could result in some inconvenience in completing re-enrolment.

A student who loses a Union card must notify the University Union as soon as possible.

New students will be issued with University Union cards by mail to their term address as soon as possible after fee payment. In the meantime, the fees receipt form should be carried during attendance at the University and shown on request. If the Union card is not received within three weeks of fee payment the University Union should be notified.

FEES*

Fees for Undergraduate Courses

Where course fees are assessed on the basis of term hours of attendance the hours for each subject for purposes of fee assessment shall be those prescribed in the Calendar, irrespective of any variation from the prescribed hours which may be necessary in conducting the subject.

For the purpose of fee determination for courses in the Faculty of Science assessment is on a term basis. A full-time course fee will be charged for any term where more than 15 hours' per week instruction, etc., is involved.

(i) Full-time Course Fee (more than 15 hours' attendance per week)—$110 per term.

(ii) Part-time Course Fee (over 6 hours' and up to 15 hours' attendance per week)—$55 per term.

(iii) Part-time Course Fee (6 hours' or less attendance per week)—$28 per term.

(iv) Course Continuation Fee—A fee of $23 per annum (no term payment) is payable by:—

Category (a) Students who have once been enrolled for a thesis and have only that requirement outstanding; OR

Category (b) Students given special permission to take annual examinations without attendance at the University. (Students in this category are not required to pay the subscriptions to the University Union, the Students' Union, the Sports Association and the Library Fee.)

Miscellaneous Subjects

Undergraduate subjects taken as "miscellaneous subjects" (i.e., not for a degree or diploma) or to qualify for registration as a candidate for a higher degree are assessed on an hourly basis in accordance with the schedule above.

*** Fees quoted are current at time of publication and may be altered by Council without notice.**

Students given approval to enrol in a miscellaneous subject or subjects in addition to being enrolled in a course are assessed according to the total hours of attendance as if the additional subject(s) formed part of the course.

Other Fees

In addition to the course fees set out above all registered undergraduates will be required to pay—

Matriculation Fee—$7—payable at the beginning of first year.

Library Fee—annual fee—$12.

University Union*—entrance fee—$20.

Student Activities Fees

University Union*—$12—annual subscription.

Sports Association*—$2—annual subscription.

Students' Union*—$5—annual subscription.

Miscellaneous—$10—annual fee.

Total—$29.

Graduation or Diploma Fee—$7—payable at the completion of the course.

Depending on the course being taken, students may also be required to pay—

Applied Psychology Kit Hiring Charge—$2 per kit. Additional payment for breakages and losses in excess of $1.

Biochemistry Kit Hiring Charge—$4 per kit. Additional charge for breakages and losses in excess of $1 may be required.

Chemistry Kit Hiring Charge—$4 per kit. Additional charge for breakages and losses in excess of $1 may be required.

Excursion Fee—$2 per subject (botany, zoology, entomology).†

Special Examination Fees

Deferred examination—$5 for each subject.

Examinations conducted under special circumstances—$7 for each subject.

Review of examination result—$7 for each subject.

* Life members of these bodies are exempt from the appropriate fee or fees.

† Students in the original Applied Biology degree course pay an excursion fee of $1 per subject for botany, zoology and entomology.

Late Fees

First Enrolments

Fees paid on the late enrolment session and before the commencement of term	$6
Fees paid during the first and second weeks of term	$12
Fees paid after the commencement of the third week of term with the express approval of the Registrar and Head of the School concerned	$23

Re-Enrolments

First Term

Failure to attend enrolment centre during enrolment week	$6
Fees paid after the commencement of the third week of term to 31st March	$12
Fees paid after 31st March where accepted with the express approval of the Registrar	$23

Second and Third Terms

Fees paid in third and fourth weeks of term	$12
Fees paid thereafter	$23
Late lodgement of corrected enrolment details forms (late applications will be accepted for three weeks only after the prescribed dates)	$5

Withdrawal from Course

Students withdrawing from a course are required to notify the Registrar in writing. Fees for the course accrue until a written notification is received.

Where notice of withdrawal from a course is received by the Registrar before the first day of First Term a refund of all fees paid other than the matriculation fee will be made.

Where a student terminates for acceptable reasons a course of study before half a term has elapsed, one half of the term's fee may be refunded. Where a student terminates a course of study after half a term has elapsed, no refund may be made in respect of that term's fees.

The Library fee is an annual fee and is not refundable where notice of withdrawal is given after the commencement of First Term.

On notice of withdrawal a partial refund of the Student Activities Fees is made on the following basis:

University Union—$2 in respect of each half term.

University of New South Wales Students' Union—where notice is given prior to the end of the fifth week of first term $2, thereafter no refund.

University of New South Wales Sports Association—where notice is given prior to 30th April a full refund is made, thereafter no refund.

Miscellaneous—where notice is given prior to 30th April $5, thereafter no refund.

PAYMENT OF FEES

Completion of Enrolment

All students are required to attend the appropriate enrolment centre during the prescribed enrolment period* for authorisation of course programme. Failure to do so will incur a late fee of $6.

First year students (including students repeating first year) must complete enrolment (including fee payment) before they are issued with class timetables or permitted to attend classes. A first year student who has been offered a place in a course to which entry is restricted and fails to complete enrolment (including fee payment) at the appointed time may lose the place allocated.

Fees should be paid during the prescribed enrolment period but will be accepted during the first two weeks of First Term. (For late fees see below.) No student is regarded as having completed an enrolment until fees have been paid. Fees will not be accepted (i.e., enrolment cannot be completed) from new students after the end of the second week of term (i.e., 14th March 1969), and after 31st March from students who are re-enrolling, except with the express approval of the Registrar, which will be given in exceptional circumstances only.

Payment of Fees by Term

Students who are unable to pay their fees by the year may pay by the term, in which case they are required to pay First Term course fees and other fees for the year, within the first two weeks

* The enrolment periods for Sydney students are prescribed annually in the leaflets "Enrolment Procedure for New Students" and "Enrolment Procedure for Students Re-enrolling".

of First Term. Students paying under this arrangement will receive accounts from the University for Second and Third Term fees. These fees must be paid within the first two weeks of each term.

Assisted Students

Scholarship holders or Sponsored Students who have not received an enrolment voucher or appropriate letter of authority from their sponsor at the time when they are enrolling should complete their enrolment paying their own fees. A refund of fees will be made when the enrolment voucher or letter of authority is subsequently lodged with the Cashier.

Extension of Time

Any student who is unable to pay fees by the due date may apply in writing to the Registrar for an extension of time. Such application must give year or stage, whether full-time or part-time, and the course in which the applicant wishes to enrol, state clearly and fully the reasons why payment cannot be made and the extension sought, and must be lodged before the date on which a late fee becomes payable. Normally the maximum extension of time for the payment of fees is until 31st March for fees due in First Term and for one month from the date on which a late fee becomes payable in Second and Third Terms.

Where an extension of time is granted to a First Year student in First Term, such student may only attend classes on the written authority of the Registrar, but such authority will not normally be given in relation to any course where enrolments are restricted.

Failure to Pay Fees

Any student who is indebted to the University and who fails to make a satisfactory settlement of his indebtedness upon receipt of due notice ceases to be entitled to membership and privileges of the University. Such a student is not permitted to register for a further term, to attend classes or examinations, or to be granted any official credentials.

No student is eligible to attend the annual examinations in any subject where any portion of his course fees for the year is outstanding after the end of the fourth week of Third Term (26th September, 1969).

In very special cases the Registrar may grant exemption from the disqualification referred to in the two preceding paragraphs upon receipt of a written statement setting out all relevant circumstances.

RULES RELATING TO STUDENTS

ATTENDANCE AT CLASSES

Where a student has attended less than eighty per cent of the possible classes, he may be refused permission to sit for the examination in that subject.

COURSE TRANSFERS AND CLAIMS FOR ADVANCED STANDING

Students wishing to transfer from one course to another (including transfer from full-time to part-time study or vice versa) must make application to the Admissions Office. Applications to transfer to courses where quotas apply will not be accepted after 20th January. The Admissions Office will give each applicant an acknowledgement of his application to transfer.

Having made application to the Admissions Office, students transferring are required to attend the School Enrolment Centre at the time set down for the year/stage of the new course in which they expect to enrol. They must present the letter granting approval of the transfer to the enrolling officer.

Students who have not received a letter granting approval to the transfer before the date on which they are required to enrol must present their acknowledgement to the enrolling officer who will decide whether to permit them to attend classes provisionally in the new course. Students who are permitted to attend classes provisionally should not pay fees until they have received their letter granting formal approval to transfer.

Students claiming advanced standing (exemptions from subjects) by reason of courses completed in other places should do so by applying to the Registrar on the appropriate form. Copies of the form may be obtained from the Admissions Office.

CHANGES IN COURSE PROGRAMMES AND WITHDRAWAL FROM SUBJECTS

Students seeking approval to substitute one subject for another or add one or more subjects to their programme must make

application to the Head of the School responsible for the course on a form available from School offices. In the case of students wishing to withdraw from subjects or terminate their enrolment the application must be lodged at the Examinations and Student Records Section. The Registrar will inform students of the decision. Approval of withdrawal from subjects is not automatic, each application being determined after considering the circumstances advanced as justifying withdrawal. It is emphasized that withdrawal from subjects after Term I or failure to sit for the examinations in any subjects for which the student has enrolled is regarded as failure to pass the subjects unless written approval to withdraw has been obtained from the Registrar.

RESUMPTION OF COURSES

Students wishing to resume their studies after an absence of twelve months or more are required to apply to the Admissions Office for permission to re-enrol by 20th January, 1969. Students re-enrolling in this way will normally be required to satisfy conditions pertaining to the course at the time of re-enrolment. This condition applies also to students who have been re-admitted to a course after exclusion under the rules restricting students re-enrolling.

ANNUAL EXAMINATIONS

The annual examinations take place in November-December for students in 30-week courses, and in September for students in 21- and 24-week courses. Timetables showing time and place at which individual examinations will be held are posted on the central notice boards. Misreading of the timetable is not an acceptable excuse for failure to attend an examination. Examination results are posted to the term addresses of students. No results will be given by telephone.

All students will receive an enrolment details form by 30th June. It is not necessary to return this form, unless any information recorded there is incorrect. Amended forms must be returned to the Examinations Branch by 19th July. Amendments notified after the closing date will not be accepted unless exceptional circumstances exist and approval is obtained from the Registrar. Where a late amendment is accepted, a late fee of $5 will be payable. Amended forms returned to the Registrar will be acknowledged in writing within fourteen days.

RESTRICTION UPON STUDENTS RE-ENROLLING

The University Council has adopted the following rules governing re-enrolment with the object of requiring students with a record of failure to show cause why they should be allowed to re-enrol and retain valuable class places. These rules will be applied retrospectively from January, 1962.

(i) As from 1st January, 1962, a student shall show cause why he should be allowed to repeat a subject in which he has failed more than once. (Failure in a deferred examination as well as in the annual examination counts, for the purpose of this regulation, as one failure.) Where such subject is prescribed as a part of the student's course he shall be required to show cause why he should be allowed to continue the course. A student in the medical course shall show cause why he should be allowed to repeat the second year of the course if he has failed more than once to qualify for entry to the third year.

(ii) Notwithstanding the provisions of clause (i), a student shall be required to show cause why he should be allowed to continue a course which he will not be able to complete in the time set down in the following schedule:—

Number of years in course	*Total time allowed from first enrolment to completion (years)*
3	5
4	6
5	8
6	9
7	11
8	12

*(iii) No full-time student shall, without showing cause, be permitted to continue a course unless all subjects of the first year of his course are completed by the end of his second year of attendance. No student in the Faculty of Arts shall, without showing cause, be permitted to continue a course unless he completes four subjects by the end of his second year of attendance.

No part-time student shall, without showing cause, be permitted to continue a course unless all subjects of the first two stages of his course are completed by the end of his fourth year of attendance and all subjects of the third and fourth stages of his course by the end of his seventh year of attendance.

No student in the Faculty of Medicine shall, without showing cause, be permitted to continue with the medical course unless he completes the second year of the course by the end of his third year of attendance, and the third year of the course by the end of his fourth year of attendance.

(iv) A student who has a record of failure in a course at another University shall be required to show cause why he should be admitted to this University. A student admitted to a course at this University following a record of failure at another University shall be required to show cause, notwithstanding any other provisions in these rules, why he should be permitted to continue in that course if he is unsuccessful in the annual examinations in his first year of attendance at this University.

(v) Any student excluded under any of the clauses (i)-(iii) may apply for re-admission after two academic years and such application shall be considered in the light of any evidence submitted by him.

(vi) A student wishing "to show cause" under these provisions shall do so in writing to the Registrar. Any such application shall be considered by the Professorial Board, which shall determine whether the cause shown is adequate to justify his being permitted to continue his course or re-enrol as the case may be.

(vii) The Vice-Chancellor may on the recommendation of the Professorial Board exclude from attendance in a course or courses any student who has been excluded from attendance in any other course under the rules governing re-enrolment and whose record at the University demonstrates, in the opinion of the Board and the Vice-Chancellor, the student's lack of fitness to pursue the course nominated.

(viii) A student who has failed, under the provisions of Clause (vi) of these rules, to show cause acceptable to the Professorial Board why he should be permitted to con-

* Rule (iii) in so far as it relates to students in the Faculty of Arts will apply retrospectively as from the 1st January, 1967, and in so far as it relates to students in the Faculty of Medicine, will apply to students enrolling for the first time in 1967 or thereafter.

tinue in his course, and who has subsequently been permitted to re-enrol in that course or to transfer to another course, shall also be required to show cause, notwithstanding any other provisions in these rules, why he should be permitted to continue in that course if he is unsuccessful in the annual examinations immediately following the first year of resumption or transfer of enrolment as the case may be.

(ix) A student may appeal to an Appeals Committee constituted by Council for this purpose, against his exclusion by the Professorial Board from any subject or course.

RE-ADMISSION AFTER EXCLUSION

Applications for re-admission must be made on the standard form and lodged with the Registrar not later than 30th June of the year prior to that for which re-admission is sought. An application should include evidence of appropriate study in the subjects (or equivalents) on account of which the applicant was excluded. In addition, evidence that the circumstances which were deemed to operate against satisfactory performance at the time of exclusion are no longer operative or are reduced in intensity, should be furnished. An applicant may be required to take the annual examinations in the relevant subjects as qualifying examinations in which case re-admission does not imply exemption from the subject.

It should be noted that a person under exclusion may not be enrolled in miscellaneous subjects unless he has received the approval of the Professorial Board.

Persons who intend applying for re-admission to the University at a future date may seek advice as to ways in which they may enhance their prospects of qualifying for re-admission. Enquiries should be made on a form obtainable from the Examinations Branch, and lodged with the Registrar.

STUDENT SERVICES

THE LIBRARY

The University library is on the upper campus and adjacent to the Chancellery and the Morven Brown and John Goodsell Buildings. The Bio-Medical Library is in the Biological Sciences Building with a branch at Prince Henry Hospital ('Phone: 661-0111). Library services are also available at Sydney Technical College, Wollongong University College and Broken Hill Division.

Each library provides a reference and lending service for staff and students, and is open in term during day and evening sessions.

Staff and students must register with the library or libraries from which they intend to borrow books.

THE UNIVERSITY UNION

The University Union is a common meeting ground for all students. Eating and general recreational facilities are available, as well as a shop for stationery and other student requisites, branches of several banks, a pharmacy, a branch of David Jones, and hairdressing facilities. Membership is compulsory for all registered students.

STUDENT ACCOMMODATION

Residential Colleges

Accommodation for students is provided within the complex of the Residential Colleges of the University which comprise Basser College, Phillip Goldstein Hall and Philip Baxter College. The College complex houses 500 men and women students, as well as staff members. Tutors in residence provide tutorial assistance in a wide range of subjects.

Board and residence fees, which are payable on a term basis, amount to $18.50 per week. Intending students should apply in writing to the Master, Box 24, Post Office, Kensington, N.S.W., 2033, from whom further information is available.

Other Accommodation

Students requiring other than Residential College accommodation may make application to the Student Amenities Service where current lists are kept of accommodation available at recognised boarding houses, private homes, and in serviced and unserviced apartments.

STUDENT COUNSELLING AND RESEARCH UNIT

Prospective students seeking advice or guidance regarding the selection and planning of courses (particularly in relation to a career), or advice regarding their suitability for a particular course, are invited to consult the University's Student Counselling and Research Unit. Appointments may be made by telephone (663-0351, extensions 2600 to 2605).

In addition to its counselling service, the Unit provides a variety of study skills programmes throughout the year, on a group or individual basis. Programmes offered in the past have included Reading Improvement, Study Methods, Written Expression, Note Taking, Studying Mathematics, Improving Listening, Preparing for Statistics.

STUDENT AMENITIES UNIT

This Unit is closely associated with the Sports Association and also handles applications for student concession fares and provides a service for students requiring other than College accommodation.

STUDENT EMPLOYMENT UNIT

Assistance is offered in finding full-time employment for evening students, and permanent employment after graduation. The Unit also administers the University's industrial training programme and is located in the Chancellery (Administration Building) located off High Street.

STUDENT HEALTH UNIT

A student health and first aid centre, staffed by a qualified medical practitioner and a nursing sister, is provided by the University. Students are encouraged to attend the centre for advice on all matters pertaining to their health.

SCHOLARSHIPS, BURSARIES AND CADETSHIPS

University Scholarships

The University annually awards up to fifteen scholarships tenable in degree courses to students who have matriculated at the Higher School Certificate Examination; ten scholarships to students who have completed certificate courses (Department of Technical Education); ten scholarships to students who have completed Trade Courses (Department of Technical Education); and ten scholarships to part-time students who have taken the Diploma Entrance course of the Department of Technical Education. The scholarships are tenable in any faculty and exempt the holder from payment of course fees during the currency of the scholarship. Scholarships will be awarded in order of merit on the Higher School Certificate Examination results. They may be held only by persons who do not hold another award. Applications must be lodged after publication of Higher School Certificate Examination results and after the announcement of the award of Commonwealth Scholarships, but not later than 31st January.

Commonwealth University Scholarships

There are three types of scholarships, which are available for both Pass and Honours courses: (a) Open Entrance Scholarships; (b) Later Year Scholarships; (c) Mature Age Scholarships. Benefits include payment of tuition fees, examination fees, matriculation fees, degree fees, and other compulsory fees. Full-time students may also apply for a living allowance, which is subject to a means test.

The closing date for applications for Commonwealth University Scholarships is 30th September of the year immediately preceding the year for which the scholarship is desired. Applications for renewal of scholarship must be made before 31st October each year. Further information, application forms and the Commonwealth Scholarship Handbook may be obtained from the Officer-in-Charge, Sydney Office, Department of Education and Science, La Salle Building, 70 Castlereagh Street, Sydney, 2000 (telephone 25-5447).

The John Heine Memorial Scholarship

Students qualified to enrol in the third year of the full-time Applied Chemistry Course or in the Applied Chemistry Conversion Course, and who are employees of a member of the Metal Trades Employers' Association are eligible to apply for the John Heine Memorial Scholarship.

The scholarship has a total value of $700.

Applications should be made not later than 31st January of each year to the Secretary, John Heine Memorial Foundation, c/- Metal Trades Employers' Association, 101 Walker Street, North Sydney, 2060.

Bursaries Awarded by the Bursary Endowment Board

A number of Bursaries tenable at the University are awarded to candidates of merit at the Higher School Certificate Examination whose family income falls within certain limits prescribed by the Bursary Endowment Board.

Applications should be made to the Secretary, Bursary Endowment Board, c/- Department of Education, Bridge St., Sydney.

Scholarships in Optometry

The Australian Optometrical Association, the Australian Optometrical Association (New South Wales Division), and Gibb & Beeman (Spectacle Makers) Pty. Ltd., offer annually one scholarship each to the value of $500 per annum. These scholarships are available to students who desire to enrol in the full-time degree course in Optometry leading to the degree of Bachelor of Optometry at the University of New South Wales.

Applicants must be residents of New South Wales. While scholarship holders are not under any bond or obligation, it is expected that they will practise optometry in Australia. Candidates must be under 21 years of age at the time of application.

Each scholarship will normally be tenable for the duration of the course but its tenure shall be at all times subject to the holder maintaining a standard of conduct and progress acceptable to the Professorial Board. The annual allowance of the scholarship is payable to the holder in three equal amounts at the commencement of each term of the University year.

These scholarships will be awarded on the understanding that applicants will normally hold a Commonwealth Scholarship which covers the cost of University fees. However, applicants who are

not holders of a Commonwealth Scholarship may also be considered.

Application for these scholarships, on forms obtainable from the Registrar, must be lodged with the Registrar after publication of examination results and the announcement of the award of Commonwealth Scholarships, but not later than 31st January each year.

Traineeships and Cadetships

Traineeships and cadetships are offered by the N.S.W. Public Service Board and by the Commonwealth Service.

These traineeships make it possible for selected employees of the Commonwealth or State Public Services to undertake full-time University study.

Students receive a salary during their years at the University and are required to undertake their industrial training with the department in which they are employed. Full details of cadetships and traineeships available at any one time may be had, in the case of the State authorities, from the N.S.W. Public Service Board, 19 O'Connell Street; and in the case of the Commonwealth authorities, from the Employment Officer, Commonwealth Public Service Inspector's Office, Commonwealth Centre, Chifley Square (cnr. Phillip and Hunter Streets) (telephone 28-5701).

Department of Railways Cadetships

The Department of Railways each year offers cadetships in Chemistry. Cadet chemists are enrolled in the appropriate part-time course leading to the degree of B.Sc. and are required to enter into a bond of $1000 to remain in the employ of the Department for five years after completion of the cadetship. Cadets have their course fees paid and receive a salary in accordance with the award rates.

The following salaries were in effect in September, 1968:—

1st Year	2nd Year	3rd Year	4th Year	5th Year
$1501	$1710	$1876	$2066	$3231

Upon reaching the age of 21, cadets receive a salary of $2236 per annum.

Vacancies for cadets are advertised between November and January and full details are given in a brochure available during this period from the Employment Personnel Officer, Department of Railways, 509 Pitt Street, Sydney.

Sponsored Students

Many private industrial and commercial organisations sponsor students in Science courses. The conditions under which students are sponsored vary from company to company, but in general the company meets all compulsory fees. Industrial training is generally undertaken with the sponsoring company.

Students are advised to consult the Admissions Office or the Student Counselling Unit at Kensington for further details concerning scholarships and cadetships and for information concerning companies sponsoring students.

FACULTY OF SCIENCE COURSES

The courses available within the Faculty of Science are of two types. The first is the Science Course, which allows a student to select sequences from a variety of the sciences. The regulations governing this course and the list of subjects available appear below. The course is of three years' duration for the degree of Bachelor of Science, with an additional year for Honours. The course may also be taken on a part-time basis, normally requiring a minimum of seven years' study, and leads to the degree of Bachelor of Science (Pass).

The second type of course offered by the Faculty consists of the more specialised courses in Applied Chemistry, Applied Physics and Optometry. The Applied Chemistry and Applied Physics courses lead to the degree of Bachelor of Science and the Optometry course to the degree of Bachelor of Optometry. The Applied Chemistry course may be completed in three years of full-time study or six years of part-time study; an additional full-time year (or two part-time years) is required for Honours. The Applied Physics course may be completed in four years' full-time study at either the pass or honours level. The Optometry course is a four-year full-time course.

Details of the three special courses mentioned above are given under the titles of the Schools which provide them.

GENERAL STUDIES COURSES

All undergraduates in faculties other than Arts are required to complete a number of general studies subjects. The general pattern and course outlines in the Faculty of Science are listed in the Department of General Studies Handbook which is available, free of cost, to all students.

HONOURS COURSES

In general, Honours degrees are awarded after one year of extra study for full-time students or two years for part-time students. The requirements of the School in which the student is

to take Honours are, broadly, that (i) he apply in writing to the Head of the School in which he anticipates working, during the final year in his pass course; and (ii) that he have a better than average record in his studies. He will be required to complete in a satisfactory manner such courses as the Head of the School prescribes and engage in a programme of original research under the supervision of a staff member.

More precise details are given under the sections dealing with the various schools. For students in the Science Course, details are given under the section entitled "Requirements for Honours in the Science Course".

POSTGRADUATE COURSES

On completion of a first degree course (B.Sc.) the student may wish to proceed to a higher degree. This usually entails two or three years' research under direction. A limited number of Scholarships are available at this and other Universities, and these are competitive.

The regulations governing higher degrees are to be found in the University Calendar. A candidate thinking of undertaking such a course should first discuss the matter with the Head of the School in which he wishes to study.

A course in Food and Drug Analysis is offered by the School of Chemistry on a part-time basis over two years and leads to a diploma (Dip.F.D.A.). The course is designed to provide systematic training at an advanced level for chemists who wish to extend their acquaintance with analytical techniques, and is thus suitable for those who wish to practise as public analysts.

FACULTY OF BIOLOGICAL SCIENCES

UNDERGRADUATE COURSES

Students may select sequences from a variety of the biological sciences as part of the Science Course, and details of these subjects are given below under the appropriate school headings. The regulations governing the Science Course may be found in the section dealing with the Faculty of Science.

In addition, the Faculty of Biological Sciences offers a course in Applied Psychology leading to the degree of Bachelor of Science, details of which are given under the section dealing with the School of Applied Psychology.

HONOURS COURSES

In general, Honours degrees are awarded after one year of extra study for full-time students or two years for part-time students. The requirements of the School in which the student is to take Honours are, broadly, that (i) he apply in writing to the Head of the School in which he anticipates working, during the final year in his pass course; and (ii) that he have a better than average record in his studies. He will be required to complete in a satisfactory manner such courses as the Head of the School prescribes and engage in a programme of original research under the supervision of a staff member.

More precise details are given under the sections dealing with the various schools.

POSTGRADUATE COURSES

On completion of a first degree course (B.Sc.) the student may wish to proceed to a higher degree. This usually entails two or three years' research under direction. A limited number of scholarships is available.

The regulations governing higher degrees are to be found in the University Calendar. A candidate thinking of undertaking such a course should first discuss the matter with the Head of the School in which he wishes to study.

Two courses at the postgraduate level, leading to the award of a Graduate Diploma, are also available. These are in Applied Psychology and Biochemical Engineering. The first leads to the Diploma in Psychology (Dip. Psych.), and is specifically designed to provide professional training at an advanced level for graduates with at least three years of undergraduate training in psychology. In particular, the course aims to train students in the application of psychological theory and techniques to vocational and educational guidance, to clinical practice and/or to psychological problems in industry. The course is offered in one year of full-time study or two years of part-time study.

The second postgraduate diploma course is offered by the School of Biological Technology, in conjunction with the School of Chemical Engineering, and leads to a Diploma of Biochemical Engineering (Dip. Biochem. Eng.). Problems in biochemical engineering are of increasing occurrence in a wide range of Australian industries and it is felt that this course will help to meet the need for trained personnel in this area. The course may be completed in one year of full-time study or two years of part-time study.

Further details of the content of these diploma courses may be found in Section D of the University Calendar.

THE SCIENCE COURSE

Various arrangements of this course are available to students wishing to specialise in subjects offered by the relevant Schools. No concurrent industrial experience is required.

All subjects are available for study during the day, and most during the evening sessions.

A pass degree may be awarded after three years' full-time study and an honours degree after four years' full-time study. The normal time for a course leading to a pass degree by part-time study is seven years with an additional year full-time, or two years part-time, for a course leading to an honours degree. Some subject groupings cannot be completed in the minimum time due to the exigencies of the timetable.

Progression in the Science Course is normally permitted by subjects (but see Clause 2e below).

Any arrangements of subjects to be studied under these regulations must be approved by the Dean of the Faculty and the advice of his representative must be sought.* A student who intends to seek admission to an Honours Course should consult the Head of the appropriate School on completion of the first year subjects. The normal requirements for admission to Honours studies in Schools of the Faculty may be found under the description of the courses offered by these Schools as set out below.

REGULATIONS GOVERNING THE SCIENCE COURSE

1. A student is required to select his course from the following groups of qualifying subjects in accordance with the provisions set out in subsequent clauses.†

* A table of recommended patterns of subjects is given below.

† A student who selects an unusual combination of subjects, or selects subjects from more than one group in one year, may be required, owing to the exigencies of the timetable, to attend for more than the minimum number of years (this may sometimes be avoided by attendance at night classes).

NOTE: Students who have completed certain subjects in the first two years of the Science Course may apply to the Australian National University for admission to the Bachelor of Science (Forestry) degree course with advanced standing. Further details are available from the Registrar at A.N.U.

Students should note that some Group I, Group II and Group III subjects are offered at two or three different depths, and that each of these may differ in its adequacy and acceptability as a co-requisite or pre-requisite for other subjects or level of a subject.

It should be noted that Group II subjects are now divided into units.

Students enrolling in Year II of the full-time course in 1969 must take two whole Science subjects **and** no less than two additional units of a Science subject together with the General Studies requirements. **Advice regarding choice of units must be sought from the schools from which students are taking their major subjects.**

Students commencing their course and intending to study any of Chemistry, Mathematics (compulsory), and Physics, should be aware of the need to select the subject level which is appropriate to, and adequate for, the study of other subjects which are taken concurrently or are to be taken in a subsequent year.

Details of approved first-year programmes and of pre-requisites and co-requisites are given under Clauses 3 and 4 respectively.

		Term 1 Lec. Lab./ Tut.	Term 2 Lec. Lab./ Tut.	Term 3 Lec. Lab./ Tut.
(A) GENERAL STUDIES				
Any **three** of the following provided at least **one** is taken from the **first six subjects:**				
26.501	English			
26.511	History			
26.521	Philosophy			
26.571	Drama			
26.641	German Civilisation, Part 1			
26.651	Spanish and Spanish-American Literature, Part 1	1 — ½	1 — ½	1 — ½
26.121	Psychology			
26.151	Economics			
26.301	Music			
26.531	Sociology			
26.541	Political Science			
11.011H	History of Fine Arts			
11.021H	History of Architecture			
Additional for an Honours Degree—				
	Advanced General Studies Elective	1 — 1	1 — 1	0 — 0

(B) SCIENCE SUBJECTS— *Group I*—		Term 1 Tut. Lec. Lab./	Term 2 Tut. Lec. Lab./	Term 3 Tut. Lec. Lab./
1.001	Physics I *or*	3 — 3	3 — 3	3 — 3
1.011	Higher Physics I *or*	3 — 3	3 — 3	3 — 3
1.041	Physics IC	3 — 3	3 — 3	3 — 3
2.001	Chemistry I *or*	2 — 4	2 — 4	2 — 4
2.011	Higher Chemistry I	2 — 4	2 — 4	2 — 4
5.001	Engineering I	6	6	6
10.001	Mathematics I *or*	4 — 2	4 — 2	4 — 2
10.011	Higher Mathematics I *or*	4 — 2	4 — 2	4 — 2
10.021	Mathematics IT	4 — 2	4 — 2	4 — 2
12.001	Psychology I	3 — 2	3 — 2	3 — 2
17.001	General and Human Biology	3 — 3	3 — 3	3 — 3
25.001	Geology I*	2 — 4	2 — 4	2 — 4
27.031	Geography IS	2 — 4	2 — 4	2 — 4
52.111	Philosophy I	4	4	4

* Field tutorials are an essential component of this course.

Group II --

No.	Name	When Offered Full Year	1st 15 wks	2nd 15 wks	Hours per week
1.112A	Electromagnetism		X		6
1.112B	Atomic Physics			X	6
1.112C	Thermodynamics and Mechanics	X			2
1.112W	Physics IIW‖	X			8
1.122A	Higher Electromagnetism				
1.122B	Higher Atomic Physics	X			8
1.122C	Higher Thermodynamics and Mechanics				
1.212T	Physics IIT*				3
2.002A	Physical Chemistry‡‡		X	X	6
2.002B	Organic Chemistry‡‡		X	X	6
2.002C	Inorganic Chemistry‡‡		X	X	6
10.031	Mathematics	X			2
10.111A	Linear Algebra	X			2
10.111B	Mathematical Analysis	X			2
10.111C	Abstract Algebra	X			2
10.121A	Higher Mathematical Analysis‡ ††	X			5
10.121B	Higher Algebra‡	X			2½
10.211A	Mathematical Methods	X			2
10.211B	Analytical Dynamics	X			2
10.211C	Hydrodynamics	X			2
10.221A	Higher Mathematical Methods§	X			2½
10.221B	Higher Analytical Dynamics§	X			2
10.221C	Higher Hydrodynamics§	X			2
10.311	Theory of Statistics I†	X			8
10.311T	Statistics	X			2
10.321	Higher Theory of Statistics I†	X			8
10.911	Mathematics II†	X			6
10.111W	Pure Mathematics IIW‖	X			5
10.121W	Higher Pure Mathematics IIW‖	X			6
10.211W	Applied Mathematics IIW‖	X			7

NOTE: See overleaf for footnotes.

		When Offered			
		Full Year	1st 15 wks	2nd 15 wks	Hours per week
10.221W	Higher Applied Mathematics IIW‖	X			7
10.411W	Mathematics IIW‖	X			7
10.421W	Mathematics II (Engineering)‖	X			5
12.012	Psychology II†	X			8
25.002A	Stratigraphy and Palaeontology¶	X			3
25.002B	Crystallography, Mineralogy and Petrology¶††	X			6
41.101A	Chemistry of Biologically Important Molecules		X		6
41.101B	Metabolism		X		6
41.101C	Control Mechanisms			X	6
43.101A	Genetics and Biometry		X		6
43.101B	Plant Morphology			X	6
43.101C	Plant Physiology			X	6
44.101A	Introductory Microbiology	X			3
45.101A	Genetics and Biometry B**		X		6
45.101B	Invertebrate Zoology			X	6
45.101C	Vertebrate Zoology			X	6
52.112	Philosophy II†	X			4
52.122	Philosophy II (Honours)†	X			5
73.011A	Principles of Physiology††	X			6

* 30 weeks or 15 weeks depending on topics selected.

† Counts as three units.

‡ 1. Admission to Higher Pure Mathematics II units normally requires completion of 10.011 Higher Mathematics I. Students who gain a superior pass in 10.001 Mathematics I may, subject to the approval of the Head of the School of Mathematics, be permitted to proceed to Higher Pure Mathematics II units.

2. Students majoring in Physics who wish to take Higher Pure Mathematics II should attempt 10.121A, 10.121B and either 10.221A or 10.211A.

3. Students aiming at Honours in Pure Mathematics must take 10.121A and 10.121B, and 10.211A or 10.221A—extra mathematics units are optional.

§ Students aiming at Honours in Applied Mathematics must take all Level II units of Higher Applied Mathematics, 1.122 Higher Physics II and at least unit A of Level II Higher Pure Mathematics.

‖ Subjects available only at Wollongong University College.

¶ Geological excursions and field work are an essential component of these courses.

** Same as 43.101A Genetics and Biometry.

†† Counts as two units.

‡‡ Students are required to take this subject in *either* the first 15 weeks *or* the second 15 weeks of the academic year.

Group III— Part (a)—		Term 1 Lec. Lab./ Tut.	Term 2 Lec. Lab./ Tut.	Term 3 Lec. Lab./ Tut.
1.113	Physics III	4 — 8	4 — 8	4 — 8
2.003	Chemistry III	4 — 10	4 — 10	4 — 10
2.003W	Chemistry III	4½ — 7½	4½ — 7½	4½ — 7½
10.112	Pure Mathematics III	4 — 1	4 — 1	4 — 1
10.122	Higher Pure Mathematics III	6 — 1	6 — 1	6 — 1
10.212	Applied Mathematics III	3 — 4	3 — 4	3 — 4

10.222	Higher Applied Mathematics III	5 — 3	5 — 3	5 — 3
10.112W	Pure Mathematics IIIW	5	5	5
10.122W	Higher Pure Mathematics IIIW	7	7	7
10.212W	Applied Mathematics IIIW	7	7	7
10.222W	Higher Applied Mathematics IIIW	8	8	8
10.412W	Mathematics IIIW	7	7	7
12.013	Psychology III†	4 — 5	4 — 5	4 — 5
41.102	Biochemistry II	3 — 10	3 — 10	3 — 10
44.101	Microbiology I	4 — 8	4 — 8	4 — 8
43.102	Botany II	3 — 10	3 — 10	3 — 10
45.102	Zoology II	4 — 9	4 — 9	4 — 9
42.201	Entomology I	4 — 9	4 — 9	4 — 9
25.003	Geology III*	7 — 6	7 — 7	6 — 6
73.012	Physiology II	3 — 9	4 — 10	4 — 10
Part (b)—				
1.133	Mathematical Physics	5 — 1	5 — 1	5 — 1
2.053	Chemistry III (Supplementary)	3 — 7	2 — 8	2 — 8
2.053W	Chemistry III (Supplementary)	4½ — 7½	4½ — 7½	4½ — 7½
6.065	Computer Science	4 — 5	4 — 5	4 — 5
10.312	Theory of Statistics II	4 — 4	4 — 4	4 — 4
10.322	Higher Theory of Statistics II	5 — 4	5 — 4	5 — 4
12.044	Psychology III (Supplementary)†	3 — 5	3 — 5	3 — 5
25.013	Geology III (Supplementary)*	4 — 8	4 — 8	4 — 8

* Field tutorials are an essential component of these courses.

† Students are required to undertake such additional field work and clinical studies, averaging two hours per week, as may be prescribed by the Head of the School of Applied Psychology.

2. (*a*) In order to qualify for admission to the degree of Bachelor of Science under these regulations a candidate must attend the classes and satisfy the examiners in the following subjects:—

(i) the General Studies subjects listed under section 1 (A),

(ii) nine Science subjects or equivalent units selected from the list in section 1 (B).

(*b*) *The proposed course must be approved by the Dean of the Faculty of Science or his representative during enrolment.* In special circumstances, the Dean may grant the student permission to defer enrolment in one of the Group I subjects until the second year of the course. Where any alteration in the course approved at enrolment is desired, the student must obtain the approval of the Dean or his representative for the new course.

(*c*) The nine Science subjects or equivalent units must include:—

(i) The appropriate one of 10.001 Mathematics I, 10.011 Higher Mathematics I, or 10.021 Mathematics IT.

(ii) At least three and not more than four other subjects from Group I.

(iii) At least one subject from Group III, Part (*a*).

(*d*) No more than one subject or equivalent units from each of the following groups of subjects may be chosen:—

(i) Physics II; Higher Physics II.

(ii) Pure Mathematics II; Higher Pure Mathematics II; Pure Mathematics IIW; Higher Pure Mathematics IIW; Mathematics IIW.

(iii) Applied Mathematics II; Higher Applied Mathematics II; Applied Mathematics IIW; Higher Applied Mathematics IIW; Mathematics IIW.

(iv) Pure Mathematics III; Higher Pure Mathematics III; Pure Mathematics IIIW; Higher Pure Mathematics IIIW; Mathematics IIIW.

(v) Applied Mathematics III; Higher Applied Mathematics III; Applied Mathematics IIIW; Higher Applied Mathematics IIIW; Mathematics IIIW.

(vi) Theory of Statistics I; Higher Theory of Statistics I.

(vii) Theory of Statistics II; Higher Theory of Statistics II.

(viii) Psychology I: Psychology (General Studies Elective).

(*e*) A full-time student is required to complete the appropriate Group I Mathematics and three other approved Group I subjects in the first two years of attendance or else show cause to the satisfaction of the Professorial Board why he should be allowed to re-enrol. The remaining subjects of the course may be completed in any order consistent with the requirements concerning pre-requisite and co-requisite subjects as set out in Section 4.

3. In general a full-time student should complete his course as follows:—

First Year—

(A) The subjects chosen in this year will depend on the subjects which a student plans to study in subsequent years. The appropriate Group I Mathematics must be taken by all students and the remaining three subjects to be taken are as specified below:

(a) *School of Applied Psychology.* 10.001, 10.011 or 10.021 Mathematics, 12.001 Psychology and two other Group I subjects.

(b) *Schools of Biochemistry, Biological Technology, Botany, Microbiology and Zoology.* 10.001, 10.011 or 10.021 Mathematics, 17.001 General and Human Biology, 2.001 or 2.011 Chemistry, 1.001 or 1.011 or 1.041 Physics; except that with the consent of the Head of the particular School concerned, and in special circumstances, Physics may be deferred to second year and 25.001 Geology taken in lieu in first year. In this case credit will not be given for any Group II Biology subjects until Physics I is completed.

(c) *School of Chemistry.* 10.001, 10.011 or 10.021 Mathematics, 2.001 or 2.011 Chemistry, 1.001, 1.011 or 1.041 Physics and one other Group I subject.

(d) *School of Mathematics.* 10.001, 10.011 Mathematics and three other Group I subjects except that 1.001, 1.011 or 1.041 Physics must be completed before a student enters either level of Applied Mathematics II.

(e) *School of Physics.* 10.001 or 10.011 Mathematics, 1.001 or 1.011 Physics, and two other Group I subjects. A student is usually expected to complete 2.001 or 2.011 Chemistry in his course.

(f) A student may take a degree under these regulations with a major sequence of subjects in the School of Applied Geology or in the School of Physiology:

(i) *School of Applied Geology.* 10.001, 10.011 or 10.021 Mathematics, 1.001, 1.011 or 1.041 Physics, 2.001 or 2.011 Chemistry and 25.001 Geology.

(ii) *School of Physiology.* 10.001, 10.011 or 10.021 Mathematics, 1.001, 1.011 or 1.041 Physics; 2.001 or 2.011 Chemistry and 17.001 General and Human Biology.

(B) When choosing the level to be studied in a first year subject a student must note that:—

(a) Completion of 10.021 Mathematics IT will not qualify for admission to a major sequence of subjects in the School of Mathematics. A pass at credit

standard or better in 10.021 Mathematics IT will qualify for entry to Theory of Statistics I but will not qualify for progression to Theory of Statistics II subsequently.

(b) Completion of 1.041 Physics IC will not normally qualify for admission to 1.112 Physics II. However students who achieve a superior pass in 1.041 Physics IC may apply to the Head of the School of Physics for permission to enter 1.112 Physics II.

(c) Completion of 10.001 Mathematics will not qualify for admission to any Group II Mathematics subject at the higher level.

Second Year—

(A) General Studies Elective.

(B) Three subjects or equivalent units from Group II,
or two subjects or equivalent units from Group II and one from Group I.

Third Year—

(A) Two General Studies Electives,

(B) Two subjects or equivalent units from Group III, Part (*a*),

or one subject or equivalent units from Group III, Part (*a*) and one from Group III, Part (*b*),

or one subject or equivalent units from Group III, Part (*a*) and one from Group II.

In particular cases, however, the Head of the Department of General Studies has discretion to vary the order in which the General Studies subjects are taken.

4. *Pre-requisites and Co-requisites*

(*a*) Before enrolling for any subject or equivalent units listed in Group II the student shall have attended the classes and satisfied the examiners in the corresponding subject in Group I at the appropriate level, and before enrolling for any subject listed in Group III, the student shall have attended classes and satisfied the examiners in the corresponding subject or equivalent units listed in Group II.

(*b*) Before enrolling in any subject or equivalent units listed in the left-hand column below, the student shall have attended the classes and satisfied the examiners in the subjects stated as pre-requisites in the right-hand column.

Group II

No.	Name	Pre-requisites
1.112A 1.112B 1.112C	Electromagnetism Atomic Physics Thermodynamics & Mechanics	1.001 *or* 1.011 Physics *and* 10.001 *or* 10.011 Mathematics.
1.122A 1.122B 1.122C	Higher Electromagnetism Higher Atomic Physics Higher Thermodynamics & Mechanics	1.011 Physics *and* 10.001 *or* 10.011 Mathematics.
1.212T	Physics IIT	1.001 *or* 1.011 *or* 1.031 *or* 1.041 *or* 1.051 *or* 1.061 Physics *and* 10.001 *or* 10.011 *or* 10.021 Mathematics.
2.022A 2.002B 2.002C	Physical Chemistry Organic Chemistry Inorganic Chemistry	1.001 *or* 1.011 *or* 1.041 Physics *and* 2.001 *or* 2.011 Chemistry *and* 10.001 *or* 10.011 Mathematics.*
10.031	Mathematics	10.001 *or* 10.011 Mathematics.
10.111A 10.111B 10.111C	Linear Algebra Mathematical Analysis Abstract Algebra	10.001 *or* 10.011 Mathematics.
10.121A 10.121B	Higher Mathematical Analysis Higher Algebra	10.011 Higher Mathematics I.
10.211A	Mathematical Methods	10.001 Mathematics I.
10.211B 10.211C	Analytical Dynamics Hydrodynamics	10.001 Mathematics I *and* 1.001 Physics I.
10.221A	Higher Mathematical Methods	10.011 Higher Mathematics I.†
10.221B 10.221C	Higher Analytical Dynamics Higher Hydrodynamics	1.011 Higher Physics I *and* 10.011 Higher Mathematics I.
10.311 10.311T	Theory of Statistics I Statistics	10.001 *or* 10.011 *or* 10.021 (at credit standard *or* better) Mathematics.
10.321	Higher Theory of Statistics I	10.001 *or* 10.011 Mathematics.
10.911	Mathematics II	10.001 *or* 10.011 Mathematics.
10.111W 10.121W 10.211W 10.221W 10.411W 10.421W	Pure Mathematics IIW Higher Pure Mathematics IIW Applied Mathematics IIW Higher Applied Mathematics IIW Mathematics IIW Mathematics II (Engineering)	10.001 Mathematics.
12.012	Psychology II	12.001 Psychology I.

*For 1969 only, students may, in special cases, be admitted to Chemistry II if they pass 10.021 Mathematics.

†A student who gains a superior pass in 10.001 Mathematics I may apply to proceed to Higher Applied Mathematics Units.

No.	Name	Pre-requisites
25.002A 25.002B	Stratigraphy & Palaeontology Crystallography, Mineralogy & Petrology	25.001 Geology I.
41.101A 41.101B 41.101C	Chemistry of Biologically Important Molecules Metabolism Control Mechanisms	2.001 *or* 2.011 Chemistry *and* 17.001 General and Human Biology.
43.101A 43.101B 43.101C	Genetics & Biometry Plant Morphology Plant Physiology	17.001 General and Human Biology.
44.101A	Introductory Microbiology	17.001 General and Human Biology *and* 2.001 *or* 2.011 Chemistry.
45.101A 45.101B 45.101C	Genetics & Biometry Invertebrate Zoology Vertebrate Zoology	2.001 *or* 2.011 Chemistry; 10.001 *or* 10.011 *or* 10.021 Mathematics; 17.001 General and Human Biology; *and* 1.001 *or* 1.011 *or* 1.041 Physics.
52.112	Philosophy II	52.111 Philosophy I.
73.011A	Principles of Physiology	1.001 *or* 1.011 *or* 1.041 Physics; 2.001 *or* 2.011 Chemistry; 10.001 *or* 10.011 *or* 10.021 Mathematics *and* 17.001 General and Human Biology.

Group III—

Physics III	Pure Mathematics II — either level *or* Pure Mathematics IIW — either level, *or* Mathematics IIW
Botany II	Biochemistry I *or* one of the Group II subjects offered by the Schools of Chemistry, Mathematics or Physics
Zoology II	Biochemistry I *or* Chemistry II
Microbiology I	*Either* Biochemistry I, *or* Chemistry II *and* General and Human Biology
Biochemistry II	Chemistry II
Theory of Statistics II — either level	Pure Mathematics II — either level, *or* Pure Mathematics IIW — either level
Higher Pure Mathematics III	Pure Mathematics II (Higher) *and* one other Group II subject of the School of Mathematics

Mathematical Physics	Pure Mathematics II *and* Physics II
Entomology I	Zoology I *and either* Chemistry II or Biochemistry I
Physiology II	Biochemistry I*
Geology III	1.001 Physics I *or* 1.011 Higher Physics I *or* 1.041 Physics IC
Computer Science	Pure Mathematics II *or* Applied Mathematics II *or* Theory of Statistics I *or* Physics II

* In exceptional cases, *either* Physics II *or* Chemistry II may be substituted.

(*c*) Enrolment in the subject in the left-hand column shall not be approved unless the corresponding subject or subjects listed in the right-hand column are taken concurrently or have been completed.

No.	Name	Co-requisites
1.112A	Electromagnetism	10.211A Mathematical Methods.
1.112C	Thermodynamics & Mechanics	10.211A Mathematical Methods.
1.122A 1.122B 1.122C	Higher Electromagnetism Higher Atomic Physics Higher Thermodynamics & Mechanics	10.211 (Unit A) *or* 10.221 (Unit A)*.
2.002A 2.002B 2.002C	Physical Chemistry Organic Chemistry Inorganic Chemistry	If any level II unit is taken, at least one other must be taken as a co-requisite.
41.101A	Chemistry of Biologically Important Molecules	41.101B Metabolism.
41.101B	Metabolism	41.101A Chemistry of Biologically Important Molecules.
73.011A	Principles of Physiology	If a student intends proceeding to Physiology II then 41.101 (Units A + B + C) *and* 2.002 (Units A + B).

* Students should note the additional mathematics prerequisites to units of Higher Physics Level III.

The Dean of the Faculty has the power to vary in exceptional cases the pre-requisites and/or co-requisites set down above on the recommendation of the Head of the appropriate school.

Part-time Study

5. For part-time as for full-time students subjects are offered as whole units, with the exception of Physics III and Mathematical Physics. These two subjects from Group III are still offered in

sections during the evening, and the hours per week allocated to them are shown below:—

Group III—

		Hours per week for 30 weeks			
		Lec.	Lab./Tut.		Lec. Lab./Tut.
Physics III	Part I	2	— 4	Part II	2 — 4
Mathematical Physics	Part I	2½	— ½	Part II	2½— ½

6. A part-time student must select his subjects in compliance with the regulations set out above for full-time students. However, a part-time student is required to complete the appropriate Group I Mathematics and three other approved Group I subjects in the first four years of enrolment.

Honours Course

7. (*a*) A suitably qualified candidate may be admitted to an honours course in one of the following subjects. An extra year of full-time work, or two extra years of part-time work, is required.

Biochemistry
Biological Technology
Botany
Chemistry
Computer Science
Entomology
Geology
Mathematics (Pure or Applied)
Microbiology
Physics
Physiology
Psychology
Theory of Statistics
Zoology

(*b*) A student desiring admission to the honours course must apply to the Head of the appropriate School in accordance with the requirements set out under the section entitled "Requirements for Honours in the Science Course", or, where no specific date is given, on completion of the pass degree requirements.

(*c*) A student proceeding to honours in any School must attend lectures, read and engage in laboratory work as may be required by the Head of the School.

The special requirements for admission to the honours course in each of the above subjects are set out later under the section entitled "Requirements for Honours in the Science Course".

ADVANCED STANDING IN THE SCIENCE COURSE FOR ENGINEERING STUDENTS PROCEEDING TO THE DOUBLE DEGREE — B.Sc/B.E.

A student who has satisfied the examiners in the first two years of an Engineering course, including Physics II and Mathematics II

as prescribed for the Electrical Engineering course, may be admitted to the Science degree with advanced standing.

Such student shall be required to complete the appropriate General Studies and three Science course subjects in accordance with the regulations, except that he may qualify for a pass B.Sc. by completing *two* Group III subjects.

RULES GOVERNING ADMISSION TO THE SCIENCE DEGREE COURSE WITH ADVANCED STANDING FOR THE PURPOSE OF OBTAINING A DOUBLE DEGREE

1. Undergraduates of the University of New South Wales who have satisfied the examiners in at least the first two years of a degree course extending over four or more years and approved by the Faculty of Science for the purpose of double degrees, may be admitted to the Science degree course with advanced standing. Such undergraduates' performance shall have been of a high standard and their admission shall be subject to the approval of the Dean of the Faculty of Science.

2. Students so admitted who have satisfied the examiners in General Studies subjects and/or Science course subjects shall be given advanced standing in such General Studies subjects and no more than six (6) such Science course subjects (14 such Science course Units).

3. Students so admitted may be granted exemption from one other Group II Science subject on the basis of other subjects completed by them.

4. In order to qualify for the award of the degree of B.Sc., students so admitted with advanced standing shall be required to complete the appropriate General Studies subjects and no less than either two Group II and one Group III part (a) Science subjects (6 level II and 4 level III Science Units) or two Group III Science subjects (8 level III Science Units) in accordance with the Science course regulations.

RULES GOVERNING ADMISSION TO THE SCIENCE DEGREE COURSE WITH ADVANCED STANDING

1. Graduates of the University of New South Wales may be admitted to the Science degree course with exemption in all General Studies subjects completed by them and in no more than four (4) Science course subjects (twelve Science course units) completed by them.

2. Undergraduates of the University of New South Wales who transfer from another course to the Science degree course, may be admitted to the Science degree course with exemption in all General Studies subjects completed by them and in no more than six (6) Science course subjects (fifteen Science course units) completed by them.

3. Graduates or undergraduates of other universities or of other approved tertiary institutions may be admitted to the Science degree course with advanced standing.

4. Students admitted under Rule 3 who have satisfied the examiners in subjects of the same title or subject matter as Science course subjects in this University may, subject to the approval of the appropriate Heads of School, be granted exemption in no more than four (4) Science course subjects (eleven Science course units) but not including a Group III Science course subject (level III Science course units).

5. Notwithstanding the provisions of Rules 1, 2, 3 and 4, Faculty may determine a special programme to be completed by a student who wishes to be granted advanced standing for an honours degree of Bachelor of Science in this University.

SCHOOL OF APPLIED PHYSICS AND OPTOMETRY

DEPARTMENT OF APPLIED PHYSICS

The rapid expansion of the Australian economy in recent years has caused the development and diversification of activity, particularly in the secondary industries. Many firms which previously engaged only in commerce or only in manufacture and selling, now have a need to expand the technical side of their business and to engage in Research and Development, that is, industrial research-and-development. The 1967 Industrial Research and Development Grants Act gave Commonwealth recognition and financial support to this trend. There is wide-spread recognition in industry of the need for trained graduate staff to undertake Research and Development in Australia, and of the need in particular for physicists educated and apt to such work to take part in it.

The Department of Applied Physics was established, as part of the new School of Applied Physics and Optometry, in mid-1968, and is being developed, with the aim of promoting the application of physics, particularly in Australian industrial and similar enterprises. It is intended, primarily, to provide a four-year full-time course leading to the degree of B.Sc. in Applied Physics (Pass or Honours). Details of the course are not yet determined; however, it is clear that the whole of the first two years of study can be effectively spent on existing subjects provided by other Schools. Students who have completed the normal first-year subjects* of any course in the Faculty of Science, or in the Faculties of Applied Science, Biological Sciences (with the exception of Applied Psychology), Engineering or Medicine, and who contemplate enrolling in the new course in Applied Physics, can undertake a normal programme of Science Course subjects in 1969 which will, on completion, fit them to enter the third year of the Applied Physics course. This third year will, it is hoped,

*Including *either* 2.001 Chemistry I *or* 5.001 Engineering I; also including 1.001 *or* 1.011 Physics I, and 10.001 *or* 10.011 Mathematics I. If any other Physics I subject (1.031, 1.041, 1.051, *or* 1.061) has been taken, a Credit grade pass or better is required by the School of Physics for admission to 1.112 Physics II.

be offered for the first time in 1970, and the normal fourth year in 1971. The recommended programme of second-year studies for 1969 is as follows (in terms of the Level 2 Science units proposed to be introduced in 1969):—

(a) 1.112A Electromagnetism
1.112B Atomic Physics
1.112C Thermodynamics and Mechanics
} comprising 1.112 Physics II

10.111A Linear Algebra
10.111B Mathematical Analysis
10.211A Mathematical Methods
} comprising 10.911 Mathematics II

(b) One Group I subject (2 Level 1 units), chosen so that the five Group I subjects taken in first and second years shall comprise Physics I, Mathematics I, 2.001 Chemistry I, 5.001 Engineering I and any one other.

(c) Appropriate General Studies subjects.

The course work in the third and fourth years will include 1.113 Physics III (or 1.213 Physics III, which has the same syllabus, but reduced laboratory work in the School of Physics), together with further supporting work in certain other servicing Schools, e.g., Statistics, and with studies in the Department of Applied Physics. These latter studies will be designed to give

(a) specialised training in some main areas of applied physics, e.g., physics of materials, electronics and control systems, vacuum and gas-discharge physics;

(b) practice in the application of the student's knowledge of physics to practical and technical problems;

(c) an extensive acquaintance with industrial activities which involve applied physics or concern industrial physicists, e.g., specifications, quality and life testing, inventing and patents.

Students enrolling for first-year studies in 1969 who wish to pursue the course in Applied Physics as above described should enrol in the Science Course, with a view to later transfer, with a programme of first-year (Group I) subjects that includes

1.001 Physics I
or 1.011 Higher Physics I

and

10.001 Mathematics I
or 10.011 Higher Mathematics I

The two other subjects to be studied should include at least one of 2.001 Chemistry I and 5.001 Engineering I, preferably both.

Students who expect to complete in 1969 an appropriate third-year programme including Physics III are invited to consult with the Head of the Department of Applied Physics: it may be

possible to organise a special programme of studies enabling them to complete requirements for the B.Sc. in Applied Physics in the one year, 1970.

Honours graduates in Applied Physics, and other well-qualified graduates, will be able to enrol as research students working in the Department for a Master's degree or for the degree of Doctor of Philosophy.

For further information, interested persons should consult the Head of the School.

DEPARTMENT OF OPTOMETRY

The Optometry Department provides a four year full-time degree course in Optometry leading to the degree of Bachelor of Optometry (B.Optom.) which may be awarded at the pass or honours level. The Optometry course offered at the University of New South Wales is the only course of professional training for optometrists given in New South Wales.

The first year of the Optometry course comprises the first year subjects of Physics, Chemistry, Mathematics, and General and Human Biology, and this is followed by a three-year professional course in Optometry.

Instruction in Clinical Optometry, which forms the main part of the final year, is given in the University's Optometry Clinic, where each student examines and treats about 15 patients per week. In addition to the prescribed clinical work, the final year students may also participate in the specialised clinical research activities of the department which include orthoptic clinics, clinics for subnormal vision patients and remedial reading clinics for reading-deficient children.

Facilities for individual research are available. Graduates wishing to pursue their studies in optometrical science beyond the Bachelor of Optometry level may enrol with the University as candidates for the degrees of Master of Science or Doctor of Philosophy. Graduates who wish to extend further their professional qualifications should note the introduction, in 1970, of a formal graduate course in Optometry leading to the degree of Master of Optometry (M. Optom.) in the Faculty of Science. The course is designed to provide advanced professional training in clinical and theoretical aspects of optometry, with opportunities for specialization in fields such as contact lenses, orthoptics and occupational optometry.

OPTOMETRY—FULL-TIME COURSE

Bachelor of Optometry

First Year

(30 weeks' day course)

		Hours per week for 3 terms Lec. Lab./Tut.
1.041	Physics IC	3 — 3
2.001 / 2.011	Chemistry I *or* Higher Chemistry I	2 — 4
10.001 / 10.011 / 10.021	Mathematics I *or* Higher Mathematics I *or* Mathematics IT	4 — 2
17.001	General and Human Biology	3 — 3
		12 —12

Second Year

(30 weeks' day course)

		Hours per week for 3 terms Lec. Lab./Tut.
31.811	Optometry I	4 — 4
31.821	Special Anatomy and Physiology	3 — 3
73.011	Physiology I	3 — 6
	General Studies Elective	1 — ½
		11 —13½

Third Year

(30 weeks' day course)

		Hours per week for 3 terms Lec. Lab./Tut.
12.001	Phychology I	3 — 2
31.812	Optometry II	8 — 7
31.831	Diseases of the Eye	2 — 1
	Two General Studies Electives	2 — 1
		15 —11

FOURTH YEAR
(30 weeks' day course)

		Hours per week		
		Term 1 Lec. Lab./ Tut.	Term 2 Lec. Lab./ Tut.	Term 3 Lec. Lab./ Tut.
12.741	Psychology	2 — 0	2 — 0	2 — 0
31.813	Optometry III	6 — 0	6 — 0	6 — 0
31.841	Clinical Optometry	0 — 14	0 — 14	0 — 15
74.001	Indication for Medical Referral	1 — 0	1 — 0	0 — 0
	Advanced General Studies Elective	2 — 0	2 — 0	2 — 0
		11 — 14	11 — 14	10 — 15

CONDITIONS FOR THE AWARD OF THE DOUBLE DEGREE OF B.Sc., B.OPTOM IN THE FACULTY OF SCIENCE

1. Undergraduates of the University of New South Wales who have satisfied the examiners in at least the first two years of the Optometry degree course may be admitted to the Science degree course with advanced standing for the purpose of qualifying for the double degree of B.Sc., B.Optom. Such undergraduates' performance shall have been of a high standard and their admission shall be subject to the approval of the Dean of the Faculty of Science.

2. In order to qualify for the award of the degree of B.Sc., students so admitted shall be required to complete the appropriate general studies subjects and either two Group II and one Group III Part (a) Science subjects (six level II and four level III Science Units) or two Group III Science subjects (eight level III Science Units) in accordance with the Science course regulations.

3. In order to qualify for the award of the degree of B.Optom., students so admitted shall complete the requirements of the Optometry degree course.

OPTOMETRY TEXT AND REFERENCE BOOKS

31.811 Optometry I

TEXTBOOKS

Emsley, H. H. *Visual Optics*. Vols. I and II. Hatton Press.
Fincham, W. H. A. *Optics*. Hatton Press.

REFERENCE BOOKS

Andrews, C. J. *Optics of the Electromagnetic Spectrum*. Prentice-Hall.
Curry, C. *Wave Optics*. Arnold.

Emsley, H. H. *Aberrations of Thin Lenses.* Hatton Press.
Emsley and Swaine. *Ophthalmic Lenses.* Hatton Press.
Helmholtz, H. *Physiological Optics.* Dover.
Jenkins and White. *Fundamentals of Optics.* McGraw-Hill.
Morgan, J. *Introduction to Geometrical and Physical Optics.* McGraw-Hill.
Rossi, B. *Optics.* Addison-Wesley.
Sears, F. W. *Optics.* Addison-Wesley.

31.812 Optometry II

TEXTBOOKS

Bier, N. *Correction of Sub-normal Vision.* Butterworths.
Harrington, D. O. *The Visual Fields.* Mosby.
Sasieni, L. S. *The Principles and Practice of Optical Dispensing and Fitting.* Hammond.

REFERENCE BOOKS

Berens and Zuckerman. *Diagnostic Examination of the Eye.* Lippincott.
Berliner, S. *Biomicroscopy of the Eye.* Hoeber.
Davson, H. *The Eye,* Vols. 3 and 4. Academic Press.
Dolch, E. W. *A Manual for Remedial Reading.* The Gerrard Press.
Doggart, J. H. *Ocular Signs in Slit-lamp Microscopy.* Kimpton.
Dowaliby, M. *Modern Eyewear Fashion and Cosmetic Dispensing.* Professional Press.
Duke-Elder, Sir S. *The Practice of Refraction.* Churchill.
Duke-Elder, Sir S. *Textbook of Ophthalmology.* Kimpton.
Flesch, R. *Why Johnny Can't Read.* Harper.
Giles, G. H. *The Practice of Orthoptics.* Hammond.
Giles, G. H. *The Principles and Practice of Refraction.* Hammond and Hammond.
Goddard, N. L. *Reading in the Modern Infants School.* University of London.
Harris, A. J. *How to increase Reading Ability.* Longmans.
Hartridge, H. *Recent Advances in the Physiology of Vision.* Churchill.
Hay, J. and Winger, C. E. *Reading with Phonics.* Lippincott.
Heilman, A. W. *Principles and Practice of Teaching Reading.* Merrill.
Lyle and Jackson. *Orthoptics.* Lewis.
McKee, P. *The Teaching of Reading.* Houghton Mifflin.
Ogle, K. N. *Researches in Binocular Vision.* Saunders.
Schonell, F. J. *Backwardness in the Basic Subjects.* Oliver and Boyd.
Schonell, F. J. and Schonell, F. E. *Diagnostic and Attainment Testing.* Oliver and Boyd.
Shapero, Cline and Hofstetter. *Dictionary of Visual Science.* Chilton.
Smith. *Clinical Orthoptic Procedure.* Mosby.
Tait, E. F. *Textbook of Refraction.* Saunders.
Traquair, H. M. *An Introduction to Clinical Perimetry.* Kimpton.
Wolff, M. D. and Wolff. *Remedial Reading.* McGraw-Hill.

31.813 Optometry III

TEXTBOOKS

Burnham, Hanes and Bartleson. *Color.* Wiley.
Mandel, R. B. *Contact Lens Practice: Basic and Advanced.* Charles C. Thomas.

REFERENCE BOOKS

Bier, N. *Contact Lens Practice.* Hatton.
Brandt, F. H. *The Psychology of Seeing.* Philosophical Library.
Brindley, G. S. *Physiology of the Retina and the Visual Pathway.* Arnold.
Conrady, A. E. *Applied Optics and Optical Design.* Dover.
Davson, H. *The Eye,* Vol. 4. Academic Press.
Duke-Elder, Sir S. and Perkins, E. S. *Transparency of the Cornea.* Blackwell.
Dudley, L. P. *Stereoptics.* Macdonald.
Duke-Elder, Sir S. *System of Ophthalmology,* Vol. 1. Kimpton.
Emsley, H. H. *Aberrations of Thin Lenses.* Hatton Press.
Gibson, J. J. *The Perception of the Visual World.* Houghton Mifflin.
Grosvenor, T. P. *Contact Lens Theory and Practice.* Professional.
Hartridge, H. *Recent Advances in the Physiology of Vision.* Churchill.
Haynes, P. L. *Encyclopaedia of Contact Lens Practice.* Internal Optics.
Hirsch and Wick. *Vision of the Aging Patient.* Hammond.
Hofstetter, H. W. *Industrial Vision.* Chilton.
Holmes, C. *Guide to Occupational and other Visual Needs.* Silverlake.
Ittelson, W. H. *The Ames Demonstrations in Perception.* Princeton.
Johnson, B. K. *Optics and Optical Instruments.* Hatton Press.
Le Grand, Y. *Light, Colour and Vision.* Chapman and Hall.
Luneberg, R. K. *Mathematical Analysis of Binocular Vision.* Princeton.
Martin, L. C. *Technical Optics.* Pitman.
Mazow, B. *Synopsis of Corneal Contact Lens Fitting for Optometrists.* Burgess.
Murray, H. D. *Colour in Theory and Practice.* Chapman and Hall.
Ogle, K. N. *Researches in Binocular Vision.* Saunders.
Optical Society of America. *The Science of Color.* Crowell.
Polyak, S. *The Vertebrate Visual System.* Chicago Univ.
Prince, J. H. *Comparative Anatomy of the Eye.* Thomas.
Prince, J. H. *Ocular Prothesis.* Livingstone.
Sorsby, A. *A Short History of Ophthalmology.* Staples.
Thomas, C. I. *The Cornea.* Thomas.
Thomas, P. F. *Techniques of Prescribing Multiband Microlenses.* Corneal Lens Corp.
Wright, W. D. *Researches in Normal and Defective Colour Vision.* Kimpton.
Wright, W. D. *The Measurement of Colour.* Hilger.
Wyszecki and Stiles. *Colour Science.* Wiley, 1967.

31.821 Special Anatomy and Physiology

TEXTBOOKS

Adler, F. H. *Physiology of the Eye.* Mosby.
Wolff, E. *The Anatomy of the Eye and Orbit.* Lewis.

REFERENCE BOOKS

Duke-Elder, Sir S. *System of Ophthalmology.* Vols. 2, 3 and 4. Kimpton.
Kenney, A. H. *Chronology of Ophthalmic Development.* Thomas.
Mann, I. *The Development of the Human Eye.* Cambridge.
Mann, I. *Developmental Abnormalities of the Eye.* Cambridge.
Spooner, J. D. *Ocular Anatomy.* Hatton Press.

31.831 Diseases of the Eye

TEXTBOOKS

Boyd, W. *An Introduction to the Study of Disease.* Lea and Febiger.
Fairbrother, R. W. *Textbook of Bacteriology.* Heinemann.
Lyle and Cross. *May and Worth's Manual of Diseases of the Eye.* Bailliere.
Perkins and Hansell. *An Atlas of Diseases of the Eye.* Churchill.

REFERENCE BOOKS

Ballantyne and Michaelson. *Textbook of the Fundus of the Eye.* Livingstone.
Doggart, J. H. *Ophthalmic Medicine.* Kimpton.
Doggart, J. H. *Ocular Signs in Slit-lamp Microscopy.* Kimpton.
Duke-Elder, Sir S. *Textbook of Ophthalmology.* Kimpton.
Larsen, H. W. *Atlas of the Fundus of the Eye.* Munsgaard.
Wolff, E. *A Pathology of the Eye.* Lewis.
Wolff, E. *Diseases of the Eye.* Cassell.

SCHOOL OF APPLIED PSYCHOLOGY

The study of psychology as a formal discipline in undergraduate courses is traditional in Australian Universities. Psychology as a subject is concerned with the systematic study of human behaviour, and includes historical, experimental and descriptive features. The School of Applied Psychology offers psychology as a major subject in the full-time Arts Course and in the full-time and part-time Science and Commerce Courses. It also offers a full-time and a part-time undergraduate professional degree course in Applied Psychology.

In the Science course, Psychology I, II and III and Psychology III (Supplementary) may be studied subject to the Science course regulations, and a student who wishes to proceed to honours in the subject must have completed three full courses of psychology in his pass degree and must have obtained at least credit in Psychology II and III in order to be admitted to the honours year.

APPLIED PSYCHOLOGY COURSES

The course leading to the degree of Bachelor of Science (Applied Psychology) is designed as a professional undergraduate course for the training of psychologists. It may be taken as a full-time or as a part-time course, the full-time course over four years and the part-time course over a minimum of six years. This course has been introduced in order to meet the increasing demands of professional psychologists in the various fields of applied psychology. Two main fields of specialisation will be developed—Industrial and Clinical, and students in their final year will choose between these two areas of specialisation.

The B.Sc. (Applied Psychology) course is offered on a full-time (four years) or on a part-time (six years) basis at pass or honours level with electives in industrial or clinical psychology.

These courses provide a firm background of psychological theory and of such other sciences as are required for further study (e.g., mathematics and biology), together with a leavening of the Humanities. The later years of the courses lead to increasing specialisation in either industrial psychology or clinical psychology.

The elective in industrial psychology is intended to meet the demand for students who will engage in personnel work in industry. It involves a study of the individual worker and the organisations in which he works and embraces such aspects of this study as job success and failure, job satisfaction and dissatisfaction, industrial motivation, employer-employee relations, acquisition of job skill, conditions affecting job efficiency and the like. These will be the subject of both theoretical and practical work.

The elective in clinical psychology includes basic theoretical and practical training in some of the more common areas of clinical psychology. The various aspects of the specialisation will be concerned with professional training in the diagnosis and assessment of personality and behaviour disorders and their treatment in various fields of counselling. Training is given in case studies and in preventive and therapeutic team work, and research in clinical psychology is also covered.

Details follow for all years of the new full-time and part-time courses. Honours are awarded on the quality of the work performed throughout the course.

APPLIED PSYCHOLOGY—FULL-TIME COURSE

Bachelor of Science

FIRST YEAR

(30 weeks' day course)

		Hours per week for 3 terms Lec. Lab./Tut.
10.001	Mathematics I *or*	
10.011	Higher Mathematics I *or*	4 — 2
10.021	Mathematics IT	
12.001	Psychology I	3 — 2
17.001	General and Human Biology	2 — 4
and one of—		
15.011	Economics I *or*	2 — 1
53.111	Sociology I *or*	4 — 0
62.111	History and Philosophy of Science	3 — 1
		13/11 — 9/8

SECOND YEAR
(30 weeks' day course)

		Hours per week for 3 terms Lec.	Lab./Tut.
12.012	Psychology II	3	— 5
12.042	Psychology IIA	3	— 3
	General Studies Elective	1	— ½
and one of—			
10.111	Pure Mathematics II *or*	4	— 1
10.311	Theory of Statistics I *or*	4	— 3
45.311	Physiology and Genetics	2	— 3
		9 min./ 11 max.	9½ min./ 11½ max.

THIRD YEAR
(30 weeks' day course)

		Hours per week for 3 terms Lec.	Lab./Tut.
12.013	Psychology III*	4	— 5
12.044	Psychology IIIA*	3	— 5
	General Studies Elective†	1	— ½
		8	—10½

FOURTH YEAR
(30 weeks' day course)
INDUSTRIAL COURSE ELECTIVE

		Hours per week for 3 terms Lec.	Lab./Tut.
12.045	Psychology IV (Industrial)*	5	—10
	General Studies Elective†	1	— ½
		6	—10½

OR

CLINICAL COURSE ELECTIVE

		Hours per week for 3 terms Lec.	Lab./Tut.
12.055	Psychology IV (Clinical)*	5	—10
	General Studies Elective	1	— ½
		6	—10½

* Students are required to undertake such additional field work and clinical studies, averaging 2 hours per week, as may be prescribed by the Head of the School of Applied Psychology.

†If 53.111 Sociology I has been previously selected as an option, 26.121 Psychology and 26.531 Sociology may not be taken.

APPLIED PSYCHOLOGY—PART-TIME COURSE

Bachelor of Science

First Year
(30 weeks' part-time course)

		Hours per week for 3 terms Lec. Lab./Tut.
10.011	Higher Mathematics I *or*	
10.001	Mathematics I *or*	4 — 2
10.021	Mathematics IT	
and one of—		
15.101	Economics I *or*	2 — 1
53.111	Sociology I *or*	4 — 0
62.111	History and Philosophy of Science I	3 — 1
	General Studies Elective	1 — ½
		9/8 — 2½/3½

Second Year
(30 weeks' part-time course)

		Hours per week for 3 terms Lec. Lab./Tut.
12.001	Psychology I	3 — 2
17.001	General and Human Biology	2 — 4
	General Studies Elective‡	1 — ½
		6 — 6½

Third Year
(30 weeks' part-time course)

		Hours per week for 3 terms Lec. Lab./Tut.
12.012	Psychology II	3 — 5
and one of		
10.111	Pure Mathematics II *or*	3 — 2
10.311	Theory of Statistics I *or*	4 — 3
45.311	Physiology and Genetics	2 — 3
		5 min./ 7 min./ 7 max. 8 max.

*Day-time attendance for practical work and clinical tutorials required.
‡If 53.111 Sociology I has been previously selected as an option, 26.121 Psychology and 26.531 Sociology may not be taken.

FOURTH YEAR*
(30 weeks' part-time course)

		Hours per week for 3 terms Lec.	Lab./Tut.
12.042	Psychology IIA	3	3
12.013	Psychology III†	4	5
		7	8

FIFTH YEAR
(30 weeks' part-time course)

		Hours per week for 3 terms Lec.	Lab./Tut.
12.044	Psychology IIIA†	3	5
26.521	Philosophy	1	½
		4	5½

SIXTH YEAR
(30 weeks' part-time course)
INDUSTRIAL ELECTIVE COURSE*

		Hours per week for 3 terms Lec.	Lab./Tut.
12.045	Psychology IV (Industrial)†	5	—10

OR

CLINICAL ELECTIVE COURSE*

		Hours per week for 3 terms Lec.	Lab./Tut.
12.055	Psychology IV (Clinical)†	5	—10

*Day-time attendance for practical work and clinical tutorials required. In cases where students are unable to satisfy the attendance requirements in the senior years of the degree, the Head of the School may arrange alternative programmes for practical work and clinical tutorials.

†Students are required to undertake such additional field work and clinical studies, averaging 2 hours per week, as may be prescribed by the Head of the School of Applied Psychology.

Prizes in Psychology

The *Australian Psychological Society* Prize in Psychology is awarded annually to a fourth-year student. The Society also awards annually two-years Student Subscriberships to the *Australian Journal of Psychology* to two outstanding students at the end of second year.

The Staff Prize in Psychology is awarded annually to an outstanding second-year student.

PSYCHOLOGY TEXTBOOKS

12.001 Psychology I

Part A: Theory

Whittaker, J. O. *Introduction to Psychology*. Saunders, 1965.
Whittaker, J. O. *Student's Workbook to accompany "Introduction to Psychology"*. Saunders, 1965.

Part B: Practical

Llewellyn, K. *Statistics for Psychology I*. Uni. of N.S.W. Press, 1968.
McCollough, C. and Van Atta, L. *Introduction to Descriptive Statistics and Correlation*. McGraw-Hill, 1965.

12.012 Psychology II

Part A: Personality

Mischel, W. *Personality and Assessment*. Wiley, 1968.
Sarason, I. G. *Personality: An Objective Approach*. Wiley, 1966, New York.

Part B: Psychological Statistics II

Armore, S. J. *Introduction to Statistical Analysis and Inference*. Wiley, 1966.

Part C: Psychological Testing

Anastasi, A. *Psychological Testing*. Macmillan, 1968.

12.013 Psychology III

Part A: Psychological Statistics III

McNemar, Q. *Psychological Statistics*. Wiley, 1962.

Part B: Electives

Differential Psychology

Tyler, L. E. *The Psychology of Human Differences*. 3rd ed., Appleton-Century, 1965.

Abnormal Psychology

Buss, A. H. *Psychopathology*. Wiley, 1966.
Goldstein, M. J. and Palmer, J. O. *The Experience of Anxiety*. 1964.
Kisker, G. W. *The Disorganized Personality*. McGraw-Hill, 1964.

Child Psychology and Guidance

Mussen, P. H., Conger, J. J. and Kagan, J. *Child Development and Personality*. 2nd ed., Harper and Row, 1963.

Abilities and Cognition

Bruner, G. S., Goodnow, G. G. and Austin, G. A. *A Study of Thinking*. Wiley, 1956 (or paperback ed.: Science Editions, 1965).
Vernon, P. E. *The Structure of Human Abilities*. Methuen, 1961.

Psychometrics

Guilford, J. P. *Psychometric Methods*. McGraw-Hill, 1956.
Nunnally, J. *Psychometric Theory*. McGraw-Hill, 1967.

Social Psychology

Hollander, E. P. *Principles and Methods of Social Psychology*. Oxford U.P., 1967, New York.

*or**

Jones, E. E. and Gerard, H. B. *Foundations of Social Psychology*. Wiley, 1967, New York.

*Selection to be made in consultation with the Head of the School of Applied Psychology.

Learning

Carroll, J. B. *Language and Thought*. Prentice-Hall. Foundations of Modern Psychology Series, 1964.

Keller, F. S. *Learning: Reinforcement Theory*. Random House, N.Y., 1954.

Mednick, S. A. *Learning*. Prentice-Hall. Foundations of Modern Psychology Series, 1964.

Oldfield, R. C. and Marshall, J. C. eds. *Language*. Penguin, 1968.

Perception

Dember, W. N. *The Psychology of Perception*. Holt & Co., N.Y., 1960.

Motivation

Murray, E. J. *Motivation and Emotion*. Prentice-Hall. Foundations of Modern Psychology Series, 1964.

12.014 Psychology IV

To be determined in consultation with Head of School.

12.042 Psychology IIA

References will be listed in lectures.

12.044 Psychology IIIA

Part A: Psychological Issues

Helson, H. and Bevan, W. *Contemporary Approaches to Psychology*. Van Nostrand, Princeton, N.J., 1967.

Part B: Electives:

Guidance and Counselling

Dunnett, M. D. *Personnel Selection and Placement*. Tavistock, 1966.

Perez, J. F. *Counselling Theory and Practice*. Addison-Wesley, 1965.

Tyler, L. *The Work of the Counsellor*. Appleton, 1961.

12.045 Psychology IV (Industrial)

Part A: Industrial Psychology and Personnel Techniques

Bass, B. *Organizational Psychology*. Allyn & Bacon Inc., 1966.

Part B: Counselling

Arbuckle, D. S. *Counselling: Philosophy, Theory and Practice*. Allyn and Bacon, 1966.

Sefflre, B. *Theories of Counselling*. McGraw-Hill, 1965. .

Tallent, N. *Clinical Psychological Consultation*. Prentice-Hall, 1963.

Part C: Social

March, J. G. and Simon, H. A. *Organizations.* Wiley, 1958.

Texts and references for other sections of the course will be detailed during lectures.

12.055 Psychology IV (Clinical)

Arbuckle, D. S. *Counselling: Philosophy, Theory and Practice.* Allyn and Bacon, 1966.

Sefflre, B. *Theories of Counselling.* McGraw-Hill, 1965.

Tallent, N. *Clinical Psychological Consultation.* Prentice-Hall, 1963.

Texts and References for other sections of the course will be detailed in lectures.

12.741 Psychology (Optometry)

Coville, W. J. *Abnormal Psychology.* College Outline Series, Barnes & Noble, New York, 1960.

Dember, W. N. *Psychology of Perception.* Henry Holt & Co., 1960.

SCHOOL OF BIOCHEMISTRY

Biochemistry involves a study of the chemistry of living organisms, and it is a subject where those interested in biology and those interested in chemistry work together to increase our understanding of life.

Some of the most spectacular achievements of recent times have been in the unravelling of the chemistry and function of very large molecules, macromolecules, of proteins, nucleic acids and polysaccharides which occur in living organisms. This has resulted in a better understanding of the transmission of hereditary information and the adaptation of organisms to the environment by mutations and natural selection.

Major areas of interest in biochemistry at the present time involve a study of the chemistry of these large molecules involved in body processes such as growth, movement and reproduction. The formation and breakdown of these large molecules is known as metabolism and necessarily includes the chemical processes, involving both large and small molecules, present in foodstuffs, which provide the necessary energy and the simple molecules or monomers that are then used in biosynthesis of these larger molecules which constitute the organism.

Basic to any understanding of the reactions of living organisms is the process of promoting chemical reactions under physiological conditions, that is, at low temperatures. A considerable emphasis is placed on understanding the hundreds of different types of enzymes, large protein molecules, each specifically designed for promoting one particular chemical reaction, the speed with which they function and the factors which control their operation.

The integration and control of biochemical reactions involves the study of hormones, or chemical messengers, that are synthesised in certain glands and exert their effects on cells, often situated in distant parts of the body, after being transported in the circulating blood or other vascular fluid.

A knowledge of biochemistry is essential in maintaining the health of living organisms and is vital to the study of Medicine. There is an overlap with other biological sciences so that Biochemistry is a co-requisite or pre-requisite for study in the disciplines of Biological Technology, Botany, Microbiology,

Physiology and Zoology. Biochemistry on the other hand draws particularly on a background of Biology and Chemistry and some knowledge of Mathematics and Physics.

There are excellent prospects for advanced training at honours level, involving an additional year's training, mainly in research, and for graduate research work for the Master of Science degree or for the Doctorate in Philosophy.

Biochemistry plays a role in so many facets of human activity that for students majoring in Biochemistry there are good employment opportunities in educational institutions, in many research areas, e.g., in Universities, C.S.I.R.O., Public Health and hospital organizations, and in industries concerned with food, pharmaceuticals and agriculture.

41.101A Chemistry of Biologically Important Molecules

The nature and origin of living matter. Chemistry of heterocycles. Biological techniques. The role of proteins; the properties of amino-acids; the structure of small proteins. The chemical nature of the hereditary material; the structure of nucleic acids and nucleoproteins. Bioenergetics. The chemistry of carbohydrates and lipids. Enzymology.

TEXTBOOKS

Karlson, P. *Introduction to Modern Biochemistry*. 3rd ed., Academic Press, 1958.

Stephenson, W. K. *Concepts of Biochemistry: A Programmed Text*. Wiley, 1967.

PRE-REQUISITES

17.001 General and Human Biology.
2.001 Chemistry I *or* 2.011 Higher Chemistry I.

CO-REQUISITES

41.101B Metabolism.

This unit is offered in the first half of the year, and consists of 30 hours' lecture and 60 hours' laboratory time.

41.101B Metabolism

Glycolysis. The mitochondrion and biological oxidation. Lipid metabolism. Glucose-6-phosphate oxidation and ancillary reactions. Amino-acid metabolism. Purine and pyrimidine metabolism. Protein biosynthesis.

TEXTBOOKS

Karlson, P. *Introduction to Modern Biochemistry*. 3rd ed., Academic Press, 1958.

Stephenson, W. K. *Concepts of Biochemistry: A Programmed Text*. Wiley, 1967.

PRE-REQUISITES

17.001 General and Human Biology.
2.001 Chemistry I *or* 2.011 Higher Chemistry I.

CO-REQUISITES

41.101A Chemistry of Biologically Important Molecules.

This unit is offered in the first half of the year, and consists of 30 hours' lecture and 60 hours' laboratory time.

41.101C Control Mechanisms

The relation of protein structure to function. Hormones and vitamins. The structure and function of membranes. Metabolic networks and control mechanisms. The red blood cell. Photosynthesis. Comparative biochemistry.

TEXTBOOKS

Karlson, P. *Introduction to Modern Biochemistry*. 3rd ed., Academic Press, 1958.

Stephenson, W. K. *Concepts of Biochemistry: A Programmed Text*. Wiley, 1967.

PRE-REQUISITES

17.001 General and Human Biology.
2.001 Chemistry I *or* 2.011 Higher Chemistry I.

CO-REQUISITES

This unit is offered in the second half of the year, and consists of 30 hours' lecture and 60 hours' laboratory time.

41.102 Biochemistry II

The fine structure of cells; enzymology and enzyme kinetics; biophysical chemistry; nucleic acid metabolism and protein synthesis; biological oxidation; isotopes in metabolic studies; photosynthesis; advanced biochemistry of carbohydrates and proteins; porphyrins and hormones. Practical work to illustrate the lectures.

TEXTBOOKS

Watson, J. D. *The Molecular Biology of the Gene*. Benjamin, 1966.

and either

West, E. S., Todd, W. R., Mason, H. S. and van Bruggen, J. T. *Textbook of Biochemistry*. 4th ed. Collier MacMillan, 1966.

or

White, A., Handler, R. and Smith, E. L. *Principles of Biochemistry*. 4th ed. McGraw-Hill, 1968.

PRE-REQUISITES

See Science Course regulations.

This subject is equivalent to four units, and consists of 3 hours' lecture and 10 hours' laboratory time throughout the year.

SCHOOL OF BIOLOGICAL TECHNOLOGY

The School is primarily concerned with the development of multi-disciplinary approaches to basic and applied problems in biochemistry and microbiology, and in particular those problems which arise from or have relevance to the various biological technologies in industry, agriculture and medicine. The well-established methodologies of biochemistry and microbiology can be strengthened and diversified by the newer mathematical techniques, and can be used most effectively in conjunction with the rigorous quantitative methods common in the physical sciences and in engineering.

Currently, the School has a major interest in fermentation processes and in their extension and development in new areas, such as the extraction of metals from their ores, the utilisation of natural gas and petroleum, and the conversion to useful products of non-edible agricultural materials. Basic studies on continuous biological processes and upon the growth kinetics and regulatory mechanisms of micro-organisms have been in progress for some years. Most of the activities in the School are collaborative with other schools and departments, in particular the Department of Biological Process Engineering of the School of Chemical Engineering.

Honours year programmes in the fourth year of the Science course can be undertaken in the School by students who have reached a satisfactory standard in biochemistry or microbiology in the third year of the course. A graduate diploma course in Biochemical Engineering is offered in collaboration with the School of Chemical Engineering and is open to graduates in relevant disciplines. The course is of one year's duration full-time or two years' duration part-time, and both programmes are currently available. Registration for the degrees of Master of Science or of Doctor of Philosophy is open to honours graduates in relevant disciplines or to those graduates who have completed the preliminary or qualifying programmes available in the School.

The principal educational objectives of the School are the training of graduates who, by participation in formal courses and research programmes of a collaborative kind, are experienced in the multi-disciplinary approach and appreciative of its potentialities.

SCHOOL OF BOTANY

Botany is concerned with all aspects of the structure and function of plants. Knowledge gained by investigations in these fields is important in agriculture, forestry and conservation, as well as in understanding the fundamental properties of biological material.

The major aspects of the subject which are taught in undergraduate courses in the School are Plant Genetics, Plant Physiology and Biochemistry, Plant Morphology, Environmental Botany, Mycology and Plant Pathology. Any of these courses are usually combined with appropriate subjects in Biochemistry, Microbiology and Zoology. By this means, students may complete their studies with a broad spread over a number of biological disciplines, or may concentrate more in botanical aspects, with other subsidiary supporting subjects.

Fourth year honours courses are provided for students wishing to specialise in a particular branch of botany.

Research facilities are available within the School of postgraduate study leading to a degree of Master of Science or Doctor of Philosophy.

Careers for graduates in Botany include teaching, at secondary or tertiary level, scientific and technological work in food and drug industries, and investigational or research work in the laboratories of State or Commonwealth organizations.

43.301A Genetics and Biometry

Analysis of the mitotic cycle; replication of DNA and its organization in the chromosomes; linkage, non-meiotic recombination; mutation, structural changes, polyploidy, aneuploidy; population genetics; cytoplasmic inheritance; episomes; gene structure and function. An introduction to statistical methods and their application to biological data, including an introduction to analysis of variance and experimental design.

TEXTBOOKS

Srb, A. M., Owen, R. D. & Edgar, R. S. *General Genetics.* 2nd ed. Freeman, 1965.

Goldstein, A. *Biostatistics.* Macmillan, 1964.

or

Bailey, N. T. J. *Statistical Methods in Biology.* E.U.P., 1959.

or

Stanley, J. *The Essence of Biometry*. McGill University Press, 1963.
or
Simpson, G. G., Roe, A., & Lewontin, R. C. *Quantitative Zoology*. Harcourt, Brace & Co., 1960.

PRE-REQUISITES
17.001 General and Human Biology.

This unit is offered in the first half of the year, and consists of 2 hours' laboratory and 4 hours' tutorial and lecture time per week.

43.301B Plant Morphology

Vegetative morphology and anatomy of vascular plants and an introduction to ecological anatomy. Floral morphology and the use of the key to the native flora of the Sydney and Blue Mountains area. The Australian vegetation. The vegetative structures of fungi. The methods of sexual and asexual reproduction, together with the various types of fruiting bodies which may be produced.

TEXTBOOKS
Alexopoulos, C. J. *Introductory Mycology*. Wiley, 1962.
Beadle, N. C. W., Evans, O. D., & Carolin, R. C. *Handbook of the Vascular Plants of the Sydney District and Blue Mountains*, 1962.
Eames, A. J., & McDaniels, L. H. *Introduction to Plant Anatomy*. 2nd ed. McGraw-Hill, 1947.
or
Esau, K. *Anatomy of Seed Plants*. Wiley, 1960.

PRE-REQUISITES
17.001 General and Human Biology.

This unit is offered in the second half of the year, and consists of 2 hours' lecture and 4 hours' laboratory time per week.

43.301C Plant Physiology

Photosynthesis and selected aspects of plant metabolism. Nitrogen fixation; translocation and uptake of inorganic ions; the physiology of growth and development in plants; plant growth hormones and herbicides.

TEXTBOOK
Leopold, A. C. *Plant Growth and Development*. McGraw-Hill, 1964.

PRE-REQUISITES
17.001 General and Human Biology.

This unit is offered in the second half of the year, and consists of 2 hours' lecture and 4 hours' laboratory time per week.

43.102 Botany II

Plant pathology, cytogenetics, plant physiology and environmental botany, evolution and a study of the major plant groups, including Angiosperm systematics.

TEXTBOOKS

Alexopoulos, C. J. *Introductory Mycology*. Wiley, 1962.
Beadle, N. C. W., Evans, O. D. & Carolin, R. C. *Handbook of the Vascular Plants of the Sydney District and the Blue Mountains*, 1962.
Carlquist, S. *Comparative Plant Anatomy*. Holt, Rinehart & Winston, 1962.
Hartman, P. E. & Susskind, S. R. *Gene Action*. Prentice-Hall, 1965.
Morriss, I. *An Introduction to Algae*. Hutchinson, 1967.
Sporne, K. R. *The Morphology of the Gymnosperms*. Hutchinson, 1967.
Sporne, K. R. *The Morphology of the Pteridophytes*. Hutchinson, 1966.
Swanson, C. P., Merz, T., & Young, W. J. *Cytogenetics*. Prentice-Hall, 1967.
Walker, J. C. *Plant Pathology*. 3rd ed. McGraw-Hill, 1968.
Watson, E. V. *The Structure and Life of the Bryophytes*. Hutchinson, 1964.

This subject is the equivalent of 4 units, and consists of 3 hours' lecture and 10 hours' laboratory time per week throughout the year.

SCHOOL OF CHEMISTRY

Chemistry is the science of materials, their properties and their transformations. As such, it is both an experimental and a theoretical science. Chemistry provides a common language for the experimental sciences, comparable with the language of quantitative scientific thought provided by mathematics, and is central among them, lying between physics on the one hand, and biology on the other. The interdependence of chemistry and other sciences is exemplified in the fields of biochemistry, chemical physics, geochemistry and chemical engineering. Additional to its intrinsic value, chemistry provides the basis of modern technology, through its contributions to medicine, industry and agriculture.

A recent survey of chemistry has been published as the Westheimer report, *Chemistry—A New Look* (Benjamin paperback, 1966), and is an ideal reference book for any student entering upon a career in chemistry.

Chemistry forms a part of many undergraduate courses offered, for example, Chemistry in the Science course, and Pure and Applied Chemistry. Additionally, there are courses within the Faculty of Applied Science, such as Industrial Chemistry, Polymer Science, Ceramic Engineering, Food Technology, Chemical Engineering, Textile Technology, Fuel Engineering and Metallurgy, which are predominantly concerned with technological aspects of chemistry.

The School of Chemistry provides two main undergraduate courses, namely (1) pure and applied chemistry, and (2) chemistry (as a co-major) in the Science course. Both courses lead to the B.Sc. degree.

A study of Chemistry (as a co-major) in the Science course involves a study of two branches of science to an advanced level.* For example, Chemistry III combined with Mathematics III will provide a useful basis for later specialization in X-ray crystallography or theoretical chemistry; combined with Geology III, it will be of assistance to those who later wish to specialize in geochemistry. Another possibility is to combine Chemistry III with Biochemistry II. These courses are suitable for those who

* A double major in Chemistry (Chemistry III and Chemistry III Supplementary) is possible in 1969 and 1970, but not thereafter.

wish to acquire advanced knowledge of two fields of study, or of interdisciplinary subjects. The Science course is also suitable for those planning to teach Chemistry at the secondary level. On a full-time basis, the Science course may be taken in three years (pass) or four years (with honours). On a part-time basis, however, the Science course may, according to the choice of subjects, require seven years (pass).

The Pure and Applied Chemistry course provides a study in depth largely of one field only. The course consists of the fundamental principles of chemistry and in addition elective topics are offered in contemporary fields of chemistry. It may be taken either full-time (three years for pass, four years for honours) or part-time (six years for pass, eight years for honours). The subject matter of each full-time year is identical with that of the two corresponding part-time years, and transfer from full-time to part-time, or vice versa, is possible. No industrial training is required for either the full-time or part-time course, though it is customary for students taking the part-time course to find employment in some branch of chemical industry.

Career opportunities exist for graduates of the School of Chemistry in universities, the Commonwealth Scientific and Industrial Research Organization (C.S.I.R.O.), the Australian Atomic Energy Commission (A.A.E.C.), defence research, medical research, public health, Customs and other State and Commonwealth Government organizations. Opportunities also exist in secondary teaching, and in chemical industry, particularly in the research and development, control and management sections.

The role of basic scientific research in the creation of modern industrial society is widely accepted. The usual introduction to research in chemistry is provided by the honours degree (in either the Science course, or the Pure and Applied Chemistry course), which may be followed by a higher research degree in Chemistry (e.g., M.Sc., Ph.D.). These degrees are aimed at those whose interests are in research and/or teaching. Combination of chemistry with biochemistry, with mathematics, or with geology form a satisfactory foundation for an honours degree in chemistry.*

REQUIREMENTS FOR HONOURS IN CHEMISTRY

Students desiring admission to the honours course must apply in writing to the Head of the School not later than 30th November of the year in which the third year of the full-time (or equivalent stage of the part-time) course is completed.

* As does the double major in Chemistry—available 1969 and 1970 only.

The requirement for admission to the honours course is a sufficiently meritorious record in the work of the pass degree.

The major part of the work for honours will consist of a research project which may be undertaken in any one of the six departments. A written thesis is submitted on the research project, and there is also some formal course work. Attendance will be required at such lectures and seminars as the Head of the School directs. Honours will not be awarded in any particular branch of the subject, but in chemistry as a whole.

For admission to the honours chemistry course in Science, the applicant must complete Chemistry III and one other group three subject. Students who at the beginning of their third year are already interested in taking honours in chemistry are advised to seek guidance from the School about the most appropriate subject to accompany Chemistry III.*

Prospective Honours students in the Pure and Applied Chemistry course should seek guidance before choosing their elective subjects in final year.

PURE AND APPLIED CHEMISTRY—FULL-TIME COURSE

Bachelor of Science

This course may be taken at pass or honours standard. The pass course requires full-time attendance at the University for three years. An additional year is required for the honours course.

This course is being revised. By allowing a student the opportunity to choose electives from other faculties such as Commerce or Applied Science, the course structure will also broaden its scope. Areas such as industrial chemistry, management and technical services can thus be covered to cater for those students who feel that their vocational interests lie in one particular region.

*The combination Chemistry III and Chemistry III (Supplementary)—available in 1969 and 1970 only—is desirable, but not essential.

First Year
(30 weeks' day course)

		Hours per week for 3 terms Lec. Lab./Tut.
1.011	Higher Physics I *or*	
1.001	Physics I	3 — 3
2.011	Higher Chemistry I *or*	
2.001	Chemistry I	2 — 4
10.011	Higher Mathematics I *or*	
10.001	Mathematics I	4 — 2
Plus one of—		
5.001	Engineering I	
17.001	General and Human Biology	3 — 3
25.001	Geology I*	
27.031	Geography IS	2 — 4
		12 —12
		or
		11 —13

* Three field excursions, up to five days in all, are an essential part of the course.

Second Year
(30 weeks' day course)

		Hours per week for 3 terms Lec. Lab./Tut.
2.311	Physical Chemistry	2 — 3
2.341	Chemical Instrumentation*	1 — 2
2.351	Chemical Calculations	1 — 0
2.411	Inorganic Chemistry	1 — 2
2.441	History of Chemistry	1 — 0†
2.511	Analytical Chemistry	2 — 3‡
2.611	Organic Chemistry	2 — 3
10.031	Mathematics	1 — 1
	General Studies Elective	1 — ½
		12 —14½

* Alternative subject 1.212 Physics.
† Term 2 only.
‡ Hours for Term 2: 1 — 3.

Third Year
(30 weeks' day course)

		Hours per week for 3 terms Lec. Lab./Tut.
2.322	Physical Chemistry	2 — 3
2.361	Applied Chemistry	1 — 0
2.422	Inorganic Chemistry	1 — 2
2.522	Analytical Chemistry	1 — 2
2.622	Organic Chemistry	2 — 5
22.131	Industrial Chemistry	2 — 0
	Two General Studies Electives	2 — 1

Plus one of (see overleaf)

Plus one of—			
2.211	Applied Organic Chemistry		
2.221	Applied Organic Chemistry (Food)		
2.331	Applied Physical Chemistry	.....	1 — 3
2.433	Inorganic Chemistry III		
2.533	Analytical Chemistry III		
2.811	Nuclear and Radiation Chemistry		
			12 —16

Fourth Year — Honours Course
(30 weeks' day course)

		Hours per week for 3 terms Lec. Lab./Tut.
2.014	Chemistry IV	3 — 0
2.091	Project	0 —20
	General Studies (Advanced Elective) ..	2 — 0
		5 —20

APPLIED CHEMISTRY—PART-TIME COURSE

Bachelor of Science

The part-time course in Applied Chemistry is equivalent to the full-time course and extends over six part-time years, leading to the degree of Bachelor of Science. Honours may be awarded on the completion of an additional year of full-time study or an additional two years of part-time study.

The part-time course has been designed for students employed in the chemical industry but employment in this industry is not obligatory for entrance to the course.

This course is being revised. By allowing a student the opportunity to choose electives from other faculties such as Commerce or Applied Science, the course structure will also broaden its scope. Areas such as industrial chemistry, management and technical services can thus be covered to cater for those students who feel that their vocational interests lie in one particular region.

First and Second Years
(30 weeks' part-time course)

Two of the following subjects will be taken in the first year and the other two in the second year (as directed).

		Hours per week for 3 terms Lec. Lab./Tut.
1.011	Higher Physics I *or*	
1.001	Physics I	3 — 3
2.011	Higher Chemistry I *or*	
2.001	Chemistry I	2 — 4
10.011	Higher Mathematics I *or*	
10.001	Mathematics I	4 — 2
Plus one of—		
5.001	Engineering I	
17.001	General and Human Biology	3 — 3
25.001	Geology I*	
27.031	Geography IS	2 — 4
		12 —12
		or
		11 —13

* Three field excursions, up to five days in all, are an essential part of the course.

Third Year
(30 weeks' part-time course)

		Hours per week for 3 terms Lec. Lab./Tut.
2.311	Physical Chemistry	2 — 3
2.351	Chemical Calculations	1 — 0
2.441	History of Chemistry	1 — 0*
2.511	Analytical Chemistry	2 — 3†
10.031	Mathematics	1 — 1
		7 — 7

* Term 2 only.
† Hours for Term 2: 1 — 3.

Fourth Year
(30 weeks' part-time course)

		Hours per week for 3 terms Lec. Lab./Tut.
2.341	Chemical Instrumentation*	1 — 2
2.411	Inorganic Chemistry	1 — 2
2.611	Organic Chemistry	2 — 3
	General Studies Elective	1 — ½
		5 — 7½

* Alternative subject—Physics 1.212.

Fifth Year

(30 weeks' part-time course)

		Hours per week for 3 terms Lec. Lab./Tut.
2.322	Physical Chemistry	2 — 3
2.422	Inorganic Chemistry	1 — 2
2.522	Analytical Chemistry	1 — 2
22.131	Industrial Chemistry (Processes)	1½— ½
	General Studies Elective	1 — ½
		6½— 8

Sixth Year

(30 weeks' part-time course)

		Hours per week for 3 terms Lec. Lab./Tut.
2.361	Applied Chemistry	1 — 0
2.622	Organic Chemistry	2 — 5
	General Studies Elective	1 — ½
Plus one of—		
2.211	Applied Organic Chemistry	1 — 3
2.221	Applied Organic Chemistry (Food)	
2.331	Applied Physical Chemistry	
2.433	Inorganic Chemistry III	
2.533	Analytical Chemistry III	
2.811	Nuclear and Radiation Chemistry	
		5 — 8½

CHEMISTRY TEXT AND REFERENCE BOOKS

2.001 Chemistry I and 2.011 Higher Chemistry I

TEXTBOOKS

Ander and Sonnessa. *Principles of Chemistry*. Collier Macmillan, 1966.
Aylward and Findlay. eds. *Chemical Data Book*. 2nd ed. Wiley, 1967.
Chemistry 1 Laboratory Manual. Univ. of N.S.W., 1969.
Hart and Schuetz. *Organic Chemistry*. Feffer and Simons, 1967.
Sanderson. *Principles of Chemistry*. Wiley, 1967.

REFERENCE BOOKS

Barrow, Kenney, Lassila, Litle and Thompson. *Programmed Supplements for General Chemistry*. Vols. I and II, Benjamin, 1963.
Brown. *A New Guide to Modern Valency Theory*. Longmans, 1967.
Eastwood, Swan and Youatt. *Organic Chemistry. A First University Course in Twelve Programs*. Science Press, 1967.

Gray and Haight. *Basic Principles of Chemistry*. Benjamin, 1967.
Pauling. *College Chemistry*. 3rd ed. Freeman, 1964.

2.021 Chemistry IE

TEXTBOOKS

Aylward and Findlay. eds. *Chemical Data Book*. 2nd ed. Wiley, 1967.
Chemistry IE—Laboratory Manual. Univ. of N.S.W., 1969.
Sanderson. *Principles of Chemistry*. Wiley, 1967.
Strong & Stratton. *Chemical Energy*. Reinhold, 1965, *or*, Chapman & Hall, 1966.

2.002 Chemistry II

For Physical Section, see under 2.311.
For Organic Section, as for 2.611, omitting Framework Molecular Models Kit.

Inorganic/Analytical Section:

TEXTBOOKS

Brumblay. *Quantitative Analysis*.
Jolly. *The Chemistry of the non-metals*.
Larsen. *Transitional Elements*.

REFERENCE BOOKS

Barnard. *Theoretical Basis of Inorganic Chemistry*.
Brown and Sallee. *Quantitative Chemistry*.
Cotton and Wilkinson. *Advanced Inorganic Chemistry*. 2nd ed. Wiley.
Douglas, B. E. and McDaniel, D. H. *Concepts and Models of Inorganic Chemistry*. Blaisdell Intl. Textbook Series.
Emeleus and Anderson. *Modern Aspects of Inorganic Chemistry*.
Pauling. *Nature of the Chemical Bond*.
Sidgwick. *Chemical Elements and their Compounds*. Vols. I & II.
Sienko and Plane. *Physical Inorganic Chemistry*.

2.003 Chemistry III

For Physical Section, see under 2.322.
For Analytical Section, see under 2.522.

Inorganic Section

TEXTBOOK

Vogel. *Macro and Semi-micro Qualitative Inorganic Analysis*.

REFERENCE BOOKS

Adams and Raynor. *Advanced Practical Inorganic Chemistry*. Wiley, 1965.
Bailar. *Chemistry of the Co-ordination Compounds*.
Barnard. *Theoretical Basis of Inorganic Chemistry*.
Cotton and Wilkinson. *Advanced Inorganic Chemistry*. 2nd ed., Wiley, 1966.
Durrant and Durrant. *Advanced Inorganic Chemistry*. Longmans, 1962.
Dwyer and Mellor. *Chelating Agents and Metal Chelates*.
Emeleus and Anderson. *Modern Aspects of Inorganic Chemistry*.
Lee. *Concise Inorganic Chemistry*.
Lewis and Wilkins. *Modern Co-ordination Chemistry*. Interscience, 1960.
Pauling. *Nature of the Chemical Bond*.

Remy. *Treatise on Inorganic Chemistry*, Vols. I and II.
Sidgwick. *Chemical Elements and their Compounds*, Vols. I and II.
Sienko and Plane. *Physical Inorganic Chemistry.*
Wells. *Structural Inorganic Chemistry.*

Organic Section:
TEXTBOOKS as for 2.622 omitting Pryor.

REFERENCE BOOKS as for 2.622 omitting House and Whitham.

Students are required to obtain a Framework Molecular Models Kit as provided by Prentice-Hall of Australia Pty. Ltd.

2.022 Chemistry II M

As for 2.002 Chemistry II, omitting Organic Section.

2.053 Chemistry III (Supplementary)

A. *Physical Chemistry Major*—books as for 2.331.
B. *Inorganic Chemistry Major.*
TEXTBOOK
Cotton and Wilkinson. *Advanced Inorganic Chemistry*. 2nd ed., Wiley, 1966.
REFERENCE BOOKS
Adams and Raynor. *Advanced Practical Inorganic Chemistry*. Wiley, 1965.
Basolo and Pearson. *Mechanics of Inorganic Reactions.*
Dwyer and Mellor. *Chelating Agents and Metal Chelates.*
Edwards. *Inorganic Reaction Mechanisms.* Benjamin, 1964.
Emeleus and Anderson. *Modern Aspects of Inorganic Chemistry.*
Lewis and Wilkins. *Modern Co-ordination Chemistry.*
Pauling. *Nature of the Chemical Bond.*
Rossotti and Rossotti. *Stability Constants.*
Sienko and Plane. *Physical Inorganic Chemistry.*

C. Organic Chemistry Major
TEXTBOOKS as for 2.622.

REFERENCE BOOKS as for 2.622 omitting House.
D. Nuclear and Radiation Chemistry Major—as for 2.811.

Students are required to obtain a Framework Molecular Models Kit as provided by Prentice-Hall of Australia Pty. Ltd.

2.211 Applied Organic Chemistry

REFERENCE BOOKS
Garney. *Laboratory Fractional Distillation.*
Flory. *Principles of Polymer Chemistry.*
Heftmann. *Chromatography.*
Kharasch. *Organic Sulphur Compounds.*
Lenz. *Organic Chemistry of Synthetic Polymers.*
Lundberg. *Autoxidation and Autoxidants*, Vols. I and II.
Markley. *The Fatty Acids.* 2nd ed.
Pinder. *Chemistry of the Terpenes.*
Pryor. *Mechanisms of Sulphur Reactions.*
Rosenberg. *Chemistry and Physiology of the Vitamins.*
Schwarz. *Physical Methods in Organic Chemistry.*
Scott. *Atmospheric Oxidation and Antioxidants.*
Solomon. *Organic Film Formers.* Wiley.

2.221 Applied Organic Chemistry (Food)

REFERENCE BOOKS

Heftmann. *Chromatography.*
Joslyn. *Methods in Food Analysis.*
Karrer and Jucker. *Carotenoids.*
Laidler. *Introduction to the Chemistry of Enzymes.*
Markley. *The Fatty Acids.* 2nd ed.
Neurath. *Proteins.* Vols. I-III, 2nd ed.
Pigman. *The Carbohydrates.*
Sebrell and Harris. *The Vitamins.* Vols. I-VII.
Winton and Winton. *Structure and Composition of Foods.*

2.261 Applied Organic Chemistry (Food)

REFERENCE BOOKS

Heftman. *Chromatography.*
Karrer and Jucker. *Carotenoids.*
Markley. *The Fatty Acids.*
Neurath. *The Proteins.* Vols. I-III, 2nd ed.
Pigman. *The Carbohydrates.*
Rosenberg. *Chemistry and Physiology of the Vitamins.*
Schwarz. *Physical Methods in Organic Chemistry.*
Scott. *Atmospheric Oxidation and Antioxidants.*
Stock and Rice. *Chromatographic Methods.*
Walton. *Principles and Methods of Chemical Analysis.*
Willard, Merritt and Dean. *Instrumental Methods of Analysis.*

2.311 Physical Chemistry I

TEXTBOOKS

Aylward and Findlay (eds.). *Chemical Data Book.* 2nd ed., Wiley, 1966.
Barrow. *Physical Chemistry.* 2nd ed. McGraw-Hill, 1966.
Daniels et al. *Experimental Physical Chemistry.* 6th ed., McGraw-Hill, 1962.
Pohl. *Quantum Mechanics for Science and Engineering.* Prentice-Hall, 1967.
Shaw. *Introduction to Colloid and Surface Chemistry.* Butterworth, 1966.

REFERENCE BOOKS

Daniels and Alberty. *Physical Chemistry.* 3rd ed. Wiley, 1966.
Barrow. *Structure of Molecules.* Benjamin, 1963.
Glasstone. *Textbook of Physical Chemistry.* Van Nostrand or Macmillan, 1948.
Jirgensons and Straumanis. *A Short Textbook of Colloid Chemistry.* 2nd ed. Pergamon, 1962.
Moore. *Physical Chemistry.* 4th ed. Longmans, 1963.
Shoemaker and Gorland. *Practical Physical Chemistry.* 2nd ed. McGraw-Hill, 1967.

2.322 Physical Chemistry II

TEXTBOOKS

Barrow. *Physical Chemistry.* 2nd ed., McGraw-Hill, 1966.
Carswell. *Introduction to Nuclear Chemistry.* Elsevier, 1967
or
Friedlander and Kennedy. *Nuclear and Radiochemistry,* 2nd ed., Wiley, 1964.

Coulson. *Valence*. 2nd ed., Oxford, 1961.
Daniels et al. *Experimental Physical Chemistry*. 6th ed., McGraw-Hill, 1962.
Golding, R. H. *Applied Wave Mechanics*. Van Nostrand, 1969.
Laidler. *Chemical Kinetics*. 2nd ed., McGraw-Hill, 1965.

REFERENCE BOOKS
Amdur and Hammes. *Chemical Kinetics*. McGraw-Hill, 1966.
Bersohn and Baird. *Introduction to Electron Paramagnetic Resonance Spectroscopy*. Benjamin, 1966.
Bond. *Catalysis by Metals*. Academic Press, 1962.
Boudart. *Kinetics of Chemical Processes*. Prentice-Hall, 1968.
Calvert and Pitts. *Photochemistry*. 1966.
Eggers et al. *Physical Chemistry*. Wiley, 1964.
Glasstone, Laidler and Eyring. *Theory of Rate Processes*. McGraw-Hill, 1941.
Pople, Schneider and Bernstein. *High Resolution Nuclear Magnetic Resonance*. McGraw-Hill, 1959.

2.331 Applied Physical Chemistry

REFERENCE BOOKS
Benyon. *Mass Spectrometry and its Application to Organic Chemistry*.
Delahay. *The Double Layer and Electrode Kinetics*. Interscience, 1965.
King. *Spectroscopy and Molecular Structure*. Holt, Rinehart & Winston, 1964.
Nuffield. *X-Ray Diffraction Methods*. Wiley, 1966.

2.341 Chemical Instrumentation

TEXTBOOKS
Daniels et al. *Experimental Physical Chemistry*. 6th ed., McGraw-Hill, 1962.
Martin and Johnson. *Practical Microscopy*. 3rd ed., Blackie, 1958.

REFERENCE BOOKS
Chamot and Mason. *Handbook of Chemical Microscopy*. Vol. I, Wiley, 1958.
Malmstedt, Enke and Toren. *Basic Electronics for Scientists*. Benjamin, 1963.
Strobel. *Chemical Instrumentation*. Addison-Wesley, 1960.
Wood. *Crystals and Light*. Van Nostrand, 1964.

2.351 Chemical Calculations

TEXTBOOK
Bosworth, Lark and Craven. *The Handling of Chemical Data*. Pergamon, 1968.

REFERENCE BOOKS
Bennett and Franklin. *Statistical Analysis in Chemistry and the Chemical Industry*. Wiley, 1954.
Davies. *Statistical Methods in Research and Production*. 3rd ed., Oliver and Boyd, 1957.
Mandel. *The Statistical Analysis of Experimental Data*. Interscience, 1964.
Worthing and Geffner. *Treatment of Experimental Data*. Wiley, 1943.

2.361 Applied Chemistry

REFERENCE BOOKS

Bird, Stewart and Lightfoot. *Transport Phenomena.* Wiley, 1960.
Corley. *Successful Commercial Chemical Development.* Wiley, 1954.
Himmelblau. *Basic Principles and Calculations in Chemical Engineering.* 2nd ed., Prentice-Hall, 1967.
Johnson. *Analogue Computer Techniques.* McGraw-Hill, 1956.
Johnstone and Thring. *Pilot Plants, Models and Scale-up Methods in Chemical Engineering.* McGraw-Hill, 1957.
Landau (ed.). *Chemical Plant.* Reinhold, 1966.
Langhaar. *Dimensional Analysis and the Theory of Models.* Wiley, 1951.
Perry. *Chemical Business Handbook.* 1st ed., McGraw-Hill, 1954.
Shilling. *Process Dynamics and Control.* McGraw-Hill.

2.411 Inorganic Chemistry I

TEXTBOOK

Cotton and Wilkinson. *Advanced Inorganic Chemistry.* 2nd ed. Wiley, 1966.

REFERENCE BOOKS

Bailar. *Chemistry of the Co-ordination Compounds.*
Barnard. *Theoretical Basis of Inorganic Chemistry.*
Basolo and Johnson. *Introduction to Co-ordination Chemistry.*
Dwyer and Mellor. *Chelating Agents and Metal Chelates.*
Graddon. *An Introduction to Co-ordination Chemistry.*
Jolly. *Chemistry of the Non-Metals.*
Jones, M. *Elementary Co-ordination Chemistry.*
Larsen. *Transitional Elements.*
Lewis and Wilkins. *Modern Co-ordination Chemistry.*
Sienko and Plane. *Physical Inorganic Chemistry.*
Sidgwick. *Chemical Elements and their Compounds.* Vols. I & II.
Vogel. *A Textbook of Macro and Semi-micro Qualitative Inorganic Analysis.*
Wells. *Structural Inorganic Chemistry.*

2.422 Inorganic Chemistry II

TEXTBOOK

Cotton and Wilkinson. *Advanced Inorganic Chemistry.* 2nd ed. Wiley, 1966.

REFERENCE BOOKS

Adams and Raynor. *Advanced Practical Inorganic Chemistry.* Wiley, 1965.
Bailar. *Chemistry of Co-ordination Compounds.*
Barnard. *Theoretical Basis of Inorganic Chemistry.*
Dwyer and Mellor. *Chelating Agents and Metal Chelates.*
Lewis and Wilkins. *Modern Co-ordination Chemistry.* Wiley.
Lee. *Concise Inorganic Chemistry.*
Sidgwick. *Chemical Elements and their Compounds,* Vols. I and II.
Sienko and Plane. *Physical Inorganic Chemistry.*
Wells. *Structural Inorganic Chemistry.*

2.433 Inorganic Chemistry III

TEXTBOOK

Cotton and Wilkinson. *Advanced Inorganic Chemistry.* 2nd ed. Wiley, 1966.

REFERENCE BOOKS
Adams and Raynor. *Advanced Practical Inorganic Chemistry*. Wiley, 1965.
Basolo and Pearson. *Mechanics of Inorganic Reactions.*
Dwyer and Mellor. *Chelating Agents and Metal Chelates.*
Edwards. *Inorganic Reaction Mechanisms.* Benjamin.
Emeleus and Anderson. *Modern Aspects of Inorganic Chemistry.*
Hannay. *Solid State Chemistry*. Prentice-Hall, 1967.
Lewis and Wilkins. *Modern Co-ordination Chemistry.*
Sidgwick. *Chemical Elements and their Compounds,* Vols. I and II.
Sienko and Plane. *Physical Inorganic Chemistry.*
Wells. *Structural Inorganic Chemistry.*

2.451 Inorganic/Analytical Chemistry

For Inorganic Section, see 2.411.
Analytical Section

TEXTBOOK
Brown and Sallee. *Quantitative Chemistry*. Prentice-Hall, 1963.

REFERENCE BOOKS
Delahay. *Instrumental Analysis.* New York, Macmillan, 1957.
Laitinen. *Chemical Analysis. New York,* McGraw-Hill, 1960.

2.511 Analytical Chemistry I

TEXTBOOKS
Brown and Sallee. *Quantitative Chemistry*. Prentice-Hall, 1963.
Lingane. *Analytical Chemistry of Metallic Elements.* Reinhold, 1966.

REFERENCE BOOKS
Delahay. *Instrumental Analysis.* New York, Macmillan, 1957.
Hamilton and Simpson. *Calculations of Analytical Chemistry*. 7th ed. McGraw-Hill.
Laitinen. *Chemical Analysis.* New York, McGraw-Hill, 1960.

2.522 Analytical Chemistry II

TEXTBOOK
Pecsok and Shields. *Modern Methods of Chemical Analysis.* Wiley, N.Y., 1968.

REFERENCE BOOKS
Delahay. *Instrumental Analysis.* McGraw-Hill, 1960.
Hamilton and Simpson. *Calculations of Analytical Chemistry*. 7th ed. McGraw-Hill.
Hildebrand, Lundell, Hofmann and Bright. *Applied Inorganic Analysis.* Wiley, 1953.
Laitinen. *Chemical Analysis.* New York, McGraw-Hill, 1960.
Lingane. *Electroanalytical Chemistry.* Interscience, 1958.
Schwarzenbach. *Complexometric Titrations.* London, Methuen, 1957.
Strouts, Gilfillan and Wilson (Eds.). *Analytical Chemistry,* 3 vols., Oxford University Press, 2nd ed.

2.533 Analytical Chemistry III

REFERENCE BOOKS

Flaschka. *E.D.T.A. Titrations.* Pergamon, 1959.
Heftmann. *Chromatography.* Reinhold, 1961.
Kolthoff and Lingane. *Polarography,* Vols. I and II. Interscience, 2nd ed., 1952.
Laitinen. *Chemical Analysis.* New York, McGraw-Hill, 1960.
Meites. *Polarographic Techniques.* Interscience, 1955.
Milner. *The Principles of Application of Polarography and other Electroanalytical Processes.* Longmans, 1951.
Purnell. *Gas Chromatography.* Wiley, 1962.
Schwarzenbach. *Complexometric Titrations.* London, Methuen, 1957.
Stock and Rice. *Chromatographic Methods.* 2nd ed. Science Paperbacks, Chapman and Hall.

2.611 Organic Chemistry I

TEXTBOOKS

1. Roberts and Caserio. *Basic Principles of Organic Chemistry*
   or
   Morrison and Boyd. *Organic Chemistry.* 2nd ed., Allyn & Bacon, 1966.
2. Vogel. *Elementary Practical Organic Chemistry.* Pt. II "Qualitative Organic Analysis", Longmans, 1957
   or
   Cheronis and Entriken. *Identification of Organic Compounds.* Wiley Internat. ed. (paperback).
   or
   Shriner, Fuson and Curtin. *Systematic Identification of Organic Compounds.* 5th ed., Wiley, 1964.

Students are required to obtain a Framework Molecular Models Kit as provided by Prentice-Hall of Australia Pty. Ltd.

2.622 Organic Chemistry II

TEXTBOOKS

Morrison and Boyd. *Organic Chemistry.* 2nd ed. Allyn & Bacon, 1966.
or
Roberts and Caserio. *Basic Principles of Organic Chemistry.* Benjamin, 1964.
Dyer. *Applications of Absorption Spectroscopy of Organic Compounds.* Prentice-Hall.
Hallas. *Organic Stereochemistry.* McGraw-Hill, 1965.
Pryor. *Introduction to Free Radical Chemistry.* Prentice-Hall.
and one of the following
Vogel. *Elementary Practical Organic Chemistry,* Pt. II, "Qualitative Organic Analysis". Longmans, 1957.
Cheronis and Entriken. *Identification of Organic Compounds.* Wiley Internat. ed. (paperback).
Shriner, Fuson and Curtin. *Systematic Identification of Organic Compounds.* Wiley, 5th ed., 1964.

Students are required to obtain a Framework Molecular Models Kit as provided by Prentice-Hall of Australia Pty. Ltd.

REFERENCE BOOKS

Acheson. *An Introduction to the Chemistry of Heterocyclic Compounds.* Interscience, 1960.
Eliel. *Stereochemistry of Carbon Compounds.* McGraw-Hill, 1962.
Gould. *Mechanism and Structure in Organic Chemistry.* Holt, Rinehart and Winston, 1959.
Hine. *Physical Organic Chemistry.* McGraw-Hill, 1964.
House. *Modern Synthetic Reactions.* Benjamin, 1965.
Sykes. *A Guidebook to Mechanism in Organic Chemistry.* Wiley, 1965.
Whitham. *Alicyclic Chemistry.* Oldbourne.

2.811 Nuclear and Radiation Chemistry

TEXTBOOKS

Carswell. *Introduction to Nuclear Chemistry.* Elsevier.

OR

Friedlander and Kennedy. *Nuclear and Radiochemistry,* 2nd ed., Wiley, 1964.

OR

Harvey. *Introduction to Nuclear Physics and Chemistry.* Prentice Hall, 1962.

REFERENCE BOOKS

Farley. *Elements of Pulse Circuits.* Methuen, 1955.
Glasstone. *Source Book on Atomic Energy.*
Haissinsky (Trans. D. G. Tuck). *Nuclear Chemistry and its Applications.* Addison-Wesley, 1964.
Sharpe. *Nuclear Radiation Detectors.* Methuen, 1964.
Spinks and Woods. *An Introduction to Radiation Chemistry.* Wiley, 1964.
Taylor. *The Measurement of Radioisotopes.* Methuen, 1959.

17.001 GENERAL AND HUMAN BIOLOGY

This is an introductory course for students intending to proceed in medicine or in the biological sciences. The structure of the course is determined by a committee drawn from the Faculty of Medicine and the Faculty of Biological Sciences, with Professor H. N. Barber as chairman. The acting director is Dr. A. E. Wood.

Syllabus—Characteristics of living organisms. Properties of living matter. Cell structure and function. Life cycles. An introduction to biochemistry, ultrastructure, genetics and cytology. Plant structure and function. Physiology of vertebrate animals. Human biology and variation. The biology of micro-organisms. Evolution. Anatomy and histology of selected animals. Practical work to illustrate the lecture course.

TEXTBOOKS

Abercrombie, Hickman and Johnson. *A Dictionary of Biology*. Penguin.

Keeton, W. T. *Biological Science*. Norton, New York, 1967.

GEOGRAPHY

FOR STUDENTS IN THE SCIENCE COURSE

The geographer studies variations from place to place on the earth arising from the spatial relationships of the phenomena making up man's physical and social environment. Apart from its cultural value, an understanding of these relationships is necessary for the conservation and planned development of physical and economic resources. Geography IS should be of particular interest to those studying concurrently in the physical and biological sciences.

Geography IS treats the elements of geography with emphasis on the physical basis. Climatology is introduced in terms of the energy balance of the atmosphere and then, through the hydrologic cycle, as a key to modes of landform evolution and to the major ecosystems and their world distribution. The lithological and structural bases of relief are studied and the land-forming processes of weathering and soil formation, denudation, and deposition are reviewed separately and in relation to life forms in the major ecosystematic complexes. The role of man as a physical geographic agent is also considered in this framework. Types and patterns of rural and urban land use are studied in the context of stages of agricultural and industrial development and of the locational factors involved. Patterns and structures of rural and urban settlements are analysed in functional terms. The interplay of geographic factors is illustrated by interpretative regional studies from southeast Australia and southeast Asia.

Laboratory work comprises the construction and use of maps, the assembly, analysis, and depiction of geographic data and the analysis of air photos.

Lecture, laboratory and tutorial arrangements for Geography IS are as follows:

27.031 Geography IS	Hours per Week for 3 Terms
Lectures	2
Laboratory	3
Tutorials	1
Plus 3 days fieldwork	

GEOGRAPHY TEXT AND REFERENCE BOOKS

27.031 Geography IS

TEXTBOOKS

Corbett, J. R. *The Living Soil.* Martindale Press.

CSIRO. *The Australian Environment.* Melbourne U.P.

Dickens, S. N. and Pitts, F. R. *Introduction to Human Geography.* Ginn Blaisdell.

Hare, F. K. *The Restless Atmosphere.* Hutchinson.

Monkhouse, F. J. and Wilkinson, H. R. *Maps and Diagrams.* Methuen.

Odum, E. P. *Ecology.* Modern Biology Series.

REFERENCE BOOKS

Barry, R. G. and Chorley, R. J. *Atmosphere, Weather and Climate.* Methuen.

Bureau of Meteorology. *Manual of Meteorology.*

Chisholm, M. *Rural Settlement and Land Use.* Hutchinson.

Estall, R. C. and Buchanan, R. O. *Industrial Activity and Economic Geography.* Hutchinson.

Fisher, C. A. *Southeast Asia.* Methuen.

Fogg, G. E. *The Growth of Plants.* Penguin.

Gentilli, J. *Sun, Climate and Life.* Jacaranda Press.

Gregory, S. *Statistical Methods for the Geographer.* Longmans.

McCarty, H. H. and Lindberg, J. B. *A Preface to Economic Geography.* Prentice-Hall.

Mayer, H. M. and Kohn, C. F. (eds.). *Readings in Urban Geography.* Chicago U.P.

Pettersen, S. *Introduction to Meterology.* McGraw-Hill.

Riley, D. and Young, A. *World Vegetation.* C.U.P.

Roepke, H. G. ed. *Readings in Economic Geography.* Wiley.

Rutherford, J., Logan, M. I. and Missen, G. J. *New Viewpoints in Economic Geography.* Martindale.

Stephens, C. G. *A Manual of Australian Soils.* CSIRO.

Strahler, A. N. *Physical Geography.* Wiley, International Edition.

Thomas, W. L. (ed.). *Man's Role in Changing the Face of the Earth.* Chicago U.P.

Tweedie, A. D. *Water and the World.* Nelson Paperback.

Twidale, C. R. *Geomorphology.* Nelson Paperback.

Wooldridge, S. W. and East, W. G. *The Spirit of Geography.* Hutchinson.

NOTE:

The cost of the field tutorials will be about $4.00; in addition, students will need drawing equipment and a topographic map costing a maximum of $8.00.

GEOLOGY

FOR STUDENTS IN THE SCIENCE COURSE

Students may major in Geology in the Science course (see the regulations governing this course). This course is available on both a full-time and a part-time basis and leads to the degree of Bachelor of Science, Pass or Honours. Students majoring in Geology will complete the following subjects:—

First year—25.001 Geology I (as for the Applied Geology degree course).

Second year—25.002 Geology II (as for the Applied Geology degree course).

Third year—25.003 Geology III (as for the Applied Geology degree course).

In addition, students in this course may take a second Geology subject in their third year, 25.013 Geology III (Supplementary). This course covers fields not dealt with in other Geology courses and advanced or specialized treatment of topics studied earlier. Section (a) of the course is compulsory and contains Geology of Fuels, Geomorphology and Photogeology, Structural Geology, Oceanography, Geochemistry and Geophysics. Candidates may select *either* Section (b) consisting of Clay Mineralogy and Mineragraphy, *or* Section (c) consisting of Stratigraphy and Palaeontology, to complete the course.

Honours in Geology

Full-time students in the Faculty of Science who have completed the two third year Geology subjects and part-time students who have completed course requirements up to the end of the sixth year and whose programme includes the two third year Geology subjects may apply to the Head of the School of Applied Geology to read for an Honours degree in Geology. Students who have majored in either Physics and Geology *or* Chemistry and Geology, may also be admitted with a view to studies in geophysics or geochemistry respectively.

The Honours course will consist of:—

A short field assignment with appropriate work in the laboratory on material collected, the results of both the field and laboratory investigations to be presented in a graduation thesis. Advanced lectures, practical work and seminars. Short laboratory assignments on specific problems may be given.

Further details of the Honours course may be had from the Head of School.

Full-time students will cover the Honours work in the fourth year of the course. Part-time students will be required to commence their field thesis work at the end of the sixth year of their course and advanced laboratory assignments will be done in the eighth year along with the further work necessary to complete the field thesis work.

Students seeking to do Honours in Geology will have to satisfy the Head of the School that they have attained a sufficient standard in their pass course work to indicate their ability to undertake geological studies at a more advanced level.

GEOLOGY TEXT AND REFERENCE BOOKS

25.001 Geology I

TEXTBOOKS

Dana's Minerals and How to Study Them. 1963, 3rd Science edition. Revised by C. S. Hurlbut, Jnr.

Longwell and Flint. *Introduction to Physical Geology.* Wiley.

McElroy. *Explanatory Notes to accompany the Sydney 4-mile Geological Map (with map).* Bureau of Mineral Resources, Canberra.

Read. *Rutley's Elements of Mineralogy.* Murby, London.

REFERENCE BOOKS

Dunbar. *Historical Geology.* Wiley.

Ford. *Dana's Textbook of Mineralogy.* Wiley.

Holmes. *Principles of Physical Geology.* Revised ed. Nelson & Sons, London, 1965.

Morley Davies. *An Introduction to Palaeontology.*

25.002 Geology II

(a) Petrology I

TEXTBOOKS

Kerr. *Optical Mineralogy.* McGraw-Hill, 1959.

Williams, Turner and Gilbert. *Petrography.* Freeman, 1954.

REFERENCE BOOKS

Harker. *Metamorphism.*

Harker. *Petrology for Students.*

Hatch, Wells and Wells. *The Petrology of the Igneous Rocks.*

Tyrrell. *The Principles of Petrology.*
Turner and Verhoogen. *Igneous and Metamorphic Petrology.*
Wahlstrom. *Theoretical Igneous Petrology.* Wiley.

(b) Palaeontology I

TEXTBOOK
Moore, Lalicker and Fischer. *Invertebrate Fossils.* McGraw-Hill, 1952.
OR
Beerbower. *Search for the Past.* Prentice-Hall, 1960.

REFERENCE BOOKS
Arnold. *An Introduction to Palaeobotany.* McGraw-Hill, 1947.
Shrock and Twenhofel. *Principles of Invertebrate Palaeontology.* McGraw-Hill.
Woods. *Palaeontology Invertebrate.* Cambridge.

(c) Stratigraphy I

TEXTBOOK
Krumbein and Sloss. *Stratigraphy and Sedimentation.* 2nd ed.

REFERENCE BOOKS
David (ed. Browne). *Geology of the Commonwealth of Australia.* 3 vols. Arnold, 1950.
Shrock. *Sequence in Layered Rocks.*
Woodford. *Historical Geology.* Freeman, 1965.

(d) Mineralogy II

TEXTBOOKS
Hurlbut (ed.). *Dana's Manual of Mineralogy.*
Phillips. *An Introduction to Crystallography.*

REFERENCE BOOK
Wahlstrom. *Optical Crystallography.* 3rd ed.

25.003 Geology III

Petrology II

TEXTBOOK
Kerr. *Optical Mineralogy.* McGraw-Hill, 1959.

REFERENCE BOOKS
Harker. *Metamorphism.*
Turner and Verhoogen. *Igneous and Metamorphic Petrology.*

Stratigraphy II

REFERENCE BOOKS
David (ed. Browne). *Geology of the Commonwealth of Australia.* 3 vols. 1950.
Dunbar and Rodgers. *Principles of Stratigraphy.* Wiley, 1957.
Gignoux. *Stratigraphic Geology* (English translation).
Kuenen. *Marine Geology.*

Stratigraphical Palaeontology

TEXTBOOKS

Colbert. *Evolution of the Vertebrates.*
Von Koenigswald. *The Evolution of Man.*

Mineralogy III

REFERENCE BOOKS

Azaroff and Buerger. *The Powder Method.* McGraw-Hill.
Buerger. *X-ray Crystallography.* Wiley.
Bunn. *Chemical Crystallography.* Oxford.
Evans. *Crystal Chemistry.* Cambridge.
Henry, Lipson and Wooster. *The Interpretation of X-ray Diffraction Photographs.* Macmillan.
Wahlstrom. *Optical Crystallography.* 3rd ed. Wiley.

Geophysics I

TEXTBOOK

Howell. *Introduction to Geophysics.* McGraw-Hill, 1959.

REFERENCE BOOKS

Bullen. *Introduction to Theory of Seismology.* Cambridge, 1963.
Chapman. *The Earth's Magnetism.* Methuen, 1951.
Garland. *The Earth's Shape and Gravity.* Pergamon, 1964.
Gutenberg. *Physics of the Earth's Interior.* Academic, 1959.
Heiskanen and Vening Meinesz. *The Earth and its Gravity Field.*
Hill. *The Sea.* Vol. 3. Wiley, 1963.
Irving. *Paleomagnetism.* Wiley, 1964.
Jacobs. *The Earth's Core and Geomagnetism.* Pergamon, 1963.

Structural Geology I

TEXTBOOKS

Hills. *Elements of Structural Geology,* 1963.
Phillips. *Use of Stereographic Projection in Structural Geology.* 1954.

REFERENCE BOOKS

Badgley. *Structural and Tectonic Principles.* 1965.
Billings. *Structural Geology.* 1954.
De Sitter. *Structural Geology.* 1964.
Price: *Fault and Joint Development in Brittle and Semi-brittle Rocks.* 1966.
Whitten. *Structural Geology of Folded Rocks.* 1966.

Economic Geology

(i) Coal

TEXTBOOK

Raistrick and Marshall. *The Nature and Origin of Coal and Coal Seams.* 1952.

REFERENCE BOOK

Francis. *Coal, Its Formation and Composition.*

(*ii*) *Oil*

TEXTBOOK

Levorsen. *Petroleum Geology*. 1954.

REFERENCE BOOK

LeRoy. *Subsurface Geologic Methods*.

(*iii*) *Ore Deposits*

REFERENCE BOOKS

Edwards. *Textures of the Ore Minerals*. 2nd ed., 1954.

Fiftieth Anniversary Volume of Economic Geology, Vol. I. Society of Economic Geologists, Urbana, Illinois.

Geology of Australian Ore Deposits. 2nd ed., Melbourne, 1965. Aust. Inst. Min. and Met.

Lindgren. *Mineral Deposits*. 4th ed., 1933.

25.004 Geology IV

Mining Geology

TEXTBOOK

Lawrence (ed.). *Exploration and Mining Geology*. Melbourne, 1965. Aust. Inst. Min. Met.

REFERENCE BOOK

McKinstry. *Mining Geology*. Prentice-Hall.

Photogeology

REFERENCE BOOKS

Krynine and Judd. *Principles of Engineering Geology and Geotechnics*. McGraw-Hill, 1957.

Leuder. *Aerial Photo Interpretation*. McGraw-Hill, 1959.

Manual on Photographic Interpretation. Am. Soc. of Photogrammetry, Washington, 1960.

Geophysics II

TEXTBOOKS

Dobrin. *Introduction to Geophysical Prospecting*. McGraw-Hill, 1960.

Parasnis. *Principles of Applied Geophysics*. Methuen, 1962.

REFERENCE BOOKS

Dix. *Seismic Prospecting for Oil*. Harper, 1952.

Edge and Laby. *The Principles and Practice of Geophysical Prospecting*. Cambridge, 1931.

Grant and West. *Interpretation Theory in Applied Geophysics*. McGraw-Hill, 1964.

Heiland. *Geophysical Exploration*. Prentice-Hall, 1940.

Jakosky. *Exploration Geophysics*. Trija, 1950.

Pirson. *Handbook of Well Log Analysis*. Prentice-Hall, 1963.

Petroleum Engineering

REFERENCE BOOK

Uren. *Petroleum Production Engineering Development*.

25.013 Geology III (Supplementary)

Oceanography

TEXTBOOK

Pickard. *Descriptive Physical Oceanography*. Pergamon, 1964.

REFERENCE BOOKS

King. *Introduction to Oceanography*. McGraw-Hill.

Kuenen. *Marine Geology*. Wiley.

Palaeontology II

TEXTBOOK

Glaessner. *Principles of Micro-palaeontology*. Melbourne University Press, 1945. Hafner reprinted ed., 1963.

REFERENCE BOOKS

Beerbower. *Search for the Past*. Prentice-Hall, 1960.

Cushman. *Foraminifera*. Harvard University Press, 1950.

Mayr, Linsley and Usinger. *Methods and Principles of Systematic Zoology*. McGraw-Hill.

Simpson. *Principles of Animal Taxonomy*. Columbia University Press, 1961.

Stratigraphy III

See list for Stratigraphy II (25.003).

Structural Geology II

TEXTBOOK

Turner and Weiss. *Structural Analysis of Metamorphic Tectonites*. 1963.

REFERENCE BOOK

As for Structural Geology I (25.003), plus:

Barrett and Massalski. *Structure of Metals*. 1966.

Ramsay. *Folding and Fracturing of Rocks*. 1967.

Geophysics II

As for Geophysics II (25.004).

Geochemistry

TEXTBOOK

Mason. *Principles of Geochemistry*. 2nd ed.

REFERENCE BOOKS

Abelson. *Researches in Geochemistry*.

Goldschmidt. *Geochemistry*.

Rankama and Sahama. *Geochemistry*. 1950.

Smales and Wager. *Methods in Geochemistry*.

Mineragraphy

TEXTBOOKS

Edwards. *Textures of the Ore Minerals*. 2nd ed., 1954.

Hallimond. *1953 Manual of the Polarizing Miscroscope*.

REFERENCE BOOKS

Cameron. *Ore Microscopy*. 1961.

Ramdohr. *Die Erzmineralien und ihre Verwachsungen*. 3rd ed., 1960.

Clay Mineralogy

REFERENCE BOOKS

Grim. *Applied Clay Mineralogy*. 1962.

Grim. *Clay Mineralogy*. 1953.

SCHOOL OF MATHEMATICS

Traditionally, mathematics is classified into Pure Mathematics, Applied Mathematics and Statistics. The classification is not a very sharp one and there is considerable overlap and interaction between the three branches.

The Pure Mathematician is concerned with the study of mathematics for its own sake, irrespective of (though often with an eye on) possible applications in the natural, social or technical sciences and in industry. The main avenues of employment for a Pure Mathematician are the Universities, the teaching services, and some research establishments such as the C.S.I.R.O. The growth of population in Australia has resulted in a large increase in the enrolments of Australian Universities and consequently a student who graduates with a good honours degree should find little difficulty in becoming a university lecturer after three years as a teaching fellow or postgraduate student while working for a Ph.D.

In the past the employment of mathematicians in Australian industry and commerce was rather uncommon; however, over the last few years there has been a remarkable change, corresponding to the general recognition of the desirability of making quantitative what was previously mere qualitative. Amongst many reasons responsible for the change in the employment picture, one of the most important is the advent of high speed computers, which have made possible the detailed mathematical analysis of complex practical situations which could not have been carried out without them.

For example, it is now generally recognised that every reasonably large establishment should employ a statistician or team of statisticians. There must be efficient and well designed supervision of the quality and testing of products. The analysis of sales and business methods must be in the hands of experts. Statisticians are also found in many research establishments, in government departments, in industry, in the C.S.I.R.O., and in the Universities, where they are concerned with the design of experiments and analyses of the results obtained. Further, mathematically oriented

statisticians may spend their time on the invention of important mathematical descriptions of physical and social phenomena. Mathematical relations governing the behaviour of electricity, energy and satellites, for example, are well known; it is not so well known, however, that other mathematical theories are being developed in nearly every field of endeavour by persons trained in statistical theory and probability: for example, in public works for statistical models to assisting the design of dams; in sociology for theories explaining migration; and in biology for theories of inheritance. Students interested in working in these fields should study the courses in Theory of Statistics.

Applied Mathematics consists of the application of mathematical methods to the study of nature. In different Australian universities, different fields of study are emphasised, but in each case the study of nature and her laws is the main purpose, the mathematical technique being the means to this end. In this Department the main field of study is modern theoretical physics, with an emphasis on quantum mechanics, nuclear theory, and statistical mechanics and oceanography. However, other branches of Applied Mathematics are included in the course, such as electro-magnetic theory, classical dynamics, aerodynamics, theory of elasticity and solid state theory. In this general field, the normal qualification for independent research and for university employment, is a Ph.D. degree, following upon an Honours B.Sc. degree. The Department of Applied Mathematics includes provision for this full course. Furthermore, it is highly desirable for young graduates in this field who have recently qualified for a Ph.D. degree to go overseas for some time in order to widen their experience. Overseas contacts exist, and every effort is made to place graduates suitably.

One of the spectacular aids to industry and research is the high-speed computer. It requires skilled training to maintain and programme for a high-speed machine costing many hundreds of thousands of dollars. The number of persons in Australia qualified to take charge of a large machine is quite small. A graduate with satisfactory attainments in this field is assured of a well-paid and interesting position. The courses in Applied Mathematics and Statistics include training in programming for the digital computers and in numerical analysis. Students will have considerable practice on the university's computers.

It must not be thought that an honours degree is necessary for success in all these fields. Pass degrees are satisfactory for a variety

of positions in government departments, commercial or industrial organizations and experimental laboratories, but, of course, an honours degree would in almost all cases give priority.

THE COURSES AND SUBJECTS PROVIDED BY THE SCHOOL

The School of Mathematics provides courses at the Pass and Honours levels in Pure Mathematics, Applied Mathematics and Theory of Statistics. Full details of the subjects and their relations with other subjects in the Science Course appear in the University Calendar. Any student who feels that he does not understand the situation should consult one of the enrolment officers of the School.

PASS LEVEL IN MATHEMATICS AND STATISTICS

Students wishing to major in mathematics at pass level should note that the following requirements will be in operation for all students enrolling Second Year Mathematics from 1969 onwards:

(i) Pure Mathematics Majors

(a) *Students enrolling in Second Year, 1969*
A student must pass in at least 7 units chosen in accordance with pre-requisites from 10.111 Pure Mathematics II, Units A, B, C, 10.211 Applied Mathematics II, Unit A, and 10.112 Pure Mathematics III, Units B, C and D.

(b) *Students enrolling in Third Year, 1969*
Students should attempt 10.112 Pure Mathematics III.

(c) Certain part-time students who have passed in 10.111 Pure Mathematics II in 1968, or previously, wish to defer attendance in 10.112 Pure Mathematics III until a later year. Suitable courses will be arranged for these students. Details will be published later.

(ii) Applied Mathematics Majors

(a) *Students enrolling in Second Year, 1969*
In Second Year the student must pass in 10.211 Applied Mathematics II, Units A, B and C and in 10.111 Pure Mathematics II, Units A and B, together with complementary units chosen in accordance with Faculty Rules. In Third Year, the student must pass in four Third Year units of Applied Mathematics (details yet to be announced) together with complementary units chosen in accordance with Faculty Rules.

(b) *Students enrolling in Third Year, 1969*

Students wishing to specialize in Applied Mathematics are advised to take Pure Mathematics III if they wish to attempt Applied Mathematics III.

(iii) Statistics Majors

(a) *Students enrolling in Second Year, 1969*

In Second Year, the student must pass in 10.311 Theory of Statistics I together with those units from Pure Mathematics II 10.111 and Applied Mathematics II 10.211 which are necessary as pre-requisites for any Third Year Units of Pure Mathematics he undertakes. He must as well take complementary units chosen in accordance with Faculty Rules. In Third Year the student must take the equivalent of 10.312 Theory of Statistics II together with the necessary supporting Third Year units of Pure Mathematics together with complementary units chosen in accordance with Faculty Rules.

(b) *Students enrolling in Third Year, 1969*

The course of study for a student wishing to graduate at Pass Level in Theory of Statistics must include Mathematics I, Pure Mathematics II, Pure Mathematics III, Theory of Statistics I and Theory of Statistics II.

HONOURS LEVEL IN MATHEMATICS AND STATISTICS

There are three different Fourth Year honours courses in the School of Mathematics; namely, Pure Mathematics, Applied Mathematics and the Theory of Statistics. The four-year course for an honours degree is intended primarily for professional pure mathematicians, statisticians and applied mathematicians, but will prove of interest also to intending specialists in fields such as theoretical physics and engineering.

Students wishing to graduate with Honours in Mathematics should note that the following requirements will be in operation for all students enrolling:

Honours in Pure Mathematics

In Second Year the student should attempt 10.121 Higher Pure Mathematics Units A and B and is strongly advised to attempt 10.221 Higher Applied Mathematics Unit A, together with complementary units chosen in accordance with Faculty Rules. Details for Third Year units will be announced later, when approved. Students wishing to attempt Third Year Honours courses in 1969 are advised to discuss their courses with the Head of the Depart-

ment of Pure Mathematics. Permission to enter the fourth year course in Pure Mathematics is granted on the recommendation of the Professors of Pure Mathematics. Such permission will not usually be granted unless the applicant has passed in Higher Pure Mathematics III.

Honours in Applied Mathematics

In Second Year the student should attempt 10.221 Higher Applied Mathematics Units A, B and C and 10.112 Higher Pure Mathematics Unit A, together with complementary units chosen in accordance with Faculty Rules. Details for Third Year units will be announced later, when approved. Students wishing to attempt Third Year Honours courses in 1969 are advised to discuss their courses with the Head of the Department of Applied Mathematics. Permission to enter the fourth year course in Applied Mathematics is granted on the recommendation of the Professors of Applied Mathematics. Such permission will not usually be granted unless the applicant has passed in Higher Applied Mathematics III.

Honours in Theory of Statistics

In Second Year, the student should attempt 10.321 Higher Theory of Statistics I and 10.112 Higher Pure Mathematics, Units A and B, together with complementary units chosen in accordance with Faculty Rules. He is strongly advised to attempt, also, 10.221 Higher Applied Mathematics, Unit A. In Third Year, the student should attempt 10.322 Higher Theory of Statistics II, the necessary supporting Third Year units of Pure Mathematics (preferably at the Higher Level), together with complementary units chosen in accordance with Faculty Rules. Students wishing to attempt Third Year Honours courses in 1969 are advised to discuss their courses with the Head of the Department of Statistics. Permission to enter the fourth year course in the Theory of Statistics is granted on the recommendation of the Head of the Department of Statistics. Such permission will not usually be granted unless the applicant has passed in Higher Theory of Statistics II.

If a student is studying for an Honours degree in either Theory of Statistics or Applied Mathematics, and for some reason finds this unsuitable, he may turn his interest to Pure Mathematics.

Any student interested in gaining an Honours degree should consult one of the Professors in the School of Mathematics prior to enrolling for first year.

It should be noted that transfer from the Higher level to the ordinary level of the various mathematical subjects can be made

at any time if the student feels that he has made a mischoice. Transfer from ordinary courses to Higher courses will leave the student with an almost impossible task and could only be made in exceptional circumstances.

MATHEMATICS AS A SUBSIDIARY SUBJECT

In order to gain a "major" in Mathematics a student should include in his course a sequence similar to those described in detail above. Students whose main interests lie in other fields will not desire to include so much Mathematics.

In some cases, consideration should be given to the inclusion of units of Theory of Statistics I or Applied Mathematics II. The combination of such units with the three units, 10.111 Pure Mathematics II, Units A and B and 10.211 Applied Mathematics II, Unit A, provides a broader coverage at somewhat less depth than would be provided by studying, for example, the sequence of units suggested for the Pure Mathematics major.

The School of Mathematics also provides a Terminating Mathematics I course and a level II service unit, 10.031. The Terminating Mathematics I course is intended for students who will not proceed with mathematics beyond first year. A pass (at credit standard or higher) will, however, qualify for admission to Theory of Statistics I. The service unit 10.031 does not lead to any level III unit but is particularly appropriate for students in Applied Chemistry.

SCHOOL TEACHERS

There is no doubt that in order to be well qualified as a high school teacher of mathematics it is desirable that the student should have completed a sequence of Mathematics units similar to that outlined under Pure Mathematics majors at Pass level and that other units should be selected from the Theory of Statistics or Applied Mathematics sequences. This extra work will broaden the prospective teacher's outlook and will certainly improve his teaching.

Those who feel that they may be interested in proceeding to a higher degree after graduation are advised to attempt some of the courses at the higher level.

Pure Mathematics Level II, Unit C and Pure Mathematics Level III, Unit D, should be of interest to school teachers. The second of these units will not be available in 1969.

STUDENTS WITH LOW MATHEMATICAL QUALIFICATIONS

Students who have only a pass in Mathematics Level II (Short) at the Higher School Certificate or who have been inadequately prepared even though they have passed Mathematics Level II (Full), should see that they do not fall behind the class. Attention is directed to the Bridging Courses in Mathematics given over the University of N.S.W. Radio Station VL2UV. Tutorial time is provided by the School in Mathematics I. Students should use these tutorial periods to obtain advice on supplementary reading to make up any deficiencies in their pre-university training. If, after receiving this advice, the student cannot keep up with the class, he should consult a senior member of the staff of the School of Mathematics.

STUDENTS TRANSFERRING FROM OTHER COURSES

In some cases the mathematical subjects of the Science Course differ quite considerably from the mathematics taught to students following other courses (e.g., Engineering). Students transferring to the Science Course and wishing to obtain credit for work done in previous courses should make application through the Admissions Office as early as possible. The staff of the School will advise students in such cases but this does not relieve the student of the reponsibility of making an early application through the correct channels.

SUBJECTS SUBSIDIARY TO MATHEMATICS

As mentioned above, a student wishing to major in Mathematics must pass other Science subjects in accordance with Science Course regulations. In this connection it is worth noting that the Applied Mathematics Course has a considerable content of mathematical physics and there is no doubt that Physics I and/or Physics II would assist the student.

Mathematics Prizes

There are at present available prizes of $20 each in the subjects Theory of Statistics I, Theory of Statistics II and Theory of Statistics III, from funds obtained through the Department of Statistics; also a prize of $20 and a year's subscription to the Statistical Society of Australia, New South Wales Branch, from that Society in the subject Theory of Statistics III.

MATHEMATICS TEXT AND REFERENCE BOOKS

10.001 Mathematics I

TEXTBOOKS

Beaumont, R. A. and Pierce, R. S. *The Algebraic Foundations of Mathematics.* Addison-Wesley.
Blatt, J. M. *Introduction to Fortran IV Programming.* Goodyear.
Purcell, E. J. *Calculus with Analytic Geometry.* Appleton-Century-Crofts.

REFERENCE BOOKS

Ball, R. W. *Principles of Abstract Algebra.* Holt, Rinehart and Winston.
Coulson, A. E. *An Introduction to Matrices.* Longmans.
Keane, A. and Senior, S. A. *Complementary Mathematics.* Science Press.
McCoy, N. H. *Introduction to Modern Algebra.* Allyn and Bacon.
Neill, H. and Moakes, A. J. *Vectors, Matrices and Linear Equations.* Oliver and Boyd.
Rose, I. H. *Algebra: An Introduction to Finite Mathematics.* Wiley.
Shanahan, P. *Introductory College Mathematics.* Prentice-Hall.
Smith, W. K. *Limits and Continuity.* Collier Macmillan, (Paperback).
Taylor, H. E. and Wade, T. L. *University Freshman Mathematics.* Wiley.
Whitesitt, J. E. *Principles of Modern Algebra.* Addison-Wesley.

SUPPLEMENTARY READING LIST

Adler, I. *The New Mathematics.* Mentor Press.
Allendoerfer, C. B. and Oakley, C. O. *Principles of Mathematics.* McGraw-Hill.
Courant and Robbins. *What is Mathematics?* O.U.P.
Sawyer, W. W. *A Concrete Approach to Abstract Algebra.* Freeman.
Sawyer, W. W. *Prelude to Mathematics.* Pelican.

10.011 Higher Mathematics I

TEXTBOOKS

Beaumont, R. A. and Pierce, R. S. *The Algebraic Foundations of Mathematics.* Addison-Wesley.
Blank, A. A. *Problems in Calculus and Analysis.* Wiley.
Blatt, J. M. *Introduction to Fortran IV Programming.* Goodyear.
Courant, R. and John, F. *Introduction to Calculus and Analysis.* Wiley.

REFERENCE BOOKS

As for 10.001 Mathematics I.

SUPPLEMENTARY READING LIST

As for 10.001 Mathematics I.

10.021 Mathematics IT

TEXTBOOK

Blatt, J. M. *Introduction to Fortran IV Programming.* Goodyear.
Purcell, E. J. *Calculus with Analytic Geometry.* Appleton-Century-Crofts.

REFERENCE BOOKS

Allendoerfer, C. B. and Oakley, C. O. *Fundamentals of College Algebra.* McGraw-Hill.
Fine, N. J. *Introduction to Modern Mathematics.* Rand McNally & Co.
Hoyt, J. P. *A brief introduction to Probability Theory.* International Text Book Co.

Johnson, W. G. and Zaccaro, L. N. *Modern Introductory Mathematics.* McGraw-Hill.
Nahikian, H. M. *Topics in Modern Mathematics.* Macmillan.

10.031 Mathematics

TEXTBOOK
Kreyszig, E. *Advanced Engineering Mathematics.* Wiley.

REFERENCE BOOKS
Aitken, A. C. *Determinants and Matrices.* Oliver and Boyd.
Carslaw, H. S. and Jaeger, J. C. *Operational Methods in Applied Mathematics.* Oxford University Press.
Churchill, R. V. *Modern Operational Mathematics in Engineering.* McGraw-Hill.
Ferrar, W. *Algebra.* Clarendon.
Keane, A. and Senior, S. A. *Mathematical Methods.* Science Press.

10.111 Pure Mathematics II

Unit A. Linear Algebra.

TEXTBOOK
Lang, S. *Linear Algebra.* Addison Wesley, World Student Series.

Unit B. Analysis.

TEXTBOOKS
Betz, H., Burcham, P. B., Ewing, G. M. *Differential Equations with Applications.* Harper.
Churchill, R. V. *Complex Variables and Applications.* McGraw-Hill.

REFERENCE BOOKS
Birkhoff, G., Rota, G. C. *Ordinary Differential Equations.* 2nd ed. Blaisdell.
Knopp, K. *Theory of Functions, Part I.* Dover.

Unit C. Abstract Algebra.

TEXTBOOKS
Gass, H. *Linear Programming.* McGraw-Hill.
Miller, K. *Elements of Modern Abstract Algebra.* Harper.

REFERENCE BOOK
Lederman, W. *Introduction to the Theory of Finite Groups.* Oliver and Boyd.

10.112 Pure Mathematics III

TEXTBOOKS
Griffin, H. *Elementary Theory of Numbers.* International Students ed., McGraw-Hill.
Miller, K. S. *Elements of Modern Abstract Algebra.* International Students reprint, Harper.
Ryser, H. *Combinatorial Analysis.* Carus Monograph Series, Wiley.
Simmons, G. F. *Introduction to Topology and Modern Analysis.* International Students ed., McGraw-Hill.
Willmore, J. J. *An Introduction to Differential Geometry.* Oxford University Press.

REFERENCE BOOKS

Birkhoff, G. S. and Rota, G. C. *Ordinary Differential Equations.* Ginn.
Carslaw, H. S. and Jaeger, J. *Operational Methods in Applied Mathematics.* Dover.
Hall, M. *Combinatorial Analysis.* Blaisdell.
Hurewicz, W. *Lectures on Ordinary Differential Equations.* Wiley.
Jacobson, W. *Lectures in Abstract Algebra,* Vols. I and II. Van Nostrand.
Sneddon, I. N. *Elements of Partial Differential Equations.* McGraw-Hill.
Van der Waerden, B. L. *Modern Algebra.* Ungar.

10.121 Higher Pure Mathematics II

Unit A. Analysis.

TEXTBOOKS

Birkhoff, G. and Rota, G. C. *Ordinary Differential Equations.* 2nd ed. Blaisdell.
Goldberg, R. R. *Methods of Real Analysis.* Blaisdell.
Nehari, Z. *Introduction to Complex Analysis.* Revised ed. Allyn and Bacon.

REFERENCE BOOKS

Fulks, W. *Advanced Calculus.* Wiley.
Heins, M. *Complex Function Theory.* Academic Press.
Knopp, K. *Infinite Series.* Dover.

Unit B. Algebra.

TEXTBOOK

Lang, S. *Linear Algebra.* Addison-Wesley.

REFERENCE BOOKS

Abraham, R. *Linear and Multilinear Algebra.* Benjamin.
Herstein, I. M. *Topics in Algebra.* Blaisdell.
Hoffman, K. and Kunze, R. *Linear Algebra.* Prentice-Hall.
van der Waerden, B. L. *Modern Algebra, Parts I and II.* Ungar.

10.122 Higher Pure Mathematics III

TEXTBOOKS

Cartan, H. *Elementary Theory of Analytic Functions of One or Several Complex Variables.* Addison-Wesley.
Herstein, I. N. *Topics in Algebra.* Blaisdell.
Rudin, W. *Real and Complex Analysis.* McGraw-Hill, 1966.
Sneddon, I. N. *Elements of Partial Differential Equations.* McGraw-Hill.
Willmore, J. J. *An Introduction to Differential Geometry.* Oxford.

REFERENCE BOOKS

Ahlfors, L. V. *Complex Analysis.* McGraw-Hill.
Bateman, H. *Partial Differential Equations.* Cambridge University Press.
Birkhoff, G. S. and Rota, G. C. *Ordinary Differential Equations.* Ginn.
Coppel, W. A. *Stability and Asymptotic Behaviour of Differential Equations.* Heath.
Dugundji, J. *Topology.* Allyn and Bacon.
Hu, S. T. *Elements of General Topology.* Holden Day.
Hurewicz, W. *Lectures on Ordinary Differential Equations.* Wiley.
Ince, E. L. *Ordinary Differential Equations.* Dover.
Kelley, J. L. *General Topology.* Van Nostrand.
Lang, S. *Algebra.* Addison-Wesley.

Titchmarsh, E. C. *Theory of Functions.* Oxford University Press.
Van der Waerden, B. C. *Modern Algebra.* Ungar.
Webster, A. C. *Partial Differential Equations in Mathematical Physics.* Dover.

10.211 Applied Mathematics II

Unit A
TEXTBOOKS
Bowman, F. *Introduction to Bessel Functions.* Dover.
Hilton, P. J. *Partial Derivatives.* Dover.
Smith, G. D. *Vector Analysis Including the Dynamics of a Rigid Body.* O.U.P.
Sneddon, I. N. *Fourier Series.* Dover.
REFERENCE BOOK
Dettman, J. W. *Mathematical Methods in Physics and Engineering.* McGraw-Hill.

Unit B
TEXTBOOK
Halfman, R. L. *Dynamics, Particles, Rigid Bodies and Systems.* Vol. I. Addison-Wesley.
REFERENCE BOOK
Fowles, G. R. *Analytical Mechanics.* Holt, Rinehart and Winston.

Unit C
TEXTBOOK
Rutherford, D. E. *Fluid Dynamics.* Oliver and Boyd.

10.221 Higher Applied Mathematics II

Unit A
TEXTBOOKS
Hilton, P. J. *Partial Derivatives.* Dover.
Smith, G. D. *Vector Analysis Including the Dynamics of a Rigid Body.* O.U.P.
Sneddon, I. N. *Fourier Series.* Dover.
Sneddon, I. N. *Special Functions of Mathematical Physics and Chemistry.* Dover.
REFERENCE BOOKS
Dettman, J. W. *Mathematical Methods in Physics and Engineering.* McGraw-Hill.
Shilov, G. *An Introduction to the Theory of Linear Spaces.* Prentice-Hall.

Unit B
TEXTBOOK
McCuskey, S. W. *Introduction to Advanced Dynamics.* Addison-Wesley.
REFERENCE BOOK
Goldstein, H. *Classical Mechanics.* Addison-Wesley.

Unit C
TEXTBOOK
Curl, N. and Davies, H. J. *Modern Fluid Dynamics, Vol. I.* Van Nostrand.
REFERENCE BOOK
Landau, L. D. and Lifshitz, E. M. *Fluid Mechanics.* Pergamon.

10.212 Applied Mathematics III

TEXTBOOKS

Conte, S. D. *Elementary Numerical Analysis.* McGraw-Hill.
Mathews, P. T. *Introduction to Quantum Mechanics.* McGraw-Hill.
Tralli, N. *Classical Electromagnetic Theory.* International Students' ed. McGraw-Hill.

REFERENCE BOOKS

Bullen, K. E. *Introduction to the Theory of Seismology.* C.U.P.
Courant, R. and Hilbert, D. *Methods of Mathematical Physics,* Vol. I Interscience.
Jackson, J. D. *Classical Electrodynamics.* Wiley.
Landau, L. D. and Lifshitz, E. M. *Quantum Mechanics.* Pergamon.
Lighthill, M. J. *Fourier Analysis and Generalised Functions.* C.U.P. (paperback).
Merzbacher, E. *Quantum Mechanics.* Wiley Toppan.
Messiah, A. *Quantum Mechanics. Vols. I, II.* North Holland.
Panofsky, W. K. H., Phillips, M. *Classical Electricity and Magnetism.* Addison-Wesley.
Ralston, A. *A First Course in Numerical Analysis.* McGraw-Hill.
Whittaker, E. T. and Watson, G. N. *A Course in Modern Analysis.* C.U.P.

10.222 Higher Applied Mathematics III

TEXTBOOKS

Conte, S. D. *Elementary Numerical Analysis.* McGraw-Hill.
Lawden, D. F. *Tensor Calculus and Relativity.* Oliver and Boyd.
Merzbacher, E. *Quantum Mechanics.* Wiley Toppan.
Tralli, N. *Classical Electromagnetic Theory.* International Student ed., McGraw-Hill.

REFERENCE BOOKS

As for 10.212, but in addition
Bergmann, P. G. *Introduction to the Theory of Relativity.* Prentice-Hall.
Einstein, A. and Others. *The Principle of Relativity.* Dover.
Landau, L. D. and Lifshitz, E. M. *Classical Theory of Fields.* Pergamon.
Moller, C. *Theory of Relativity.* C.U.P.
Pauli, W. *Theory of Relativity.* Pergamon.

10.223 Applied Mathematics IV

TEXTBOOKS

Blatt, J. M. and Weisskopf, V. F. *Theoretical Nuclear Physics.* Wiley.
Kittel, C. *Introduction to Solid State Physics.* 3rd Ed., Wiley.
Landau, L. D. and Lifshitz, E. M. *Statistical Physics.* Pergamon.
Merzbacher, E. *Quantum Mechanics.* Wiley Toppan.
Rushbrooke, G. S. *Introduction to Statistical Mechanics.* Clarendon.

Graduate Lectures

TEXTBOOK

Schroedinger, E. *Space Time Structure.* C.U.P.

10.311 Theory of Statistics I

10.321 Higher Theory of Statistics I

INTRODUCTORY READING

Bross, I. D. J. *Design for Decision.* Macmillan.
Huff, D. *How to Lie with Statistics.* Gollancz.
Moroney, M. J. *Facts from Figures.* Pelican.

TEXTBOOKS

Hogg, R. V. and Craig, A. T. *Introduction to Mathematical Statistics.* Macmillan.
Kendall, M. G. and Stuart, A. *The Advanced Theory of Statistics,* Vols. I and II. 2nd ed. Griffin.
Statistical Tables.

REFERENCE BOOKS

Anderson, R. L. and Bancroft, T. A. *Statistical Theory in Research.* McGraw-Hill.
Mood, A. M. and Graybill, F. A. *Introduction to the Theory of Statistics.* McGraw-Hill, 2nd ed.
Parzen, E. *Modern Probability Theory and its Applications.* Wiley.
Pearson, E. S. and Hartley, H. O. *Biometrika Tables for Statisticians.* Cambridge.

10.312 Theory of Statistics II

10.322 Higher Theory of Statistics II

As for 10.311 and 10.321 plus:

TEXTBOOKS

Feller, W. *An Introduction to Mathematical Probability and its Applications.* Vol. I. 3rd ed. Wiley.
Graybill, F. A. *An Introduction to Linear Statistical Models.* McGraw-Hill.
Johnson, N. L. and Leone, F. C. *Statistics and Experimental Design.* Vol II. Wiley.
Pearson, E. S. and Hartley, H. O. *Biometrika Tables for Statisticians.* Cambridge.
Pitt, H. R. *Integration, Measure and Probability.* Oliver and Boyd.

REFERENCE BOOKS

Anderson, T. W. *An Introduction to Multivariate Statistical Analysis.* Wiley.
Cochran, W. G. and Cox, G. M. *Experimental Design.* Wiley.
Cochran, W. G. *Sampling Techniques.* Wiley.
Cox, D. R. and Miller, H. D. *The Theory of Stochastic Processes.* Methuen.
Cox, D. R. *Planning of Experiments.* Wiley.
Feller, W. *An Introduction to Probability Theory and its Applications.* Vol. II. Wiley.
Finney, D. J. *Statistical Methods for Biological Assay.* Griffin.
Gass, S. R. *Linear Programming—Methods and Applications.* McGraw-Hill.
Karlin, S. *A First Course in Stochastic Processes.* Academic Press.

10.323 Theory of Statistics III

TEXTBOOKS

As for 10.322 plus:

Kendall, M. G. and Stuart, A. *The Advanced Theory of Statistics.* Vol. III. Griffin.

REFERENCE BOOKS

Anderson, T. W. *An Introduction to Multivariate Statistical Analysis.* Wiley.
Cochran, W. G. and Cox, G. M. *Experimental Designs.* Wiley.
Feller, W. *An Introduction to Mathematical Probability and its Applications.* Vol. II, Wiley.
Girshick, M. A. and Blackwell, D. *Theory of Games and Statistical Decisions.* Wiley.
Kempthorne, O. *The Design and Analysis of Experiment.* Wiley.
Lehmann, E. L. *Tests of Hypotheses.* Wiley.
Miller, R. G. *Simultaneous Statistical Inference.* McGraw-Hill.
Moran, P. A. P. *An Introduction to Probability Theory.* O.U.P.
Morrison, D. F. *Multivariate Statistical Methods.* McGraw-Hill.
Noether, G. E. *Non-parametric Statistics.* Wiley.
Patil, G. P. *Classical and Contagious Discrete Distributions.* Stat. Pub. Co.
Rao, C. R. *Advanced Statistical Methods in Biometric Research.* Wiley.
Sarhan, A. E. and Greenberg, B. G. *Contributions to Order Statistics.* Wiley.
Savage, L. J. *Foundations of Statistics.* Wiley.
Savage, L. J. *The Foundations of Statistical Inference.* Methuen.
Scheffé, H. *The Analysis of Variance.* Wiley.
Wald, A. *Sequential Analysis.* Wiley.
Wald, A. *Statistical Decision Functions.* Wiley.
Wetherill, G. B. *Sequential Methods in Statistics.* Methuen.
Yaglom, A. M. *An Introduction to the Theory of Stationary Random Functions.* Prentice-Hall.

10.331 Statistics

TEXTBOOKS

Freund, J. E. *Mathematical Statistics.* Prentice-Hall.

Statistical Tables.

REFERENCE BOOKS

Derman, C. and Klein, M. *Probability and Statistics Inference for Engineers.* O.U.P.
Freeman, H. *Introduction to Statistical Inference.* Addison-Wesley.
Hald, A. *Statistical Theory with Engineering Applications.* Wiley.

SCHOOL OF MICROBIOLOGY

The science of microbiology is concerned with the nature of the smallest living forms and their effects on human welfare. They are beneficial in providing for the decomposition of organic wastes, by maintaining and increasing the fertility of the soil and by the direct production of foodstuffs, beverages, pharmaceuticals (including antibiotics) and other industrially important compounds. On the other hand, microorganisms are important agents of disease and destruction; they can be responsible for serious spoilage of foods and textiles and for the decomposition of structural materials. As well as applying our knowledge directly and utilizing their potential to bring benefits and to minimize or prevent harmful effects, microorganisms are also being used to advance our knowledge of the nature of living substances and processes, particularly in the areas of molecular biology, genetics and metabolism.

Students may undertake microbiology as a major or minor Science course, as part of the medical degree, in food technology, biological technology or in public health engineering and drug analysis.

The subject can also be taken to the honours level and for the Master of Science and Doctor of Philosophy degrees. The last two degrees are also available for science students in the area of medical microbiology and immunology. Medical students can interrupt their course to undertake the Bachelor of Medical Science in microbiology and higher medical degrees may also be taken in the subject. Such advanced work in microbiology will include research work as well as an additional programme of reading and more formal instruction. Those who have not majored in microbiology but have otherwise suitable basic training may enrol for a higher degree in microbiology at this stage.

A student wishing to undertake microbiology at any level should ensure that he meets all pre-requisites. He is advised to consult appropriate members of staff for advice on the best course structure for his particular interests. A student wishing to undertake honours will be expected to have achieved a high standard in courses taken for the pass degree and to have majored in microbiology. Additionally he must receive the permission of the Head of the School. Those in the Faculty of Medicine wishing to

proceed to the Bachelor of Science (Medicine) or higher degrees in Medical Microbiology should consult the Head of that Department and conform with faculty requirements.

44.101A Introductory Microbiology

A short course in microbiology, designed as an introduction to third year microbiology units and to provide a terminal course for non-microbiologists. It deals with the nature, occurrence and importance of microorganisms; the historical development of microbiology; major systematic groups; composition, metabolism, physiology and genetics of microorganisms (including fine structure, metabolic requirements, metabolic activity, growth and inhibition); ecology and application of microbiology.

TEXTBOOKS

Stanier, R. Y., Doudoroff, M. and Adelberg, E. A. *General Microbiology*. 2nd ed. Macmillan, 1963 (also published under the title *The Microbial World*. Prentice-Hall).

or

Pelczar, M. J. and Reid, R. R. *Microbiology*, 2nd ed. McGraw-Hill, 1965 (available in International Student Edition).

or

Frobisher, M. *Fundamentals of Microbiology*. 8th ed. Saunders, 1968.

PRE-REQUISITES

17.001 General and Human Biology.
2.001 Chemistry I *or* 2.011 Higher Chemistry I.

This unit consists of 3 hours per week throughout the year.

44.102 Microbiology I

Nature, occurrence and importance of microorganisms; historical development of the subject; fine structure and cytochemistry; growth and inhibition; metabolism, genetics, serology, viruses, interbiotic relationships; microbiology of air, water and soil; dairy, food and industrial microbiology.

TEXTBOOK—As for 44.101A above.

This subject is the equivalent of four units, and consists of 4 hours' lecture and 8 hours' laboratory time per week throughout the year.

SCHOOL OF PHILOSOPHY

The study of Philosophy is partly the study of perennial problems of common interest to everyone; for example, the foundation of morality, the grounds of religious belief, the problem of the source and reliability of knowledge, and the relation between body and mind. But secondly, Philosophy also leans out to and illuminates other fields of study. Consequently, courses in Philosophy are designed to make it possible for students to pursue an interest in a course related to their other interests.

The First Year course in Philosophy is a wide-ranging course which is intended to give a broad introduction to the subject and assumes no previous acquaintance with it. There is no specialization, and no distinction between Pass and Honours. In Second Year a part of the course is also common to all students, but there is also a range of choice of possible sequences of subjects to suit special interests.

Special attention has been given to the needs of those who take Philosophy for only one or two years, so that courses will be self-contained and give a balanced picture of the subject up to the stage reached.

52.111 Philosophy I

The course divides into three parts as follows:

(1) A study of some Dialogues of Plato, with reference to definition, the immortality of the soul and the theory of universals; and an introduction to Ethics. (2) A study of the *Enquiry* of Hume, with reference to miracles, personal identity, the body-mind problem and freedom of the will. (3) An investigation of the structure of arguments, formal and informal, and of the foundations of scientific knowledge.

RECOMMENDED FOR PRELIMINARY READING

Popkin, R. H. and Stroll, A. *Philosophy Made Simple*. Made Simple Books.
Russell, B. *The Problems of Philosophy*. Oxford H.U.L.

TEXTBOOKS

Halverson, W. H. *A Concise Introduction to Philosophy*. Random.
Hamblin, C. L. *Elementary Formal Logic—A Programmed Course*. Hicks Smith and University Paperbacks.
Hume, David. Flew, A. ed. *On Human Nature and the Understanding*. Collier.
Plato. Guthrie, W. K. C. trans. *Protagoras and Meno*. Penguin Classics.

Plato. Tredennick trans. *The Last Days of Socrates.* Penguin Classics.
Warnock, G. *Contemporary Moral Philosophy.* Macmillan, 1967.

REFERENCE BOOKS

Ayer, A. J. *Philosophical Essays.* Macmillan.
Ayer, A. J. *The Concept of a Person.* Macmillan.
Burnet, J. *Greek Philosophy.* Macmillan.
Copi, I. M. *Introduction to Logic.* Collier Macmillan.
Crombie, I. M. *An Examination of Plato's Doctrines.* Routledge and Kegan Paul.
Cross, R. C. and Woozley, A. D. *Plato's Republic.* Macmillan.
Hospers, J. *Introduction to Philosophical Analysis.* 2nd ed. Prentice-Hall *or* Routledge and Kegan Paul, 1967.
Robinson, R. *Plato's Earlier Dialectic.* Oxford.
Ross, W. D. *Plato's Theory of Ideas.* Oxford.
Russell, B. *Problems of Philosophy.* Oxford H.U.L.
Scriven, M. *Primary Philosophy.* McGraw-Hill.
Sesonske, A. and Fleming, N. eds. *Human Understanding.* Wadsworth.
Taylor, A. E. *Plato.* Methuen.

52.112 Philosophy II (Pass)

Three hours of lectures weekly, with tutorials and practice classes as arranged.

All students take the course-unit (1) Modern Philosophy A, and two other course-units chosen from: (2) Logic, (3) Scientific Method, (4) British Empiricism, (5) Philosophy of Politics and History, (6) Philosophy of Value, and (7) Philosophical Psychology. Students should normally choose one, but not both of units (2) and (3), and those interested in a general philosophical background should choose unit (4).

Description of course-units

(1) Modern Philosophy A: The logical atomism of Russell and Wittgenstein; the logical positivist movement; criticism of these movements by Moore, Ayer, Quine and others.

TEXTBOOKS

Ammerman, R. R. ed. *Classics of Analytic Philosophy.* McGraw-Hill.
Ayer, A. J. ed. *Logical Positivism.* Free Press.

REFERENCE BOOKS

(a) *General*

Ayer, A. J. and others. *The Revolution in Philosophy.* Macmillan.
Copleston, F. *Contemporary Philosophy.* Burns and Oates.
Edwards, P. and Pap, A. eds. *A Modern Introduction to Philosophy.* Free Press.
Flew, A. ed. *Logic and Language, Series 1 and 2.* Blackwell.
Hospers, J. *An Introduction to Philosophical Analysis.* 2nd ed. Prentice-Hall or Routledge and Kegan Paul, 1967.
Kraft, V. *The Vienna Circle.* Philosophical Library.
Linsky, L. ed. *Semantics and the Philosophy of Language.* University of Illinois.

Pap, A. *Elements of Analytic Philosophy*. Macmillan.
Passmore, J. *A Hundred Years of Philosophy*. 2nd ed. Duckworth.
Pears, D. F. ed. *The Nature of Metaphysics*. Macmillan.
Russell, B. *A History of Western Philosophy*. Allen and Unwin.
Urmson, J. O. *Philosophical Analysis*. Oxford.
Von Mises, R. *Positivism*. Harvard U.P.
Warnock, G. J. *English Philosophy Since 1900*. Oxford H.U.L.
Warnock, M. *Ethics Since 1900*. Oxford H.U.L.

(b) *Logical Atomism and Logical Positivism*

Ayer, A. J. *Language, Truth and Logic*. Gollancz.
Ayer, A. J. *Philosophical Essays*. Macmillan.
Anscombe, G. E. M., *An Introduction to Wittgenstein's Tractatus*. Hutchinson.
Black, M. *A Companion to Wittgenstein's Tractatus*. C.U.P.
Moore, G. E. *Some Main Problems of Philosophy*. Allen and Unwin.
Pitcher, G. *The Philosophy of Wittgenstein*. Prentice-Hall.
Quine, W. V. *From a Logical Point of View*. Harper Torch.
Russell, B. Marsh, ed. *Logic and Knowledge*. Allen and Unwin.
Russell, B. *Problems of Philosophy*. Oxford H.U.L.
Scheffler, I. *The Anatomy of Inquiry*. Knopf.
Schlick, M. *Philosophy of Nature*. Philosophical Library.
Schlick, M. *Problems of Ethics*. Prentice-Hall.
White, M. *Toward Reunion in Philosophy*. Atheneum.
Wittgenstein, L. Pears and McGuiness trans. *Tractatus Logico-Philosophicus*. Routledge and Kegan Paul.

(2) Logic: A systematic course in formal logic, with particular attention to the examination and formalization of arguments in ordinary language.

TEXTBOOK

Copi, I. M. *Symbolic Logic*. 2nd ed. Collier Macmillan, 1965.

REFERENCE BOOKS

Beth, E. W. *Formal Methods*. Reidel.
Hughes, G. E. and Londay, D. G. *Elements of Formal Logic*. Methuen University Paperbacks.
Lemmon, E. J. *Beginning Logic*. Nelson.
Neidorf, R. *Deductive Forms*. Harper and Row.
Prior, A. N. *Formal Logic*. Oxford.
Quine, W. V. *Methods of Logic*. Routledge and Kegan Paul.

(3) Scientific Method: A course designed particularly for the needs of students of the social sciences, dealing with the nature of empirical knowledge, the concepts of explanation, induction and scientific law, counterfactual statements and the paradoxes of confirmation.

Reference boooks will be given in lectures.

(4) British Empiricism: A survey of the empiricist tradition with special concentration on Berkeley and Hume.

TEXTBOOKS

Armstrong, D. M. *Berkeley's Philosophical Writings*. Collier Paperbacks.

Hume, D. *Treatise of Human Nature*. 2 vols. Everyman.
Locke, John. *An Essay Concerning Human Understanding*. Fontana.

REFERENCE BOOKS

Basson, A. H. *David Hume*. Pelican.
Morris, C. R. *Locke, Berkeley, Hume*. Oxford.
Passmore, J. A. *Hume's Intentions*. Cambridge.
Sesonke, A. and Fleming, N. *Human Understanding*. Wadsworth.
Smith, N. K. *Studies in the Cartesian Philosophy*. Russell.
Smith, N. K. *The Philosophy of David Hume*. Macmillan.
Warnock, G. J. *Berkeley*. Pelican.

(5) Philosophy of Politics and History: A course dealing with (i) philosophical problems involved in the study of history, and (ii) philosophical problems arising from reflection on politics. In the political section of the course, particular attention is given to the role of models and analogies in political and social thinking.

TEXTBOOKS

Dray, W. H. ed. *Philosophical Analysis and History*. Harper and Row.
Dray, W. H. *Philosophy of History*. Prentice-Hall.
Hobbes, T. *Leviathan*. Oakeshott, M. ed. Blackwell.
Locke, J. *Two Treatises of Government*. Laslett ed. Mentor.
Nadel, G. H. ed. *Studies in the Philosophy of History*. Harper.
Rousseau, J. J. *The Social Contract and Discourses*. Everyman.
Walsh, W. H. *An Introduction to Philosophy of History*. Hutchinson.

REFERENCE BOOKS

Austin, J. *The Province of Jurisprudence Determined*. Hart ed. Weidenfeld and Nicholson.
Barker, E. ed. *The Social Contract*. World's Classics.
Benn, S. I. and Peters, R. S. *Social Principles and the Democratic State*. Allen and Unwin.
Brodbeck, M. ed. *Readings in the Philosophy of the Social Sciences*. Macmillan.
Brown, K. C. ed. *Hobbes Studies*. Blackwell.
Brown, R. *Explanation in Social Science*. Routledge.
Collingwood, R. G. *The Idea of History*. O.U.P.
d'Entrèves, A. P. *Natural Law*. Hutchinson.
d'Entrèves, A. P. *The Notion of the State*. O.U.P.
Dray, W. H. *Laws and Explanation in History*. O.U.P.
Edelstein, L. *The Idea of Progress in Classical Antiquity through the Hellenistic Age*. John Hopkins, 1967.
Gardiner, P. *The Nature of Historical Explanations*. O.U.P.
Gierke, O. *Natural Law and the Theory of Society 1500 to 1800*. Barker ed. Beacon Press.
Gough, J. W. *John Locke's Political Philosophy*. O.U.P.
Gough, J. W. *The Social Contract*. O.U.P.
Harré, R. *Theories and Things*. Newman History and Philosophy of Science Series, Sheed and Ward.
Hume, D. *Theory of Politics*. Watkins ed. Nelson.
Jouvenel, B. de *Sovereignty*. C.U.P.
Löwith, K. *Meaning in History*. Chicago U.P.

Masters, R. D. *The Political Philosophy of Rousseau.* Princeton U.P.
Mandelbaum, M. *The Problem of Historical Knowledge.* Harper.
Meyerhof, H. ed. *The Philosophy of History in our Time.* Anchor Books, Doubleday.
Miller, J. D. B. *The Nature of Politics.* Penguin.
Oakeshott, M. *Experience and its Modes.* C.U.P.
Peters, R. S. *Hobbes,* Penguin.
Plato. *Crito; Republic.* Any edition.
Popper, K. R. *The Open Society and its Enemies.* Rev. ed. Routledge.
Popper, K. R. *The Poverty of Historicism.* Rev. ed. Routledge.
Quinton, A. *Political Philosophy.* O.U.P.
Rousseau, J. J. *Du Contrat Social ou Principes du Droit Politique.* Classiques Garnier.
Rousseau, J. J. *The Social Contract.* Cranston tr. Penguin.
Sabine, G. H. *A History of Political Theory.* 3rd ed. Harrap.
Schumpeter, J. A. *Capitalism, Socialism and Democracy.* 3rd ed. Allen and Unwin.
Strauss, L. *The Political Philosophy of Hobbes.* Chicago U.P.
Warrender, H. *The Political Philosophy of Hobbes.* O.U.P.
Watkins, J. W. N. *Hobbes' System of Ideas.* Hutchinson.
Winch, P. *The Idea of a Social Science.* Routledge and Kegan Paul.
Wolin, S. S. *Politics and Vision.* Allen and Unwin.

ADDITIONAL SUGGESTED READING

Golding, W. *The Lord of the Flies.* Faber.
Tomasi di Lampedusa, G. *The Leopard.* Collins.
Waugh, E. *A Handful of Dust.* Chapman and Hall, *or,* Penguin.

(6) Philosophy of Value: An examination of the central concepts and types of judgments occurring in the fields of moral discourse and aesthetic and literary criticism.

REFERENCE BOOKS

Ayer, A. J. *Language, Truth and Logic.* Gollancz.
Casey, J. *The Language of Criticism.* Methuen.
Castaneda & Nakhnikian. eds. *Morality and the Language of Conduct.* Wayne State U.P.
Coleman, F. J. ed. *Contemporary Studies in Aesthetics.* McGraw-Hill.
Hare, R. M. *The Language of Morals.* O.U.P.
Hare, R. M. *Freedom and Reason.* O.U.P.
Gombrich, E. H. *Art and Illusion.* Phaidon.
Kaufmann, W. *Existentialism from Dostoevsky to Sartre.* Meridan.
Kerner, G. C. *The Revolution in Ethical Theory.* O.U.P.
Manser, A. *Sartre, A Philosophic Study.* Athlone Press.
Margolis, J. ed. *Philosophy Looks at the Arts.* Scribners.
Moore, G. E. *Principia Ethica.* C.U.P.
Sartre, J. P. *Being and Nothingness.* Methuen.
Sartre, J. P. *Existentialism and Humanism.* Methuen.
Schraader, G. A. ed. *Existential Philosophers—Kierkegaard to Merleau-Ponty.* McGraw-Hill.
Stevenson, C. L. *Ethics and Language.* Yale U.P.
Stevenson, C. L. *Facts and Values.* Yale U.P.
Toulmin, S. *Reason in Ethics.* C.U.P.
Warnock, M. *Ethics Since 1900.* O.U.P.

Warnock, M. *Existentialist Ethics.* Macmillan.
Warnock, M. *The Philosophy of Sartre.* Hutchinson University Library

(7) Philosophical Psychology: A course with special reference to the conception of an action, or what it is for somebody to do something, to whether or not the will is the cause of action, and to behaviourist psychology.

REFERENCE BOOKS

Anscombe, G. E. M. *Intention.* Blackwell.
Confer, C. N. & Appley, M. H. *Motivation: Theory & Research.* Wiley.
Bennett, J. *Rationality.* Routledge and Kegan Paul.
Bindra, D. & Stewart, J. *Motivation.* Penguin.
Gustafson, Donald F. *Essays in Philosophical Psychology, 1964.* Macmillan Paperback.
Hampshire, S. *Thought and Action.* Chatto and Windus.
Hebb, D. O. *Textbook of Psychology.* W. B. Saunders.
Hull, C. L. *Principles of Behaviour.* Appleton-Century-Crofts.
Kenny, A. *Action, Emotion & Will.* Routledge and Kegan Paul.
Louch, A. R. *Explanation & Human Action.* Blackwell.
Melden, A. I. *Free Action.* Routledge and Kegan Paul.
Minkus, P. A. *Philosophy of the Person.* Blackwell.
Pears, D. F. *Freedom & Will.* Macmillan.
Peters, R. S. *The Concept of Motivation.* Routledge and Kegan Paul.
Ryle, G. *The Concept of Mind.* Hutchinson.
Skinner, B. F. *Science and Human Behaviour.* Macmillan, N.Y.
Skinner, B. F. *The Behaviour of Organisms.* Appleton-Century-Crofts.
Skinner, B. F. *Verbal Behaviour.* Appleton-Century-Crofts.
Taylor, C. *The Explanation of Behaviour.* Routledge and Kegan Paul.
Watson, J. B. *Psychology from the Standpoint of a Behaviourist.* J. B. Lippincott.
Woodworth, R. S. *Dynamics of Behaviour.*

52.122 Philosophy II (Honours)

The course consists of the material set out for 52.112 Philosophy II (Pass), together with an extra course-unit chosen from those listed: Distinction students will be obliged to choose one, but not both of units (2) and (3). In addition a series of seminars will be arranged in which certain topics will be treated at a more advanced level.

SCHOOL OF PHYSICS

The School of Physics provides both pass and honours courses. The pass course with a major in physics at two levels, ordinary and higher, normally takes three years to complete. In this course a broad and balanced treatment of all branches of physics is presented without specific emphasis on any branch or topic which may be temporarily prominent. Taken at a higher level, it precedes an honour's year during which work, to some extent, will be specialized. These studies are provided within the framework of the Science course (see earlier) as sequences appropriate for students seeking qualification as professional physicists, whether they intend to engage in research, industrial practice or the teaching of science.

A student intending to take a pass degree with a major in physics must at least complete 1.001 Physics I, 1.112 Physics II (Units A, B and C) and Physics III. 10.001 Mathematics I is a pre-requisite of all units of Physics II. Unit A of 10.211 Applied Mathematics II is a co-requisite of all units of Physics II and students are advised also to take Units A and B of 10.111 Pure Mathematics II in their second year. Note that Unit A of 10.111 Pure Mathematics II must be completed before or concurrently with Physics III. Students are also required to complete supporting subjects or units in accordance with the Science course regulations and these will normally include 2.001 Chemistry I. It should be understood that units of corresponding subjects at the higher level can often be substituted for those mentioned above.

Honours

A student intending to take honours in physics will normally complete the above sequence of physics subjects at the higher level, e.g., 1.122 Higher Physics II. However, students with a good record in the lower subjects, 1.001 Physics or 1.112 Physics, may be allowed, on application to the Head of School to enter the higher subject in the following year. Students should be aware that Unit A of 10.211 Applied Mathematics II and Units A and B of 10.111 Pure Mathematics II (or Unit A of 10.221 Higher Applied Mathematics II and Unit A of 10.121 Higher Pure Mathematics) are co-requisites of 1.122 Higher Physics II. Additional units of Physics and/or Mathematics will be specified in third year.

The following alternatives show typical programmes which, together with the perscribed General Studies subjects, complete requirements for a Pass degree.

A. Pass Degree

FIRST YEAR

Subject	Level	No. Units
Physics	I	2
Mathematics	I	2
Chemistry	I	2
General and Human Biology	I	2

SECOND YEAR

Subject	Level	No. Units
Physics	II	3
Pure Mathematics	II	2
Applied Mathematics Unit A	II	1
Geology	I	2

THIRD YEAR

Subject	Level	No. Units
Physics	III	4
Chemistry	II	3
Additional other unit	II/III	1

B. Pass Degree

FIRST YEAR

Subject	Level	No. Units
Physics	I	2
Mathematics	I	2
Chemistry	I	2
Other subject	I	2

SECOND YEAR

Subject	Level	No. Units
Physics	II	3
Applied Mathematics Unit A	II	1
Pure Mathematics Unit B	II	1
Other units	I/II	3

THIRD YEAR

Subject	Level	No. Units
*Physics	III	4
Pure Mathematics Unit A (if not previously taken)	II	1
Other units	II/III	2 or 3

C. Honours Degree

FIRST YEAR

Subject	Level	No. Units
Higher Physics	IH	2
Mathematics	I	2
Chemistry	I	2
Another subject	I	2

SECOND YEAR

Subject	Level	No. Units
Higher Physics	IIH	3
Pure Mathematics Units A, B	II	2
Applied Mathematics Unit A	II	1
Other units	II	2

THIRD YEAR

Subject	Level	No. Units
*Higher Physics	IIIH	4
Mathematics, Physics	III	4†

*If Physics III or Higher Physics III is taken, certain units of Applied Mathematics II may not be credited towards the degree.

†Entry to the honours year may, subject to the approval of the Head of the School of Physics, be permissible from appropriate third level applied mathematics or pure mathematics.

Physics Prizes

The following prizes are offered annually.

The School Prize, for the best performance in Physics II, value $40.

The Physics Staff Prize, for the best performance in Physics III, value $60.

The Head of School's Prize, for the best performance in laboratory work in Physics III, value $20.

The Physics Thesis Prize, for the best Honours thesis of the year, value $40.

The G. P. Falls Memorial Prize, for the best performance in Mathematical Physics, value $20.

PHYSICS TEXT AND REFERENCE BOOKS

1.001 Physics I
1.011 Higher Physics I

TEXTBOOKS

Halliday, D. and Resnick, R. *Physics for Students of Science and Engineering.* Vols. I and II, or combined volume, Wiley, 1960.

Krackhardt, R. H. *Vacuum Tube Electronics.* Merrill Books, 1966.

Marsden, K. and Russell, G. *Laboratory Notes for Physics I.* University of N.S.W. Press.

REFERENCE BOOKS

Feynman, R. P., Leighton, R. B. and Sands, M. *The Feynman Lectures on Physics.* Vols. I and II, Addison-Wesley.

Stephenson, R. J. *Mechanics and Properties of Matter.* 2nd ed., Wiley, 1960.

Wiedner, R. T. V. and Sells, R. L. *Elementary Classical Physics.* Vols. I and II, Allyn and Bacon.

For 1.011 only—

Tomboulian, D. H. *Electric and Magnetic Fields.* Harcourt, Brace & World, 1965, New York.

1.041 Physics IC (for students taking only one full year of Physics)

TEXTBOOKS

Halliday, D. and Resnick, R. *Physics for Students of Science and Engineering*. Vols. I and II, or combined volume, Wiley, 1960.

Marsden, K. and Russell, G. *Laboratory Notes for Physics I*. University of N.S.W. Press.

REFERENCE BOOKS

Richards, J. A., Sears, F. W., Wehr, M. R. and Zemansky, M. W. *Modern University Physics*. Addison-Wesley, 1960.

Starling, S. G. and Woodall, A. J. *Physics*. Longmans Green, 1950.

Wiedner, R. T. and Sells, R. L. *Elementary Modern Physics*. Allyn and Bacon, 1960.

1.112 Physics II

Unit A

TEXTBOOK

Scott, W. T. *The Physics of Electricity and Magnetism*. 2nd ed., Wiley.

Unit B

TEXTBOOK

Beiser, A. *Concepts of Modern Physics*. McGraw-Hill, 1967.

REFERENCE BOOKS

Mermin, N. D. *Space and Time in Special Relativity*. McGraw-Hill, 1968.

Weidner, R. T. and Sells, R. L. *Elementary Modern Physics*. Vol. III, Allyn and Bacon, 1960.

Unit C

TEXTBOOKS

Greenwood, D. T. *Principles of Dynamics*. Prentice-Hall, 1965.

Sears, F. W. *Thermodynamics, the Kinetic Theory of Gases and Statistical Mechanics*. Addison-Wesley.

REFERENCE BOOKS

Bradbury, T. C. *Theoretical Mechanics*. International ed. Wiley, 1968.

Spiegel, M. R. *Theory and Problems of Theoretical Mechanics*. Schaum.

1.122 Higher Physics II

TEXTBOOKS

Corson, D. and Lorrain, P. *Introduction to Electromagnetic Fields and Waves*. Freeman.

Eisberg, R. M. *Fundamentals of Modern Physics*. Wiley, 1961.

Symon, K. R. *Mechanics*. 2nd ed. Addison-Wesley, 1965.

Zemansky, M. W. *Heat and Thermodynamics*. 5th ed. McGraw-Hill, 1968.

1.113 Physics III (Science Course)

TEXTBOOKS

Baird, D. C. *An Introduction to Measurement Theory and Experiment Design*. Prentice-Hall.

Corson, D. and Lorrain, P. *Introduction to Electromagnetic Fields and Waves*. Freeman, 1962.

Eisberg, R. M. *Fundamentals of Modern Physics*. Wiley, 1961.

Herzberg, G. *Atomic Spectra and Atomic Structure*. Dover Publications, 1944.

McDaniel, E. W. *Collision Processes in Ionised Gases.* Wiley, 1964.
Phillips, L. F. *Electronic for Experimenters.* Wiley.
Wannier, G. H. *Statistical Physics.* Wiley, 1966, London.
REFERENCE BOOKS
Heavens, O. S. *Optical Masers.* Methuen, 1964.
Leighton, R. B. *Principles of Modern Physics.* McGraw-Hill, 1959.
Messiah, A. *Quantum Mechanics.* Vol I, North Holland Pub. Co., 1961.
Panofsky, W. K. H. and Phillips, M. *Classical Electricity and Magnetism.* 2nd ed., Addison-Wesley, 1962.
von Engel, A. *Ionised Gases.* O.U.P., 1965.
White, H. W. *Introduction to Atomic Spectra.* McGraw-Hill, 1934.

1.133 Mathematical Physics (Science Course)

TEXTBOOKS
Long, R. R. *Mechanics of Solids and Fluids.* Prentice-Hall, 1961.
Messiah, A. *Quantum Mechanics.* Vol. I, North Holland Pub. Co., 1961.
Nye, J. F. *Physical Properties of Crystals.* O.U.P., 1957.
Pauli, W. *Theory of Relativity.* Pergamon Press, 1958.
Wax, N. *Selected Papers on Noise and Stochastic Processes.* Dover, 1954.
Weatherburn, C. E. *Mathematical Statistics.* C.U.P., 1957.
REFERENCE BOOKS
Landau, L. D. and Lifshitz, E. M. *Theory of Elasticity.* Pergamon Press, 1960.
Mood, A. M. *Introduction to the Theory of Statistics.* McGraw-Hill, 1950.
Phillips, F. C. *An Introduction to Crystallography.* Longmans Green, 1957.
Powell, J. L. and Craseman, B. *Quantum Mechanics.* Addison-Wesley, 1961.

1.212T Physics IIT

Half Unit A
TEXTBOOKS
Fincham, W. *Optics.* Hatton Press.
REFERENCE BOOKS
Conrady, A. E. *Applied Optics and Optical Design.* Dover.
Emsley, H. H. *Aberrations of Thin Lenses.* Hatton Press.
Hardy, A. C. and Perrin, P. H. *Principles of Optics.* McGraw-Hill.
Morgan, J. *Introduction of Geometrical and Physical Optics.* McGraw-Hill.
Half Unit B
TEXTBOOK
Millman, J. and Halkias, C. C. *Electronic Devices and Circuits.* McGraw-Hill, 1967.
Half Unit C
TEXTBOOK
Wert, C. A. and Thomson, R. M. *Physics of Solids.* Int. Student ed., McGraw-Hill, 1964.
REFERENCE BOOKS
Azaroff, L. V. and Brophy, J. J. *Electronic Processes in Materials.* Int. Student ed., McGraw-Hill, 1963.
Wulff, J. ed. *The Structure and Properties of Materials.* Vols. 1 and 2 1964; Vol. 3 1965; Vol. 4 1966. Wiley.
Half Unit D
Consult Head of School of Physics for list of textbooks and reference books.

PHYSIOLOGY

FOR STUDENTS IN THE SCIENCE COURSE

Courses in physiology for students in the Science Course were commenced in 1963. During the second and third years of their B.Sc. course, students may take Principles of Physiology and Physiology II. Students reaching an adequate standard in these subjects may proceed to a B.Sc. degree with honours by taking Physiology III during the fourth year of the course. For the present, physiology will be available only as a day course.

73.011 Principles of Physiology

This is a two-unit course that will continue for six hours each week throughout the year. Pre-requisites for the course are Physics I, Chemistry I, Mathematics I and General and Human Biology, and the co-requisite is Genetics and Biometry (43.301A).

Syllabus: An introductory course in mammalian physiology. It considers the basic problems of homeostasis encountered in mammals and draws to a very limited extent on other examples from comparative physiology. An overall survey of the control systems and general principles of neural and chemical control is considered by the student within the framework of special lectures in systematic physiology.

TEXTBOOKS

Ganong, W. F. *Review of Medical Physiology*. 3rd ed. Lange Medical Publications, 1967.

Guyton, A. C. *Function of the Human Body*. 2nd ed. W. B. Saunders Company, Philadelphia and London, 1964.

73.012 Physiology II

This course will continue for 12 hours per week throughout the year, and will generally consist of 3 lectures and 9 hours of tutorials and laboratory work each week. On some occasions,

students may be required to attend at other times for the maintenance and treatment of experimental animals. Pre-requisites for this course are Principles of Physiology, Genetics and Biometry, and Biochemistry I (Chemistry of Biologically Important Molecules; Metabolism; Control Mechanisms). A student who wishes to proceed to Physiology II and has not done Biochemistry I can proceed by arrangement with the Head of the School, provided he has passed in either Physics II or Chemistry II.

Syllabus: Includes a more advanced study of mammalian physiology. Special emphasis is placed on control mechanisms, in particular on a detailed study of the central nervous system and on control in the autonomic nervous system, particularly from the point of view of regulating the circulation and respiration. Problems of humoral and chemical control processes are considered using the kidney as a model.

TEXTBOOKS

Burton, A. C. *Physiology and Biophysics of the Circulation.* Year Book Medical Publishers Incorporated, Chicago, 1965.

Comroe, J. H. *Physiology of Respiration.* Year Book Medical Publishers Incorporated, Chicago, 1965.

Davenport, H. W. *Physiology of the Digestive Tract.* 2nd ed. Year Book Medical Publishers Incorporated, Chicago, 1966.

Pitts, R. F. *Physiology of the Kidney and Body Fluids.* 2nd ed. Year Book Medical Publishers Incorporated, Chicago, 1968.

Ruch, T. C., Patton H. D., Woodbury, W. J., Towe, A. L. *Neurophysiology.* 2nd. ed. W. B. Saunders Company, Philadelphia and London, 1965.

Tepperman, J. *Metabolic and Endocrine Physiology.* 2nd ed. Year Book Medical Publishers Incorporated, 1968.

SCHOOL OF ZOOLOGY

The School provides two undergraduate science courses, Zoology and Entomology, the latter being taught only at third year and later levels. The courses offered by the School place emphasis on an experimental approach to animal physiology, entomology and marine science. All courses require that students obtain an adequate background in biochemistry, biometry and genetics. The teaching in marine science places strong emphasis on the ecological relationships of animals.

Graduates at the bachelor level may find employment in scientific and technical departments of various State and Commonwealth organizations, in certain industries and in teaching. Students intending to pursue research careers in any of the various branches of zoology are urged to complete the requirements for Honours, Master's or Doctor's degrees.

Courses in zoology are taught mainly in the lecture theatres and laboratories, but field work, including field camps and excursions, is an essential part of all courses. To this end, the School maintains an undergraduate teaching Field Station at Smith's Lake where compulsory courses are taught during vacations. The animal physiology teaching is strongly oriented towards Australian invertebrate and vertebrate animals, and the School has interests in field stations at which marsupials are studied.

Honours in Zoology or Entomology

Students must receive permission of the Head of School before proceeding to honours. Generally speaking they should have completed all subjects or units required for a Bachelor's degree and have achieved a consistently high standard in relevant units offered by the School of Zoology.

45.102 Zoology II

A study of the relationships between marine organisms and the environment, with emphasis on those factors of the environment which influence distribution and abundance of organisms. The dynamics of populations in relation to the environment, with emphasis on behavioural aspects. The mechanisms, function, phylogeny and autogeny of animal behaviour. Selected aspects of animal physiology with emphasis on vertebrate physiology. Com-

parative aspects of the reproduction, embryology and endocrinology of the vertebrate phyla.

TEXTBOOKS

Elton, C. *The Ecology of Animals.* Methuen Paperback, 1966.
Florey, E. *General and Comparative Animal Physiology.* Saunders, 1966.
Frye, B. E. *Hormonal Control of Vertebrates.* Macmillan, 1967.
Gilchrist, F. G. *A Survey of Embryology.* McGraw-Hill, 1968.
Klopfer, P. H. and Hailman, J. P. *An Introduction to Animal Behaviour.* Prentice-Hall, 1967.
Moore, H. B. *Marine Ecology.* Wiley, 1958.
Nalbandov, A. V. *Reproductive Physiology.* Freeman, 1964.

This subject is equal to 4 units, and consists of 4 hours' lecture and 9 hours' laboratory time per week throughout the year.

45.201 Entomology I

Comparative anatomy of insects. Classification into orders and families. Biology of each major group. Insect physiology and behaviour. Economic and medical entomology. Control of insect pests. Insecticides, formulation, application and bioassay. Visits, field excursions, field and laboratory courses as arranged.

TEXTBOOKS

Beirne, P. *Pest Management.* Leonard Hill, 1967.
Imms, A. D. *A General Textbook of Entomology.* Methuen, 1957.
Patton, R. L. *Introductory Insect Physiology.* Saunders, 1963.

This subject is equivalent to 4 units, and consists of 4 hours' lecture and 9 hours' laboratory time per week throughout the year.

45.301A Genetics and Biometry

See under School of Botany, 43.301A Genetics and Biometry.

45.301B Invertebrate Zoology

A comparative study of structure and function in the invertebrate phyla. The practical course involves the use of a variety of techniques, including microscopy, dissection, histology and simple experimental procedures, to elucidate the function of vertebrate organs. An obligatory field camp is held during the second term vacation.

TEXTBOOKS

Clark, R. B. *A Practical Course in Experimental Zoology.* Wiley, New York, 1966.
Hegner, R. W. and Engemann, J. G. *Invertebrate Zoology.* 2nd ed. Macmillan, 1968.

PRE-REQUISITES

17.001 General and Human Biology

This unit is offered in the second half of the year, and consists of 2 hours' lecture and 4 hours' laboratory time per week.

45.301C Vertebrate Zoology

A comparative study of the Chordata. Morphology, systematics, evolution, natural history, with reference to selected aspects of physiology and reproduction. Practical work to supplement the lecture course. Field excursions as arranged.

TEXTBOOK

Young, J. Z. *The Life of the Vertebrates*. Clarendon Press, 1958.

PRE-REQUISITES

17.001 General and Human Biology.

This unit is offered in the second half of the year, and consists of 2 hours' lecture and 4 hours' laboratory time per week.

STUDENT'S TIMETABLE

Time	Monday	Tuesday	Wednesday	Thursday	Friday
9-10					
10-11					
11-12					
12-1					
1-2					
2-3					
3-4					
4-5					
5-6					
6-7					
7-8					
8-9					