FACULTY OF BIOLOGICAL SCIENCES AND FACULTY OF SCIENCE

COMBINED 1971 HANDBOOK

THE UNIVERSITY OF NEW SOUTH WALES

80 CENTS

COMBINED
FACULTY OF BIOLOGICAL SCIENCES AND FACULTY OF SCIENCE

1971 HANDBOOK

EIGHTY CENTS

THE UNIVERSITY OF NEW SOUTH WALES
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INTRODUCTION

The Science Course is offered in a unit system in all three years of the pass degree. In this system, the traditional subjects, such as Mathematics, are broken up into smaller units: first year subjects into two units, second year subjects into three units and third years subjects into four units.

First year subjects, which count as two units, differ from those of later years in that they must be taken as a whole. In other words one unit cannot be taken without the other. All students in the Science Course must enrol in Mathematics I, which is offered in three versions each of which counts as two units: Mathematics I, Higher Mathematics I and Mathematics IT. One only is required, but care must be taken in making the choice. Care must also be taken in choosing between Physics I, Higher Physics I and Physics IC. In general, Mathematics IT and Physics IC considerably limit the choice of units in following years.

Students proceeding to a degree in Science will be associated principally with schools within the Faculties of Biological Sciences and Science. However, in accordance with the regulations, students may elect to take subjects from schools in other faculties. Students seeking advice should contact the representative of the relevant School. A list appears below:

Faculty of Applied Science
School of Applied Geology .... Mr. G. J. Baldwin

Faculty of Arts

School of Geography*	Professor J. A. Mabbutt
School of Philosophy**	Professor C. L. Hamblyn

Faculty of Biological Sciences

General and Human Biology* (pre-requisite for all other units in this Faculty excepting Psychology)

School of Applied Psychology	Mr. P. J. Cleary (Science Course)
	Mrs. N. Binks (Applied Psychology)
School of Biochemistry†	Dr. P. J. Schofield
School of Biological Technology‡	Professor B. J. Ralph
School of Botany†	Dr. M. M. Hindmarsh
School of Microbiology†	Mr. R. G. H. Barbour or Dr. A. J. Wicken
School of Zoology†	Dr. E. Russell

Faculty of Engineering

School of Mechanical and Industrial Engineering	
Engineering I*	Mr. H. A. Borchardt
School of Electrical Engineering	
Computer Science†	Mr. G. B. McMahon

Faculty of Medicine

School of Anatomy†	Assoc. Prof. B. R. A. O'Brien
School of Physiology†	Dr. T. J. Heath

Faculty of Science

School of Applied Physics and Optometry	Professor C. J. Milner
School of Chemistry	Mr. W. J. Dunstan
School of Mathematics	Associate Professor W. E. Smith
School of Physics	Dr. R. E. Lishmund

In addition to the Science subjects, all undergraduates in Science are required to pass in three subjects in General Studies. A wide choice is available and students should consult the Department of General Studies handbook which is provided free of charge.

Students who wish to be admitted with advanced standing should obtain the necessary forms from the Admissions Office. Copies of recommended courses may be obtained from the Enrolment Office.

C.J.Q.
N.C.S.

* First year level only
** First and Second year levels only
† Second and Third year levels only

CALENDAR OF DATES FOR 1971

Session 1: March 1 to May 15
May Recess: May 16 to May 23
May 24 to June 12
Midyear Recess: June 13 to July 18
Session 2: July 19 to August 14
August Recess: August 15 to August 29
August 30 to November 6

JANUARY

Monday 25	Last day for acceptance of applications to enrol by new students and students repeating first year
Tuesday 26 to Saturday, Feb. 6	Deferred examinations

FEBRUARY

Monday 1	Australia Day—Public Holiday
Thursday 18 to Monday 22	Enrolment period for new students and students repeating first year
Monday 22	Enrolment week commences for students re-enrolling (second and later years)

MARCH

Monday 1	**Session 1 lectures commence**
Friday 12	Last day of enrolment for new students (late fee payable)
Wednesday 31	Last day for later year enrolments (late fee payable)

APRIL

Friday 9 to Monday 12	Easter
Monday 26	Anzac Day—Public Holiday

MAY

Sunday 16 to Sunday 23	May Recess

JUNE

Saturday 12	**Session 1 ends**
Monday 14	Queen's Birthday—Public Holiday
Wednesday 30	Last day for acceptance of applications for re-admission after exclusion under rules governing re-enrolment

JULY

Monday 19	**Session 2 commences**
Thursday 29	Foundation Day

AUGUST

Sunday 15 to Sunday 29	August Recess

SEPTEMBER

Wednesday 15	Last day for acceptance of corrected enrolment details forms

OCTOBER

Monday 4	Eight Hour Day—Public Holiday
Wednesday 6	Last day for acceptance of corrected enrolment details forms (late fee payable)

NOVEMBER

Saturday 6	**Session 2 ends**
Tuesday 9	Examinations begin

1972

Session 1: March 6 to May 13
May Recess: May 14 to May 21
May 22 to June 17
Midyear Recess: June 18 to July 23

Session 2: July 24 to August 12
August Recess: August 13 to August 27
August 28 to November 11

JANUARY

Tuesday, 25 to Saturday, Feb. 5	Deferred examinations

FEBRUARY

Monday 14	Enrolment week commences for new students and students repeating first year
Monday 21	Enrolment week commences for students re-enrolling

THE ACADEMIC YEAR

The academic year is divided into two sessions, each containing 14 weeks for teaching. There is a recess of five weeks between the two sessions. In addition there are short recesses within the sessions—one week within Session 1 and two weeks within Session 2.

The first session commences on the first Monday of March.

FACULTY OF BIOLOGICAL SCIENCES

Dean—Professor B. J. F. Ralph

SCHOOL OF APPLIED PSYCHOLOGY

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

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

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

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 Biological Technology 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 Microbiology
A. D. Brown, MSc *Syd.*, PhD *Manc.*

SCHOOL OF ZOOLOGY

Associate Professor and Acting Head of School
A. K. O'Gower, MSc PhD *Syd.*

FACULTY OF SCIENCE

SCHOOL AND ADMINISTRATIVE OFFICERS

Dean—Professor S. J. Angyal

Dean's Representative—Associate Professor N. C. Stephenson, MSc *Syd.*, PhD *N.S.W.*, ARACI

Graduate Assistant—Emma S. 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 and Head of School
G. W. K. Cavill, MSc *Syd.*, PhD DSc *Liv.*, FRIC, FRACI

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

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

Professor
S. E. Livingstone, PhD DSc *N.S.W.*, FSTC, FRACI

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

Professor of Chemistry
J. S. Shannon, DIC, PhD *Lond.*, DSc *Adel.*, FRACI

Associate Professors
E. R. Cole, MSc *Syd.*, PhD *N.S.W.*, FRACI
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 DSc *N.S.W.*, ASTC, FRACI
R. J. L. Martin, MSc *Melb.*, PhD *Lond.*, ARACI
J. J. Simes, MSc DipEd *Syd.*, PhD *Liv.*, FRACI
N. C. Stephenson, MSc *Syd.*, PhD *N.S.W.*, ARACI
G. J. Sutton, MSc PhD DSc *N.S.W.*, ASTC, FRIC, FRACI

Director of First Year Classes in Chemistry
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.*

Professor of Statistics
A. M. Hasofer, BEE *Faruk*, BEc PhD *Tas.*, MIEAust

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

Professor of Experimental Physics
H. J. Goldsmid, BSc PhD DSc *Lond.*, FInstP

Associate Professors
D. Haneman, MSc *Syd.*, PhD *R'dg.*, FAIP
J. C. Kelly, BSc *Syd.*, PhD *R'dg.*, GradInstP, AAIP
J. F. McConnell, MSc *Syd.*, PhD *N.S.W.*, AInstP, AAIP
L. G. Parry, BSc DipEd *Syd.*, MSc PhD *N.S.W.*, AInstP, AAIP

Director of First Year Studies
J. E. Giutronich, BSc *Syd.*, PhD *N.S.W.*, AAIP

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

ADMISSIONS AND ENROLMENT PROCEDURE

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.

ADMISSIONS PROCEDURE

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, Third Floor, 13-15 Wentworth Avenue (near Museum Station), 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.

ENROLMENT PROCEDURE FOR UNDERGRADUATE COURSES

In 1971, it will be necessary for the University to impose quotas in each Faculty and Board of Studies.

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

First Enrolments

(a) New South Wales residents already qualified for admission and persons who are applying for enrolment on the basis of qualifications gained or about to be gained outside New South Wales must lodge an application for enrolment with the Metropolitan Universities Admissions Centre, 13-15 Wentworth Avenue, Sydney (P.O. Box 7049, G.P.O., Sydney) by 30th October, 1970.

(b) New South Wales residents qualifying for admission by the 1970 New South Wales Higher School Certificate Examination or the 1971 Sydney University Matriculation Examination and those who have attended a University in New South Wales in 1970 must apply for enrolment to the Metropolitan Universities

Admissions Centre, 13-15 Wentworth Avenue, Sydney (P.O. Box 7049, G.P.O., Sydney) by 25th January, 1971.

Students whose applications for enrolment are accepted will be required to complete their enrolment at a specified appointment time before the start of Session 1. 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.

Failure in First Year—First year students who failed all subjects at the 1970 Annual Examinations and who were not granted any deferred examinations will NOT follow the above procedure. They are required to "show cause" why they should be allowed to continue in the course, and should await instructions in writing from the Registrar as to the procedure.

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 Enrolment 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 Pure and Applied Chemistry course are required to complete an enrolment form in the last fortnight of Session 2. 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 $7 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 Session 1 (12th March, 1971) 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.

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.

In addition to complying with these conditions, candidates must be selected before being permitted to enrol in a course. In 1971, it will be necessary for the University to limit the number of students enrolling in all undergraduate courses.

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

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

* Students who have gained a 2S level pass in Mathematics and/or Science, while being admitted, may have difficulties in their chemistry, physics and mathematics studies and are strongly advised to attend the bridging courses in these subjects.

(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. Applied Geography and Wool and Pastoral Sciences courses) Biological Sciences Engineering Industrial Arts Course Medicine Military Studies (Engineering course and Applied Science course) Science Bachelor of Science (Education)	(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 Applied Geography and Wool and Pastoral Sciences courses (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 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.
Law Combined Arts/Law Combined Commerce/Law	Nil As for Arts As for Commerce
Military Studies (Arts Course)	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, and provided that a candidate so qualified shall not enrol in a course of English literature.

SUBJECT	SUBJECT PRE-REQUISITES
1.011—Higher Physics I 1.001—Physics I 1.041—Physics IC	As for Faculty of Science
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

UNDERGRADUATE COURSE FEES

FEES*

Fees for Undergraduate Courses

Where course fees are assessed on the basis of session 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 session basis. A full-time course fee will be charged for any session where more than 15 hours' per week instruction, etc., is involved.

(i) Full-time Course Fee (more than 15 hours' attendance per week)—$198 per session.

(ii) Part-time Course Fee (over 6 hours' and up to 15 hours' attendance per week)—$99 per session.

(iii) Part-time Course Fee (6 hours' or less attendance per week)—$49.50 per session.

(iv) Course Continuation Fee—A fee of $28 per annum (no session 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—$8—payable at the beginning of first year.

Library Fee—annual fee—$14.

University Union*—entrance fee—$20.

Student Activities Fees

University Union*—$20—annual subscription.

Sports Association*—$4—annual subscription.

Students' Union*—$5—annual subscription.

Miscellaneous—$17—annual fee.

Total—$46.

Graduation or Diploma Fee—$8—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—$6 for each subject.

Examinations conducted under special circumstances—$8 for each subject.

Review of examination result—$8 for each subject.

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

LATE FEES

Session 1—First Enrolments

Fees paid on the late enrolment session and before the commencement of Session 1	$7
Fees paid during the first and second weeks of Session 1	$14
Fees paid after the commencement of the third week of Session 1 with the express approval of the Registrar and Head of the School concerned	$28

Session 1—Re-Enrolments

Failure to attend enrolment centre during enrolment week	$7
Fees paid after the commencement of the third week of Session 1 to 31st March	$14
Fees paid after 31st March where accepted with the express approval of the Registrar	$28

Session 2—All Enrolments

Fees paid in third and fourth weeks of Session 2	$14
Fees paid thereafter	$28
Late lodgement of corrected enrolment details forms (late applications will be accepted for three weeks only after the prescribed dates)	$6

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 Session 1 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 session has elapsed, one half of the session's course fees may be refunded. Where a student terminates a course of study after half a session has elapsed, no refund may be made in respect of that session's fees.

The Library fee is an annual fee and is not refundable where notice of withdrawal is given after the commencement of Session 1.

On notice of withdrawal a partial refund of the University Union Entrance Fee is made on the following basis: any person who has paid the entrance fee in any year and who withdraws from membership of the University Union after the commencement of Session 1 in the same year, or who does not renew his membership in the immediately succeeding year may on written application to the Warden receive a refund of half the entrance fee paid.

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

University Union—$5 in respect of each half session.

University of New South Wales Students' Union—where notice is given prior to the end of the fifth week of Session 1 $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 $8.50, 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 $7.

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.

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

Fees should be paid during the prescribed enrolment period but will be accepted during the first two weeks of Session 1. (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 Session 1 (i.e., 12th March, 1971), 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 Session

Students who are unable to pay their fees by the year may pay by the session, in which case they are required to pay the first session's course fees and other fees for the year, within the first two weeks of Session 1. Students paying under this arrangement will receive accounts from the University for Session 2 fees. These fees must be paid within the first two weeks of Session 2.

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 Session 1 and for one month from the date on which a late fee becomes payable in Session 2.

Where an extension of time is granted to a first year student in Session 1, 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 session, 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 Session 2 (13th August, 1971).

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 must apply on an application form obtainable from the Admissions Office, Chancellery, by Monday, 25th January. As quotas will operate on entry to all Faculties and the Board of Vocational Studies in 1971, failure to apply by 25th January, 1971, will probably result in the application for transfer being unsuccessful.

Students whose applications to transfer are successful are required to comply with the enrolment procedures for the year/stage of the new course in which they expect to enrol. Unless otherwise instructed they must present the letter granting approval of the transfer to the enrolling officer.

Students who have not received advice regarding their application to transfer before the date on which they are required to enrol should check with the Admissions Office.

Students should also advise the Enrolling Officer of the School in which they are enrolled of their intention 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 emphasised that:

1. Withdrawal from a subject, tuition in which extends over the academic year, at any time after the May recess;
2. withdrawal from a subject, tuition in which extends over only one session, at any time after one month from the commencement of the subject; or
3. failure to sit for the examinations in any subject in which the student has enrolled,

shall be regarded as failure to satisfy the examiners in the subject, unless written approval to withdraw without academic penalty 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 25th January, 1971. 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

Most annual examinations take place in November-December although some are held in the midyear recess. Timetables showing time and place at which individual examinations will be held are posted on the central notice boards in the Bio-Medical Building, Central Lecture Theatre Block, The Chancellery, Dalton Building, Main Building and Western Grounds Area. 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 August. 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 15th September. 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 $6 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, 1971.

1. (i) 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.

   Notwithstanding the provisions of Clause 1(i)

   (ii) A student enrolled in the first year or first stage of any course who has failed in more than half the programme in which he is enrolled for that year or stage shall be required to show cause why he should be allowed to continue in the course.

   (iii) A student enrolled in the first year of the Medical course who has failed in more than one subject of that year shall be required to show cause why he should be allowed to continue in the Medical course.

   (iv) The provisions of sections (ii) and (iii) of this rule shall be deemed to apply to any student on transfer from another course or institution whose programme of studies in the first year of enrolment immediately following transfer is comprised of subjects so chosen that half or more of such subjects are listed in the University Calendar as first year subjects.

2. Notwithstanding the provisions of Clause 1, 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

3. 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.

4. 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.

5. Any student excluded under any of the Clauses 1-3 may apply for re-admission after two academic years and such application shall be considered in the light of any evidence submitted by him.

6. A student wishing "to show cause" under these provisions shall do so in writing to the Registrar. Any such application shall be considered by a committee, hereinafter referred to as the Re-enrolment Committee appointed 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.

7. The Vice-Chancellor may on the recommendation of the Re-enrolment Committee 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 Re-enrolment Committee and the Vice-Chancellor, the the student's lack of fitness to pursue the course nominated.

8. A student who has failed, under the provisions of Clause 6 of these rules, to show cause acceptable to the Re-enrolment Committee why he should be permitted to continue 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.

9. Any student who is excluded from attendance in any course or subject by decision of the Professorial Board under the provisions of these rules may appeal to an Appeal Committee constituted by Council for this purpose.

10. The notification to any student of a decision by the Re-enrolment Committee to exclude the student from attendance in any course or subject shall indicate that the student may appeal against the decision to an

Appeal Committee of Council. In lodging such appeal the student shall ensure that a complete statement is furnished of all grounds on which the appeal is based and shall indicate whether or not the student wishes to appear in person before the Appeal Committee.

In considering an appeal the Appeal Committee, on the basis of the student's academic record and the stated grounds of appeal, shall decide:

(i) whether there are grounds which justify the Committee seeing the student in person, or

(ii) whether there is sufficient information available to the Committee to allow decision without seeing the student in person and so proceed to determine the application accordingly.

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. Late applications cannot be considered where, in the opinion of the University, insufficient time will be available for the student to prepare himself for any qualifying examinations which may be required.

It should be noted that a person under exclusion may not be enrolled in miscellaneous subjects unless he has received the approval of the Re-enrolment Committee.

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 located on the Upper Campus adjacent to the Chancellery, the Commerce Building and the Arts Building. The Bio-Medical Library is in the Biological Sciences Building with a branch at Prince Henry Hospital ('Phone: 661 0111).

The Library's Undergraduate Collection covers the teaching and research interests of the Faculty, and students are expected to read widely and critically from it.

It is recommended that students attend the "Introduction to the Library" which is held at advertised times during Orientation Week and the first week of Session 1. The "Introduction" uses audio-visual aids to describe the physical layout of the undergraduate library and the services available to readers.

Copies of the booklet, *Guide to the Library*, are available on request.

Students who are interested in a subject approach to information may attend a course which outlines methods of searching for information in libraries. This course runs for eight hours over a period of one week.

Individual assistance for readers with specific library problems is provided by the *Reader Assistance Unit* which is located in the foyer.

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 450 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 about $20 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.

Accommodation is also available at International House, New College (Church of England) and Warrane College (Roman Catholic). Students should write to the college of their choice for information regarding accommodation.

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 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 and whose parents are permanent residents of Australia. Applications for these scholarships, on forms available from the Registrar, must be lodged with the Registrar within seven days of the publication of the results of the New South Wales Higher School Certificate Examination.

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 Department of Education and Science, La Salle Building, 70 Castlereagh Street, Sydney, 2000, or Box 3987, G.P.O. Sydney, 2001. Phone 2 0323.

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 (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.

The Australian Optometrical Association also offers annually a scholarship to the total value of $1,600: $500 for both second and third year, and $600 for fourth year. This scholarship is available to students proceeding to the second year of the full-time degree courses in Optometry leading to the degree of Bachelor of Optometry.

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 two session instalments.

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 $2000 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.

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.

UNDERGRADUATE COURSES

There are two types of courses available within the Faculties of Science and Biological Sciences. The first is the Science Course, which allows a student to select sequences from a variety of the sciences. The second type of course is of a more specialised nature. Such courses are offered in Pure and Applied Chemistry, Applied Physics, Optometry and Applied Psychology. Details of each of these courses are given below.

SCIENCE COURSE

The Science Course is administered by the Dean of the Faculty of Science through his nominated representative on behalf of the Schools within the Faculty of Biological Sciences and the Faculty of Science, as well as the Schools of Applied Geology, Physiology and Anatomy, and the Department of Electronic Computation (School of Electrical Engineering).

The pass degree (Bachelor of Science) is based on a unit structure. A unit in experimental subjects comprises 90 hours of lectures, tutorials and laboratory work, and in theoretical subjects comprises an equivalent loading of lectures and tutorials. A unit may be of 14 or 28 weeks' duration.

The unit structure has been chosen to allow flexibility in the choice of a course of study and the regulations have been framed so that a student may choose a pattern suitable for:—

(1) a general scientific education.
(2) the training of science teachers.
(3) professional training in a specific discipline.
(4) professional training in interdisciplinary areas.

Units are grouped according to levels. Level I subjects are all double units. Level II units normally follow after Level I pre-requisites. Level III units in most cases follow after Level II pre-requisites.

The requirements of a pass degree may be met by completing units in accordance with the regulations set out below and which

constitute a major in one of the disciplines of the Schools of the Faculties of Science and Biological Sciences, or the Schools of Applied Geology (Faculty of Applied Science), Physiology or Anatomy (Faculty of Medicine). Some units may also be included from Schools in the Faculties of Arts and Engineering. A major normally includes four Level III units chosen from those offered by a particular School.

All students are required to complete three General Studies subjects. Patterns and outlines of these subjects are listed in the Department of General Studies Handbook, which is available free of cost.

The minimum time required to complete a pass degree is three years' full-time study or an equivalent period part-time. Some subject groupings cannot, however, be completed in the minimum time due to timetable difficulties.

A student may be admitted, subject to meeting conditions defined in the regulations, to an honours course which involves an extra year of full-time study or two years of part-time study. Those intending to seek admission to an honours year should consult the Head of the appropriate school on completion of the first year subjects.

Any arrangement of units to be studied must be approved by the Dean of the Faculty of Science. Advice on recommended course patterns may be obtained from the Education Officer of the School in which a student intends to major.

REGULATIONS GOVERNING THE SCIENCE COURSE

1. Definitions

The Science course is administered by the Dean of the Faculty of Science through his nominated representative.

The pass degree is based on a unit structure. A unit may be of 14 or 28 weeks' duration, and units are grouped according to levels. Level I subjects are all double units, level II units normally follow after level I pre-requisites and level III units, in most cases, follow after level II pre-requisites. A major sequence normally includes four level III units chosen from those offered by a particular school, although a number of schools offer more than four such units.

A pre-requisite unit is one which must be completed prior to enrolment in the unit for which it is prescribed. A co-requisite unit is one which must either be completed successfully before or be studied concurrently with the unit for which it is prescribed. An excluded unit is one which cannot be counted together with the unit which excludes it towards the degree qualification. In exceptional circumstances, on the recommendation of the head of the appropriate school, the Dean of the Faculty of Science may waive or vary a particular pre-requisite or co-requisite.

CARE SHOULD BE TAKEN IN THE CHOICE OF UNITS TO ENSURE THAT THE PATTERN COMPLIES WITH THE REGULATIONS SET OUT IN SECTION 3(a). CERTAIN COMBINATIONS OF UNITS CANNOT BE COMPLETED IN THE MINIMUM TIME DUE TO THE RESTRICTIONS OF TIMETABLES. COPIES OF TYPICAL COURSE PATTERNS ARE AVAILABLE FROM THE FACULTY OFFICE.

2. Regulations governing the Science course

(a) *Requirements for a pass degree*

In order to qualify for admission to the degree of Bachelor of Science under these regulations a candidate shall attend classes and satisfy the examiners in Science units and General Studies subjects chosen as follows—

(i) At least 23 Science units shall be included from the list set out in section 3(a) and three General Studies subjects from the list in section 3(b).

(ii) The 23 Science units shall comply with the pre-requisites, co-requisites and exclusion conditions set out in section 3(a) and also shall conform to the following restrictions:

not less than 8 units, nor more than 10 units may be from level I;

not less than 4 units may be from level III, and these four shall be chosen from related disciplines.

(iii) One of 10.001 Mathematics I, *OR*
10.011 Higher Mathematics I, *OR*
10.021 Mathematics IT
shall be included.

(iv) In addition to the specific pre-requisites listed in Clause 3(a), additional general pre-requisites are required by some schools as a preliminary to certain advanced level units. These units, which are scheduled below, should be taken in the first year of enrolment together with compulsory mathematics. Eight units are normally taken in first year.

School of Chemistry:	1.001, 1.011 or 1.041 Physics.
School of Applied Geology:	1.001, 1.011 or 1.041 Physics and 2.001 Chemistry.
School of Biochemistry: School of Botany: School of Microbiology School of Zoology:	1.001, 1.011 or 1.041 Physics and 2.001 and 17.001 General and Human Biology except that, with the consent of the Head of the particular School concerned and in special circumstances, 25.001 Geology or 12.001 Psychology may be taken in lieu of Physics I in first year. In this case credit will not be given for level III units offered by these Schools until level I Physics or 12.013 Psychology III is completed.

School of Anatomy:	17.001 General and Human Biology.
School of Physiology:	2.001 Chemistry and 17.001 General and Human Biology.
Dept. of Applied Physics:	1.001 or 1.011 Physics and 2.001 and 5.001 Engineering.

(v) Only one from each of the following subjects/ units may be included:

(a) 12.001 Psychology or 26.121 Psychology.

(b) 52.111 Philosophy or 26.521 Philosophy.

(c) Any unit listed in Section 3(a) or the equivalent unit offered at Wollongong University College which contains similar syllabus material.

(vi) A full-time student is required to complete the appropriate level I Mathematics and six other approved level I units 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 units of the course may be completed in any order consistent with the requirements concerning pre-requisite and co-requisite units as set out in Clause 3(a).

(vii) *The proposed course must be approved by the Dean of the Faculty of Science or his representative at enrolment.* In special circumstances, the Dean may grant a student permission to defer enrolment in certain level I units 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.

(b) *Requirements for an honours degree*

(i) In order to qualify for admission to the honours degree of Bachelor of Science a candidate shall:

1. Satisfy the requirements for a pass degree but without proceeding to graduation;

2. Undertake an extra year of full-time or two extra years of part-time study.

(ii) Admission to an honours course is granted by the Head of School. Students wishing to proceed to an honours degree must apply to the Head of the appropriate school on completion of pass degree requirements.

(iii) A suitably qualified candidate may be admitted to an honours course in one of the following:

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

(iv) To qualify for admission to an honours course, a student must have completed successfully 8 level III units in the pass degree course* except that in special cases the Head of the appropriate school may approve entry without such a qualification.

(v) Further to requirements listed in paragraph 2(b)(iv), to qualify for entry into an honours year a student must have completed any special units at required grades as determined by the Head of the School, prior to admission to the Honours year. In order to ascertain any such special conditions, a student contemplating honours is advised to consult the Head of School at the end of the first year of study.

(vi) Upon admission to the honours course a student must attend lectures, read and engage in laboratory work as required by the Head of School.

* For the honours course in Applied Physics the corresponding normal requirement is both (a) at least six Level III units to be completed and (b) at least eight units at Levels II and III to be completed at Credit grade or better or in the respective Higher version.

3. Schedule of Units

(a) *Science units*

These are listed under the Schools which provide the instruction and are divided into levels. Students must observe the pre-requisites and co-requisites. Some Schools offer higher units to which special pre-requisites apply and which are designed to lead to honours. Students contemplating honours studies must ensure that they have selected appropriate units. Some units are terminating so that students taking these may not qualify to continue studies in that School. When selecting terminating units students must ensure that a choice of a major sequence is still available. Note that many units are of half year duration so that it is necessary to choose units which give a balanced programme of study over the year.

See following pages 46-61.

(b) *General Studies*

Turn to page 62.

FACULTY OF SCIENCE

SCHOOL OF PHYSICS

No.	Name	Level	Unit Value	When Offered	Hours p.w.	Pre-requisites‡	Co-requisites‡	Excluded
1.001	Physics I	I	2	Full yr.	6	Sc. Faculty Ent.		
1.011	Higher Physics I	IH	2	Full yr.	6	Sc. Faculty Ent.		
1.041	Physics IC*	I	2	Full yr.	6	Sc. Faculty Ent.		
	PHYSICS LEVEL II							
1.112A	Electromagnetism	II	1	Session 2	6	1.001, 10.001 1.001, 10.001	10.211A	1.122A
1.112B	Modern Physics	II	1	Session 1	6		10.211A	1.122B, 1.212/3
1.112C	Waves in Continuous Media and Thermodynamics	II	1	Full yr.	2	1.001, 10.001	10.211A	1.122C
1.212T	Physics IIT (any two of 1.212A, 1.212B, 1.212C, 1.212D)	II	1	Full yr.	3	1.001 *or* 1.011 *or* 1.031 *or* 1.041, *or* 1.051 *or* 1.061; 10.001 *or* 10.011 *or* 10.021		1.112B
	HIGHER PHYSICS LEVEL II							
1.122A	Electromagnetism	IIH	1	Session 2	6	1.011, 10.001	10.211A	1.112A
1.122B	Quantum Physics	IIH	1	Session 1	6	1.011, 10.001	10.211A	1.112B
1.122C	Thermodynamics and Mechanics	IIH	1	Full yr.	2	1.011, 10.001	10.211A	1.112C

No.	Name	Level	Unit Value	When Offered	Hours p.w.	Pre-requisites‡	Co-requisites‡	Excluded
	PHYSICS LEVEL III							
1.113A	Wave Mechanics and Spectroscopy	III	1	Session 1	6	1.112B, 1.112C 10.211A		1.123A and 1.123D 2.023A and 10.222F
1.113B	Electromagnetic Fields and Physical Optics	III	1	Session 2	6	1.112A, 10.211A		10.212C and 10.222C
1.113C	Statistical Mechanics and Solid State	III	1	Session 1	6	1.112B and 1.112C	1.113A	1.123B and 1.123C
1.113D	Astrophysics and Nuclear Physics	III	1	Session 2	6	1.112B	1.113A	1.123C
	HIGHER PHYSICS LEVEL III							
1.123A	Quantum Mechanics	IIIH	1	Session 1	6	1.122B, 1.122C, 1.122A, 10.211A, 10.111A, 10.111B		1.113A, 2.023A 10.222F
1.123B	Electromagnetic Theory and Statistical Mechanics	IIIH	1	Session 1	6	1.122C, 1.122A 10.211A		1.113C, 10.212C, 10.222C
1.123C	Solid State and Nuclear Physics	IIIH	1	Session 2	6	1.122B, 10.211A	1.113A or 1.123A or 10.222F	1.113C and 1.113D
1.123D	Atomic Physics and Spectroscopy	IIIH	1	Session 2	6	1.122B, 1.122A 10.211A	1.123A or 10.222F	1.113A

SCHOOL OF PHYSICS (Continued)

No.	Name	Level	Unit Value	When Offered	Hours p.w.	Pre-requisites‡	Co-requisites‡	Excluded
	PHYSICS LEVEL III SUPPLEMENTARY UNITS							
1.143A	Biophysics	III	1	Session 1	5	1.112C		
1.143B	Solid State Devices and Electronics	III	1	Session 2	6	1.112A, 1.112B		
1.143C	Magnetism	III	1	Session 1	5	1.112A, 1.112B 10.211A		
1.143D	Concepts of Physics**	III	1	Session 2	5	1.112C† 1.112A, 1.112B		
1.143E	Electrical and Optical Properties of Solids	III	1	Session 2	5		1.113C	1.123D
1.153A	Hydrodynamics and Magnetohydrodynamics**	IIIH	1	Full yr.	4	1.122A, 1.122C 10.211A, 10.111A 10.111B		
1.153B	Relativity and Electro-magnetism	IIIH	1	Full yr.	4	1.122A and 1.122C 10.211A, 10.111A 10.111B		10.212C and 10.222C

* Available for students who intend to study Physics for only one year.
Progression to Physics Level II units is normally by way of 1.001 or 1.011.

† This unit may be a co-requisite in special cases.

‡ Students should note the additional mathematics pre-requisite to units of Higher Physics III. Where a unit is specified at Level II as a pre-requisite or co-requisite the Level IIH unit may be substituted.
Students must apply to the Head of School for admission to Physics Honours and they must have completed at least Physics units 1.123A, 1.123B, 1.123C and 1.123D.

** Not available in 1971.

SCHOOL OF CHEMISTRY

No.	Name	Level	Unit Value	When Offered	Hours p.w	Pre-requisites	Co-requisites	Excluded
2.001	Chemistry I	I	2	Full yr.	6	H.S.C. Science 2S		
2.002A‡	Physical Chemistry	II	1	Half yr.	6	2.001 and 10.001 *or* 10.011 *or* 10.021 and 1.001 *or* 1.011 *or* 1.041 *or* 1.031 *or* 1.061		
2.002B‡	Organic Chemistry	II	1	Half yr.	6	2.001 and 10.001 *or* 10.011 *or* 10.021		
2.002C‡	Inorganic Chemistry	II	1	Half yr.	6	2.001 and 10.001 *or* 10.011 *or* 10.021		
2.003A	Physical Chemistry	III	1	Half yr.	6	2.002A		2.013A, 2.023A
2.003B	Organic Chemistry	III	1	Half yr.	6	2.002B		
2.003C	Inorganic Chemistry	III	1	Half yr.	6	2.002C		
2.003D	Analytical Chemistry	III	1	Half yr.	6	2.002A, 2.002C		
2.003E	Nuclear and Radiation Chemistry	III	1	Half yr.	6	2.002A,* 2.002C*		
2.013A	Theoretical Chemistry	III	1	Half yr.	6	2.002A, and 10.031 *or* 10.211A		2.003A, 2.023A
2.023A§	Chemical Physics	III	1	Full yr.	3	10.211A (or equiv.) and 2.002A *or* 1.112B		1.113A, 1.123A 2.013A, 2.003A

* If taken as one unit independently, pre-requisites may be waived subject to the approval of Head of School.

‡ All three level II units must be taken by students majoring in Chemistry.

§ This is a unit which may be taken in conjunction with units of Applied Mathematics or Physics. It cannot be included as a Chemistry level III unit.

SCHOOL OF MATHEMATICS

No.	Name	Level	Unit Value	When Offered	Hours p.w.	Pre-requisites	Co-requisites	Excluded*
				MATHEMATICS				
10.001	Mathematics I	I	2	Full yr.	6			
10.011	Higher Mathematics I	IH	2	Full yr.	6			
10.021	Mathematics IT	IT	2	Full yr.	6			
10.031	Mathematics	II	1	Full yr.	2	10.001 *or* 10.011 *or* 10.021 Credit		‡
10.911	Mathematics II	A subject consisting of units 10.211A & 10.111A & 10.111B						
10.032	Mathematics	III	1	Full yr.	2	10.031		§
				PURE MATHEMATICS				
	Pure Mathematics Level II							
10.111A	Algebra	II	1	Full yr.	2	10.001 *or* 10.011		10.121A
10.111B	Analysis	II	1	Full yr.	2	10.001 *or* 10.011		10.121B
10.111C	Abstract Algebra	II	1	Full yr.	2	10.001 *or* 10.011		
	Higher Pure Mathematics Level II†							
10.121A	Algebra	IIH	1	Full yr.	2½	10.011		10.111A
10.121B	Analysis	IIH	1	Full yr.	2½	10.011		10.111B
10.121D	Real Variable Theory	IIH	1	Full yr.	2½	10.011		
	Pure Mathematics Level III							
10.112A	Algebra	III	1	Full yr.	2	10.111A, 10.111C		10.122A
10.112B	Functional Analysis	III	1	Full yr.	2	10.111A		
10.112C	Differential Geometry	III	1	Full yr.	2	10.111A, 10.211A		10.122C
10.112D	Set Theory	III	1	Full yr.	2	10.001 *or* 10.011		
10.112E	Differential Equations	III	1	Full yr.	2	10.111B, 10.211A		

No.	Name	Level	Unit Value	When Offered	Hours p.w.	Pre-requisites	Co-requisites	Excluded
	Higher Pure Mathematics Level III							
10.122A	Algebra	IIIH	1	Full yr.	2½	10.121A		10.112A
10.122C	Differential Geometry and Complex Variable Theory	IIIH	1	Full yr.	2½	10.121A, B & 10.211A		10.112C
10.122D	Number Theory and Logic	IIIH	1	Full yr.	2½	10.121A	10.122A	10.112D
10.122F	Topology and Integration	IIIH	1	Full yr.	2½	10.121D		

* If a unit in this column is counted the corresponding unit in the first column may not be counted.

† 1. Admission to Higher Pure Mathematics II 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, B and D and either 10.221A or 10.211A.

‡ Mathematics 10.031 is included for students desiring to attempt only one level II Mathematics unit If other level II units in Pure Mathematics, Applied Mathematics are taken, 10.031 Mathematics will not be counted.

§ Mathematics 10.032 is included for students desiring to attempt only one level III Mathematics unit. If other level III units in Pure Mathematics, Applied Mathematics are taken, 10.032 Mathematics will not be counted.

APPLIED MATHEMATICS

No.	Name	Level	Unit Value	When Offered	Hours p.w.	Pre-requisites	Co-requisites	Excluded
	Applied Mathematics Level II							
10.211A	Mathematical Methods	II	1	Full yr.	2	10.001		10.221A
10.211B	Analytical Dynamics	II	1	Session 1	4	10,001, 1.001		10.221B
10.211C	Hydrodynamics	II	1	Session 2	4	10,001, 1.001		10.221C
	Higher Applied Mathematics Level II							
10.221A	Mathematical Methods	IIH	1	Full yr.	2½	10.011†		10.211A

SCHOOL OF MATHEMATICS (Continued)

No.	Name	Level	Unit Value	When Offered	Hours p.w.	Pre-requisites	Co-requisites	Excluded
10.221B	Analytical Dynamics	IIH	1	Session 1	4	10.011†, 1.011†		10.211B
10.221C	Hydrodynamics	IIH	1	Session 2	4	10.011†, 1.011†		10.211C
	Applied Mathematics Level III							
10.212A	Numerical Analysis	III	1	Full yr.	1½	10.111A		
10.212B	Continuum Mechanics	III	1	Full yr.	1½	10.111A, 10.111B & 10.211A, B, C		10.222B
10.212C	Maxwell's Equations	III	1	Full yr.	1½	10.211A, 10.111A, 10.111B, 1.001		1.113B, 1.123B 1.153B
10.212D	Mathematical Methods	III	1	Full yr.	1½	10.211A, 10.111A, 10.111B		10.032, 10.222D; 10.222E
	Higher Applied Mathematics Level III							
10.222A	Numerical Analysis	IIIH	1	Full yr.	1½	10.111A (or better)		10.212A
10.222B	Continuum Mechanics*	IIIH	1	Full yr.	2	10.111A, B, 10.221A, B, C		10.212B
10.222C	Maxwell's Equations and Special Relativity	IIIH	1	Full yr.	2	10.221A, 10.121B, 1.001		10.212C, 1.113B 1.123B, 1.153B
10.222D§	Complex Variables and Integral Transforms	IIIH	1	Full yr.	2	10.221A, 10.121A 10.121B‡		10.212D
10.222E§	Boundary Value Problems and Special Functions	IIIH	1	Full yr.	2	10.121A, 10.121B, 10.221A‡		10.212D
10.222F	Quantum Mechanics*	IIIH	1	Full yr.	2	10.221A, 10.121A, 10.121B‡	10.222D or E	1.113A, 1.123A

* Normally, both Quantum Mechanics and Continuum Mechanics would not be taken by the student in the same year.
† A student who gains a superior pass in 10.001 Mathematics I and/or 1.001 Physics I may apply to proceed to Higher Applied Mathematics units.
‡ 10.111A, B and 10.211A with a sufficiently good pass may be substituted as a pre-requisite in place of 10.121A, B and 10.221A.
§ Units 10.222D, 10.222E will be offered in alternate years.

No.	Name	Level	Unit Value	When Offered	Hours p.w.	Pre-requisites (all units named except as governed by *or*)	Co-requisites	Excluded
				STATISTICS				
10.311	**Theory of Statistics Level II** Probability and Random Variables Sampling Distributions and Estimation Tests of Hypotheses and Regression	II	3	Full yr.	7	10.001 *or* 10.011 *or* 10.021 Cr		10.321 10.311T
10.311T	**Statistics**	II	1	Full yr.	2	10.001 *or* 10.011 *or* 10.021 Cr		10.311, 10.321
10.321	**Higher Theory of Statistics Level II** Probability and Random Variables Sampling Distributions and Estimation Tests of Hypotheses and Regression	IIH	3	Full yr.	8	10.001 *or* 10.011		10.311; 10.311T
	Theory of Statistics Level III							
10.312A	Stochastic Processes and Applications Statistics	III	1	Session 2	4	10.311 *or* 10.321 *or* 10.311T; 10.211A *or* 10.221A		10.322A
10.312B	Experimental Design Applications and Sampling	III	1	Session 1	4	10.311 *or* 10.321 *or* 10.311T	10.211A *or* 10.221A	10.322B
10.312C	Experimental Design (Theory) and Project	III	1	Session 1	4	10.311 *or* 10.321; 10.312B; 10.111A, *or* 10.121A *or* 10.211A *or* 10.221A	10.312B *or* 10.322B*	10.322C
10.312D	Contingency Tables and Probability Theory	III	1	Session 2	4	10.311 *or* 10.311T	10.211A *or* 10.221A	10.322D

SCHOOL OF MATHEMATICS (Continued)

No.	Name	Level	Unit Value	When Offered	Hours p.w.	Pre-requisites (all units named except as governed by *or*)	Co-requisites	Excluded
				STATISTICS (Continued)				
	Higher Theory of Statistics Level III							
10.322A	Stochastic Processes and Applications	IIIH	1	Session 2	4½	10.211A *or* 10.221A; 10.321		10.312A
10.322B	Experimental Design Applications	IIIH	1	Session 1	4½	10.321	10.211A *or* 10.221A	10.312B
10.322C	Experimental Design (Theory) and Project	IIIH	1	Session 1	4½	10.111A *or* 10.121A; *or* 10.211A *or* 10.221A; 10.321;	10.312B *or* 10.322B*	10.312C
10.322D	Contingency Tables, Probability Theory	IIIH	1	Session 2	4½	10.321	10.211A *or* 10.221A	10.312D

* Any two level III Pure Mathematics or Applied Mathematics units.

SCHOOL OF APPLIED PHYSICS AND OPTOMETRY

No.	Name	Level	Unit Value	When Offered	Hours p.w.	Pre-requisites	Co-requisites	Excluded
31.113A	Physics of Materials	III	1	Session 1	6	1.112B, 1.122B *or* 1.212T		
31.113B	Physics of Measurements	III	1	Full yr.	3	1.112B, 1.122B *or* 1.212T		
31.113C	Applications of Radiation	III	1	Session 2	6	1.112B, 1.122B *or* 1.212T		

FACULTY OF BIOLOGICAL SCIENCES

SCHOOL OF APPLIED PSYCHOLOGY

No.	Name	Level	Unit Value	When Offered	Hours p.w.	Pre-requisites	Co-requisites	Excluded
12.001	Psychology I	I	2	Full yr.	5	Sc. Faculty Entrance		
12.012	Psychology II	II	3	Full yr.	8	12.001		
12.013	Psychology III	III	4	Full yr.	*9	12.012		
12.044	Psychology III (supplementary)	III	4	Full yr.	*8		12.013	

* 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 School of Applied Psychology.

GENERAL AND HUMAN BIOLOGY

No.	Name	Level	Unit Value	Period	When Offered	Hours p.w.	Pre-requisites	Co-requisites	Excluded
17.001	General and Human Biology	I	2	Full yr.		6	Sc. Faculty Entrance	1.001 *or* 1.011 *or* 1.041; 2.001 10.001 *or* 10.011 *or* 10.021. If Level II or Level III Biology Units in the Faculty of Biological Sciences are to be taken subsequently.	

SCHOOL OF BIOCHEMISTRY

No.	Name	Level	Unit Value	When Offered	Hours p.w.	Pre-requisites	Co-requisites
41.101A	Chemistry of Biologically Important Molecules	II	1	Session 1	6	**For any level II unit:**	41.101B*
41.101B	Metabolism	II	1	Session 1	6	{17.001 and 2.001	41.101A
41.101C	Control Mechanisms	II	1	Session 2	6	both 41.101A and 41.101B	
41.102A	Biochemistry of Macromolecules and Cell Biochemistry	III	2	Session 1	12	**For any level III unit:**	
41.102B	Metabolic Pathways and Control Mechanisms	III	2	Session 2	12	{both 41.101A and 41.101B and 2 level II Chem. units, including 2.002B and preferably 2.002A as the 2nd Chem. unit; 41.101C is advisable.	

* 41.101A may be taken as a single unit under special circumstances and at the discretion of the Head of School.

NOTE: Students who take more than four level II *or* level III units from those offered by the Schools of Biochemistry, Botany, Microbiology and Zoology must include the units 41.101A, 41.101B and 43.101A in their course.

SCHOOL OF BIOLOGICAL TECHNOLOGY

No.	Name	Level	Unit Value	When Offered	Hours p.w.	Pre-requisites*	Co-requisites
42.102	Fermentation Technology	III	1	Session 2	6	44.102A and/or 44.102B	

* In exceptional circumstances a student may apply to the Head of School for variation of the pre-requisite.

SCHOOL OF BOTANY

No.	Name	Level	Unit Value	When Offered	Hours p.w.	Pre-requisites
43.101A	Genetics and Biometry	II	1	Session 1	6	17.001
43.101B	Plant Morphology	II	1	Session 2	6	17.001
43.101C	Plant Physiology	II	1	Session 2	6	17.001; 2.001 *or* 1.001** *or* 1.031** *or* 1.041**
43.102A	Advanced Genetics	III*	1	Session 2	6	43.101A
43.102B	Plant Taxonomy	III*	1	Session 1	6	43.101B; 43.101A pre- or co-requisite
43.102C	Plant Physiology & Biochemistry	III*	1	Session 1	6	41.101A; 41.101B
43.102D	Mycology	III*	1	Session 2	6	17.001
43.102E	Environmental Botany	III*	1	Session 1	6	17.001; 1.001** *or* 1.031** *or* 1.041**
43.102F	Plant Pathology	III*	1	Session 1	6	17.001

NOTE: Students who take more than four Level II and/or Level III units from those offered by the Schools of Biochemistry, Botany, Microbiology and Zoology must include units 41.101A, 41.101B and 43.101A in their course. If, however, at least four units offered by the School of Botany are taken in the final year of the course, students may substitute two Level II units offered by the Schools of Chemistry or Mathematics or Physics for units 41.101A and 41.101B.

* These units may be taken in *either* second *or* third year of the Science course provided that pre-requisites have been completed.

** This unit may be taken as a co-requisite in some circumstances.

SCHOOL OF MICROBIOLOGY

No.	Name	Level	Unit Value	When Offered	Hours p.w.	Pre-requisites*	Co-requisites
44.101	Introductory Microbiology	II	1	Full yr.	3	17.001 and either 2.001	
44.102A	Basic General Microbiology: Nature of Microorganisms	III	1	Session 1	6	44.101A, 43.101A, 41.101A and 41.101B	
44.102B	Basic General Microbiology: Microbial Physiology and Ecology	III	1	Session 1	6		
44.102C	Higher Microorganisms	III	1	Session 2	6		
44.102D	General Applied Microbiology	III	1	Session 2	6	44.102A, 44.102B	
44.102E	Medical Microbiology	III	1	Session 2	6	44.102A, 44.102B	
44.102F	Immunology	III	1	Session 2	6	17.001, 41.101A, 41.101B	

* In exceptional circumstances a student may apply to the Head of School for variation of the pre-requisite.

SCHOOL OF ZOOLOGY

No.	Name	Level	Unit Value	When Offered	Hours p.w.	Pre-requisites	Co-requisites
45.101A	Genetics and Biometry (see Botany)	II	1	Session 1	6	17.001 1.001 *or* 1.011 *or* 1.041	
45.101B	Invertebrate Zoology	II	1	Session 2	6	2.001 *or* 10.001 *or* 10.011 *or* 10.021	
45.101C	Vertebrate Zoology	II	1	Session 2	6		
45.101D	Field Ecology	II	1	Session 2	6	*43.101A/45.101A	
45.102A	Marine Ecology	III	1	Session 1	6	As above	
45.102B	Animal Behaviour	III	1	Session 2	6	As above	
45.102C	Comparative and Environmental Physiology	III	1	Session 1	6	41.101A & B and 45.101B *or* 45.101C	

* This unit includes a two-week camp in February of the following year.

SCHOOL OF ZOOLOGY (Continued)

No.	Name	Level	Unit Value	Period	When Offered	Hours p.w.	Pre-requisites	Co-requisites	Excluded
45.102D*	Comparative Reproductive Physiology	III	1	Half yr.	Session 2	6	41.101A & B and 45.101C		70.012E
45.201A	Insect Structure and Classification	III	1	Half yr.	Session 1	6	45.101A & 45.101B		
45.201B	Insect Physiology	III	1	Half yr.	Session 1	6	45.201A		
45.201C	Applied Entomology	III	1	Half yr.	Session 2	6	45.201B		
45.201D	Project	III	1	Half yr.	Session 2	6	45.201B		

NOTE:
41.101A, 41.101B Biochemistry, and 43.101A, 43.101A/45.101A Genetics and Biometry must be completed if more than four second or third level units are chosen from those offered by the Schools of Biochemistry, Botany, Microbiology or Zoology.

* May not be counted towards a degree which includes 70.012E Comparative Embryology.

FACULTY OF APPLIED SCIENCE

SCHOOL OF APPLIED GEOLOGY

No.	Name	Level	Unit Value	When Offered	Hours p.w.	Pre-requisites	Co-requisites	Excluded
25.001	Geology I	I	2	Full yr.	6	Sc. Faculty Ent. 2.001		
25.002A	Structural Geology & Palaeontology	II	1	Full yr.	3*	25.001		
25.002B	Mineralogy, Petrology & Stratigraphy	II	2	Full yr.	6*	25.001		
25.003A	Mineralogy, Petrology & Stratigraphy	III	2	Full yr.	6*	25.002 (A + B)		
25.003B	Geophysics, Stratigraphic Palaeontology, Structural Geology, Economic Geology	III	2	Full yr.	7*	25.002 (A + B)		
25.013	Geology III (Supplementary)	III	4	Full yr.	12	25.002 (A + B)	25.003 (A + B)	

* Plus field work.

SCHOOL OF GEOGRAPHY

No.	Name	Level	Unit Value	When Offered	Hours p.w.	Pre-requisites	Co-requisites	Excluded
27.031	Geography IS	I	2	Full yr.	6	Sc. Faculty Ent.		

FACULTY OF ARTS

SCHOOL OF PHILOSOPHY

No.	Name	Level	Unit Value	When Offered	Hours p.w.	Pre-requisites	Co-requisites	Excluded
52.111	Philosophy I	I	2	Full yr.	4	Sc. Faculty Ent.		
52.112	Philosophy II	II	3	Full yr.	4	52.111		
52.122	Philosophy II (Honours)	IIH	3	Full yr.	5	52.111		

FACULTY OF ENGINEERING

SCHOOL OF MECHANICAL AND INDUSTRIAL ENGINEERING

No.	Name	Level	Unit Value	When Offered	Hours p.w.	Pre-requisites	Co-requisites	Excluded
5.001	Engineering	I	2	Full yr.	6	Sc. Faculty Ent.		

SCHOOL OF ELECTRICAL ENGINEERING

No.	Name	Level	Unit Value	When Offered	Hours p.w.	Pre-requisites	Co-requisites	Excluded
6.601A	Introduction to Computing	II	1	Session 1	5	10.001		6.605A*
6.601B	Assembler Programming & Non-numeric Computing	II	1	Session 2	5	10.001	6.601A	6.605A*
6.602A	Computer Systems I	III	1	Session 1	5	6.601B *or* 6.605A*		6.605B*
6.602B	Computer Systems II	III	1	Session 2	5		6.602A	6.605B*
6.602C	Computer Applications	III	1	Session 1	5	6.601A *or* 6.605A*		6.605B*
6.602D	Programming Languages	III	1	Session 2	5	6.601A *or* 6.605A*		6.605B*

* Now a discontinued course.

FACULTY OF MEDICINE

SCHOOL OF ANATOMY

No.	Name	Level	Unit Value	When Offered	Hours p.w.	Pre-requisites	Co-requisites	Excluded
70.011A	Mammalian Histology	II	1	Session 1	6	17.001		
70.011B	Mammalian Embryology	II	1	Session 2	6	17.001		
70.011C	Systematic Anatomy I	II	1	Full yr.	3	17.001		
70.012A	Systematic Anatomy II	III	1	Full yr.	3	70.011C*		
70.012B	Systematic Anatomy III	III	1	Full yr.	3	70.011C*		
70.012C	Systematic Anatomy IV	III	1	Full yr.	3	70.011C*		
70.012D	Comparative Histology	III	1	Session 1	6	70.011A		
70.012F	Comparative Embryology†	III	1	Session 2	6	70.011B		45.102D
70.012F	Microscopy & Histological Techniques†	III	1	Session 1	6			

* In some circumstances this subject may be taken as a co-requisite rather than a pre-requisite.
† Not available in 1971.

SCHOOL OF PHYSIOLOGY

No.	Name	Level	Unit Value	When Offered	Hours p.w.	Pre-requisites	Co-requisites	Excluded
73.011A	Principles of Physiology	II	2	Full yr.	6	2.001 10.001 *or* 10.011 or 10.021 17.001		
73.012	Physiology II	III	4	Full yr.	13	73.011A; 41.101 (A + B + C)	45.101A	

NOTE: The above represent the normal pre-requisites for the courses in Physiology, but the Head of School may recommend that students with a good academic record be granted exemption from them.

(b) *General Studies*

Students shall select *three* of the following subjects provided at least *one* is from the *first six listed*:

26.501	English	Full	year	1½	hours
26.511	History	,,	,,	,,	,,
26.521	Philosophy	,,	,,	,,	,,
26.571	An Introduction to Modern Drama	,,	,,	,,	,,
26.641	German Literature and Civilization	,,	,,	,,	,,
26.121	Psychology	,,	,,	,,	,,
26.151	Economics	,,	,,	,,	,,
26.211	Arts and Crafts	,,	,,	,,	,,
26.301	Music	,,	,,	,,	,,
26.531	Sociology	,,	,,	,,	,,
26.541	Political Science	,,	,,	,,	,,
11.011H	History of Fine Arts	,,	,,	,,	,,
11.021H	History of Architecture	,,	,,	,,	,,
26.621	Cosmology	,,	,,	,,	,,
26.671	*Japanese	,,	,,	3	,,

* Counts as an Elective plus an Advanced Elective. May only be taken by students who can also fit a subject from the "non-language" group into their General Studies programme.

ADDITIONAL FOR AN HONOURS DEGREE: ADVANCED GENERAL STUDIES ELECTIVE, TWO TERMS TWO HOURS/WEEK.

4. Pattern of Studies

In general, a student should select a course which is adequately distributed over the six half years of study. Typical course patterns are available from the Faculty Office.

A suggested pattern of study is:—

First year: The appropriate 2 units of level I Mathematics and 6 other level I units including those essential to the intended major sequence of units.

Second year: One general studies elective and 8 units from level II *or* 6 units from level II and 2 from level I.

Third year: Two general studies electives and at least 4 level III units. The other units could be level II or III.

Fourth year: For an honours degree, an advanced general studies elective and such requirements as specified by the Head of the appropriate School.

5. Part-time Study

A student must select the units and general studies electives in accordance with these regulations save that Clause 2a(vi) is modified so that he must complete level I Mathematics and 6 other level I units in the first four years of enrolment or else show cause to the satisfaction of the Professorial Board why he should be allowed to re-enrol.

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 units shall be given advanced standing in such General Studies subjects and no more than 14 such Science course Units.

3. Students so admitted may be granted exemption from two other level II Science Units 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 four units of either level II or level III and four other level III units in accordance with the Science course regulations.

The units submitted for the Bachelor's degree under these regulations must include at least four level III units chosen from related disciplines in accordance with the Science course regulations. One of Mathematics 10.021 or 10.001 or 10.011 must be included in the course.

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 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 all Science course units completed by them. Further, where an undergraduate has completed a subject which contains the syllabus material of a Science course unit (or units) the Dean, with the agreement of the Head of the School offering the Science course unit (or units) may allow the unit (or units) so covered to be counted to a Bachelor of Science degree.

An undergraduate transferring to the Science course must take Mathematics 10.021 or 10.001 or 10.011 during his first year of enrolment in the course unless one of them has previously been completed.

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 units 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 eleven Science course units but not including 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.

PURE AND APPLIED CHEMISTRY COURSE

This course also leads to the Bachelor of Science degree, but provides a study in depth of one field only. It may be taken either as a full-time or part-time course.

Full-time Course

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.

First Year is similar to Year I of Chemistry in the Science course. In the second year a core of chemistry subjects, similar in content to chemistry units in the science course, but treated in greater depth and with extended practical work, is supplemented by science units offered by the Faculties of Science, Applied Science and Biological Sciences. It will be possible to choose between a wide range of such units, which may include a further first year subject if desired. The most widely chosen electives are some combination of mathematics units or a group of biological science units, such as the level II Biochemistry units in the Science course. It is possible that some elective units at this level may be offered by the School of Chemistry in later years.

The first half of third year will consist of a further development of the core course in four chemistry subjects. At this stage the student will have studied chemistry to an extent comparable to the student who graduates from the Science course with a major in chemistry, *but* the Pure and Applied Chemistry student *will have studied at rather greater depth.* In the second half of the third year, students in the Pure and Applied Chemistry course will select *three* advanced elective subjects. While most of the electives available are provided by the School of Chemistry, the needs of students who see their future in the less technical areas of industry will be met by the provision of electives with an applied bias.

Third year electives are normally of 112 hours, equivalent to eight hours per week for the half year. They are arranged in four groups, corresponding to areas of scientific interest. Not more than two electives may be chosen from one group; at least one must be chosen from electives offered by the School of Chemistry and any pre- or co-requisites must be observed.

Group 1.	Physical and theoretical chemistry, chemical physics, mathematics and statistics.	2.333, 2.303
Group 2.	Organic chemistry, biochemistry	2.633
Group 3.	Inorganic, analytical, nuclear and radiation chemistry	2.433, 2.533 2.811
Group 4.	Applied chemistry, interdisciplinary	2.513, 2.711 2.911

Electives offered by School of Chemistry		*Pre-requisites*
2.333	Physical Chemistry	2.322* or 2.303*
2.303	Theoretical Chemistry	2.302* or 2.322*
2.433	Inorganic Chemistry	2.422*
2.533	Analytical Chemistry	2.522*
2.513	Analytical Biochemistry	2.522*
2.633	Organic Chemistry	2.622*
2.711	Solid State Chemistry	2.311, 2.411
2.811	Nuclear and Radiation Chemistry	2.411
2.911	Applied Chemistry	2.311, 2.411, 2.511 *and* 2.611

* May be taken as co-requisites in 1971 if necessary.

PURE AND APPLIED CHEMISTRY—FULL-TIME COURSE

		Hours per week for 2 sessions Lec.	Lab. Tut.
YEAR 1			
1.011	Higher Physics I *or*		
1.001	Physics I *or*	3	3
1.041	Physics IC		
2.001	Chemistry I	2	4
10.011	Higher Mathematics I *or*		
10.001	Mathematics I *or*	4	2
10.021	Mathematics IT		
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.

YEAR 2		Hours per week for 2 sessions Lec.	Lab. Tut.	Total
2.311	Physical Chemistry	1½	3	4½
2.411	Inorganic Chemistry	1	2	3
2.511	Analytical Chemistry	1	3	4
2.611	Organic Chemistry	1½	3	4½
	Science Electives			9
	General Studies Elective			1½
				26½

* Recommended elective subjects in Second Year. Pre- and co-requisites for these subjects are shown under the Science course and must be observed.

MATHEMATICS

10.031	Mathematics	2
10.311T	Statistics	2
10.911	Mathematics II	6

PHYSICS

1.212	Physics IIT	3*

BIOLOGICAL SCIENCES

17.001	General and Human Biology	6
41.101A	Chemistry of Biologically Important Molecules	6*
41.101B	Metabolism	6*
41.101C	Biochemical Control	6*
44.101A	Introductory Microbiology	3
73.011A	Principles of Physiology	6

GEOLOGY

25.001	Geology I	6
25.002A	Stratigraphy and Palaeontology	4
25.002B	Crystallography, Mineralogy and Petrology	5

* One Session only.

YEAR 3				
2.322	Physical Chemistry*	1	2	3
2.422	Inorganic Chemistry	1	2	3
2.522	Analytical Chemistry	1	2	3
2.622	Organic Chemistry	1	2	3
	Advanced Elective Subjects†			12
	Two General Studies Electives			3
				27

* Alternatively 2.013A Theoretical Chemistry (1, ½, 1½).

† Three to be selected from the following list in accordance with the groupings and other requirements detailed earlier:

		Lec./Tut.	Lab.
2.333	Physical Chemistry	2	2
2.303	Theoretical Chemistry	2	2
2.433	Inorganic Chemistry	1	3
2.533	Analytical Chemistry	1	3
2.513	Analytical Biochemistry	1	3
2.633	Organic Chemistry	1½	2½
2.711	Solid State Chemistry	1	3
2.811	Nuclear and Radiation Chemistry	1	3
2.911	Applied Chemistry	2	2

YEAR 4 — HONOURS

Consult School for details.

Part-time

The part-time course in Pure and 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, in special circumstances, 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 allows a student to choose electives from other faculties such as Commerce or Applied Science. Areas such as industrial chemistry, management and technical services can thus be covered by those students who feel that their vocational interests lie in one particular region.

PURE AND APPLIED CHEMISTRY—PART-TIME COURSE

STAGES 1 AND 2

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 2 sessions	
		Lec.	Lab. Tut.
1.011	Higher Physics I *or*		
1.001	Physics I *or*	3	3
1.041	Physics IC		
2.001	Chemistry I	2	4

		Hours per week for 2 sessions	
		Lec.	Lab. Tut.
10.011	Higher Mathematics I *or*		
10.001	Mathematics I *or*	4	2
10.021	Mathematics IT		
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.

		Hours per week for 2 sessions		
STAGE 3		Lec.	Lab. Tut.	Total
2.311	Physical Chemistry	1½	3	4½
2.411	Inorganic Chemistry	1	2	3
	Science Electives*			6
				13½

* See footnote under Second Year Full-time Course.

STAGE 4				
2.511	Analytical Chemistry	1	3	4
2.611	Organic Chemistry	1½	3	4½
	Science Elective*			3
	General Studies Elective			1½
				13

* See footnote under Second Year Full-time Course.

STAGE 5				
2.322	Physical Chemistry*	1	2	3
2.422	Inorganic Chemistry	1	2	3
2.522	Analytical Chemistry	1	2	3
2.622	Organic Chemistry	1	2	3
	General Studies Elective			1½
				13½

* Alternatively 2.013A Theoretical Chemistry (1, ½, 1½).

STAGE 6	
Advanced Elective Subjects**	12
General Studies Elective	1½
	13½

** Three to be selected. See list and regulations under Third Year Full-time course.

Honours

The requirements for admission to the honours course are the same as for the full-time honours course. A student wishing to do honours on a part-time basis may complete the honours year over two part-time years. Students are, however, advised to make every effort to do the honours year full time.

APPLIED PHYSICS COURSE

Details of this course are given on page 89 under the School of Applied Physics and Optometry.

OPTOMETRY COURSE

The Department of Optometry provides a four year full-time course in Optometry leading to the degree of Bachelor of Optometry, which may be awarded at the pass or honours level. The first year of the course involves a study in the fundamental sciences of physics, chemistry, mathematics and general and human biology. Students who have completed the first year of a science course including physics, chemistry, mathematics and general and human biology or zoology at any Australian university are qualified for admission to the second year of the course. Second, third and fourth years are devoted to professional training in optometry including clinical optometry in the final year.

OPTOMETRY—FULL-TIME COURSE

Bachelor of Optometry

		Hours per week for 2 sessions	
		Lec.	Lab. Tut.
YEAR 1			
1.041	Physics IC	3	3
2.001	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
YEAR 2			
31.811	Optometry I	4	4
31.821	Special Anatomy and Physiology	3	3
73.011A	Principles of Physiology	3	3
	General Studies Elective	1	½
		11	10½
YEAR 3			
12.001	Psychology 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

YEAR 4		Hours per week for 2 sessions Lec.	Lab. Tut.
12.741	Psychology	2	0
31.813	Optometry III	6	0
31.841	Clinical Optometry*	1	14
74.001	Indication for Medical Referral†	1	0
	Advanced General Studies Elective	1	½
		11	14½

* Lectures cease after first 9 weeks.
† Lectures commence after first 9 weeks.

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 no less than four units of either Level II or Level III and four other Level III units, in accordance with the Science Course regulations.

   The units submitted for the Bachelor's degree under these regulations must include at least four Level III units chosen from related disciplines 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.

BACHELOR OF SCIENCE IN APPLIED PSYCHOLOGY COURSE

The School of Applied Psychology offers a course leading to the degree of Bachelor of Science in Applied Psychology, which may be awarded at the pass or honours level. This is designed as a professional undergraduate course for the training of psychologists. It provides extensive study of psychological theory and practice, supported by an appropriate selection of other subjects. Two main fields of specialization are currently offered (Industrial and Clinical) and students in their final year will choose between these two areas.

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 organizations in which he works, and embraces such aspects of this study as job success, job satisfaction, industrial motivation, employer-employee relations, acquisition of job skill, conditions affecting job efficiency and the like.

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 specialization 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 teamwork, and research in clinical psychology is also covered.

Details of qualifications for admission to the B.Sc. in Applied Psychology Course, the course requirements for Pass and Honours at graduation and rules governing admission with Advanced Standing are given below. Hours of attendance for the main subjects available in the course are shown in the Schedule of Course Subjects, followed by some recommended course patterns.

RULES GOVERNING THE APPLIED PSYCHOLOGY (B.Sc.) COURSE

I. Applicants for admission to the Course must be matriculated to this University; and also have either satisfied the entrance requirements for the Faculty of Science or, alternatively, have passed Mathematics I or General and Human Biology.

II. (A) In order to qualify for admission to the degree of B.Sc. in Applied Psychology under these regulations a candidate must attend classes and satisfy the examiners in the following subjects:—

1. *Each of:*—
   12.001 Psychology I
   12.012 Psychology II
   12.042 Psychology IIA
   12.013 Psychology III
   12.044 Psychology III (Supplementary)

   (In special cases, the Head of the School of Applied Psychology or his representative may approve of the substitution of any other appropriate course or equivalent units for 12.044 Psychology III (Supplementary).

   and either

   12.045 Psychology IV (Industrial)

   or

   12.055 Psychology IV (Clinical)

2. *Five other subjects* (or their equivalent in units) selected to meet the following requirements:

   (a) that they shall include *at least* one of:
      (i) 10.011 Higher Mathematics I, *or*
      10.001 Mathematics I, *or*
      10.021 Mathematics IT

      or

      (ii) 17.001 General and Human Biology.

      [They may include both (i) and (ii).]

   (b) that they shall include *at least* one of:
      53.111 Sociology I
      15.101 Economics I
      54.111 Political Science I
      52.111 Philosophy I

      or with the approval of the Head of the School of Applied Psychology, one other Arts I subject or two General Studies electives.

   (c) that they shall include at least one subject which together with the subject meeting the requirements of (a) or (b) immediately above constitutes a recognized sequence of two courses.

Recognized sequences are:

(i) 10.001 Mathematics I, followed by three Mathematics Level II units, or by 10.311 Theory of Statistics I.

(ii) 17.001 General and Human Biology, followed by 12.402 Physiological Psychology, or by the equivalent of one subject chosen from the following units according to the regulations of the Faculty of Biological Sciences:

41.101A Chemistry of Biologically Important Molecules

41.101B Metabolism
(41.101A and 41.101B must be taken together, and count as two units)

41.101C Biochemical Control

45.101A Genetics and Biometry

45.101C Vertebrate Zoology

73.011A Principles of Physiology I (equivalent to 2 units)

(iii) 53.111 Sociology I, followed by 53.112 Sociology II

15.101 Economics I, followed by 15.102 Economics II

54.111 Political Science I, followed by 54.112 Political Science II

52.111 Philosophy I, followed by 52.112 Philosophy II.

(B) The proposed course must be approved by the Head of the School of Applied Psychology or his representative prior to or during enrolment. The courses must be chosen in such a way as will fit in with the timetable.

(C) Progression in the Course shall be by subjects, and the subjects in the Course may be completed in any order consistent with the requirements concerning pre-requisites and co-requisites for the subjects chosen.

III. *Pre-requisite and Co-requisites*

Before enrolling in any course (or equivalent units of a subject) the student shall have attended the classes and shall have satisfied the examiners in all relevant pre-requisite subjects.

The student should refer to the appropriate Faculty Handbook or to the Calendar for a statement of subject pre-requisites and/or co-requisites.

IV. The award of B.Sc. in Applied Psychology at graduation shall be at either Pass level or with Honours after a minimum of 4 years of full-time study or 6 years of part-time study.

RULES GOVERNING ADMISSION TO THE B.Sc. IN APPLIED PSYCHOLOGY COURSE WITH ADVANCED STANDING

1. Graduates of the University of New South Wales may be admitted to the Applied Psychology B.Sc. degree course with exemptions from no more than five subjects or their unit equivalents completed by them. No more than two Psychology subjects may be included in the subjects exempted.

2. Undergraduates of the University of New South Wales who transfer from another course to the Applied Psychology B.Sc. course may be admitted to the Applied Psychology B.Sc. course with exemption in no more than seven Applied Psychology B.Sc. course subjects or their unit equivalents.

3. Graduates or undergraduates of other universities may be admitted to the Applied Psychology B.Sc. 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 those permissible in the Applied Psychology B.Sc. course may, subject to the approval of the appropriate Heads of School, be granted exemption in no more than five subjects, of which no more than two may be Psychology subjects.

RECOMMENDED B.Sc. APPLIED PSYCHOLOGY COURSE PATTERNS

The course requirements have been so designed that they allow for:

(a) a solid core of psychology to equip the psychologist-in-training with psychological theory, skill in experimentation and psychological techniques by way of 6 compulsory psychology subjects [although the student may choose from a number of electives within the subjects comprising Psychology III, III (Supplementary) and IV];

(b) some supporting studies in mathematics and/or biology, of which a minimum of one course is compulsory;

(c) some supporting studies in the social sciences, of which a minimum of one course is compulsory; and

(d) the special needs, interests and academic or vocational background of the individual student to be considered when the balance of the five supporting subjects (or their equivalents in units) is selected in consultation with the Head of School or his representative.

For this reason, no course patterns are prescribed. The patterns to be completed by students who are admitted with advanced standing will take into account the subjects credited.

Students commencing university studies for the first time will arrange their patterns of supporting subjects in consultation with the Head of the School or his representative before completing enrolment. For such full-time students, some examples of patterns, based on supporting subject variants, are suggested below:

		Year I	Year II	Year III	Year IV
COMPULSORY PSYCHOLOGY SUBJECTS FOR ALL COURSES		12.001	12.012 12.042	12.013 12.044	12.045 *or* 12.055
MAIN SUPPORTING SUBJECT:					
Pure Mathematics	(2 Yrs.)	10.001 Social Science Subject I Any approved Level I Subject	{10.111A, 10.111B *and* 10.111C *or* 10.211A	An approved Level I or II Subject (or equiv. units)	
	(3 Yrs.)	10.001 A Social Science Subject I Any approved Level I Subject	10.111A unit 10.111B unit 10.111C unit 10.211A unit	10.112A unit 10.112B unit 10.112E unit	
Statistics	(2 Yrs.)	10.001 A Social Science Subject I Any approved Level I Subject	10.311	An approved Level I or II Subject (or equiv. units)	
	(3 Yrs.)	10.001 A Social Science Subject I Any approved Level I Subject	10.311 10.211A unit 10.112B unit	10.321B unit 10.312C unit	

		Year I	Year II	Year III	Year IV
Biochemistry		17.001 2.001 10.001 *or* 10.021	41.101A 41.101B 41.101C	A Social Science Subject I	
Zoology	(2 Yrs.)	17.001 2.001 10.001 *or* 10.021	45.101A unit 45.101C unit A Social Science Subject I		
Physiology	(2 Yrs.)	17.001 A Social Science Subject I Any approved Level I Subject	73.011A Any approved Level I or II Subject (or equiv. units)		
	(2 Yrs.)	17.001 2.001 10.001 *or* 10.011 or 10.021	73.011A 10.311T *or* A Pure Maths II Unit	A Social Science Subject I	
Social Science Subject	(2 Yrs.)	A Social Science Subject (A) I 10.011 *or* 10.021 *or* 17.001 Any approved Level I Subject	Social Science Subject (A) II An approved Level I or II Subject (or equivalent units)		

	Year I	Year II	Year III	Year IV
(3 Yrs.)	A Social Science Subject (A) I 10.011 *or* 10.021 *or* 17.001 Any approved Level I Subject	Social Science Subject (A) II	Social Science Subject (A) III	
General	Social Science Subject (A) I 17.001 10.001 *or* 10.021	12.402	Social Science Subject (A) II *or* Social Science Subject B (I) *or* Any approved Level I or II Subject	

SCHEDULE: MAIN B.Sc. APPLIED PSYCHOLOGY COURSE SUBJECTS

	No.	Subject or Unit	Level	Hours p.w.	When Offered	Pre-requisites	Co-requisites
PSYCHOLOGY	12.001	Psychology I	I	5	Full yr.		
	12.012	Psychology II	II	8	Full yr.	12.001	
	12.042	Psychology IIA*	II	6	Full yr.	12.001	12.012
	12.013	Psychology III†	III	9	Full yr.	12.012	
	12.044	Psychology III (Supp.)†	III	8	Full yr.	12.012	12.013
	12.045	Psychology IV (Indust.)*‡	IV	15	Full yr.	12.013, 12.044	
	12.055	Psychology IV (Clinical)*‡	IV	15	Full yr.	12.013, 12.044	
	12.402	Physiological Psychology	II	4	Full yr.	12.001, 17.001	
MATHEMATICS §	10.001	Mathematics I	I	6	Full yr.		
	10.011	Higher Mathematics I	I	6	Full yr.		
	10.021	Mathematics IT	I	6	Full yr.		
	10.911	Mathematics II	II	6	Full yr.	10.001 *or* 10.011	
	10.311	Theory of Statistics I	II	7	Full yr.	10.001 *or* 10.011	
GENERAL AND HUMAN BIOLOGY	17.001	General and Human Biology	I	6	Full yr.		
BIOCHEMISTRY UNITS §	41.101A	Chemistry of Biologically Important Molecules	II	6	Session 1	17.001	41.101B
	41.101B	Metabolism	II	6	Session 1	2.001	41.101A
	41.101C	Biochemical Control	II	6	Session 2	10.001 *or* 10.011 *or* 10.021	41.101A 41.101B

	No.	Subject or Unit	Level	Hours p.w.	When Offered	Pre-requisites	Co-requisites
ZOOLOGY UNITS §	45.101A	Genetics and Biometry	II	6	Session 1	17.001	
	45.101C	Vertebrates	II	6	Session 2	2.001 10.001 *or* 10.011 *or* 10.021	
PHYSIOLOGY UNITS §	73.011A	Principles of Physiology (Equiv. Unit Value = 2)	II	6	Full yr.	17.001 2.001 10.001 *or* 10.011 *or* 10.021	
ECONOMICS	15.101	Economics I	I	3	Full yr.		
	15.102	Economics II	II	4	Full yr.	15.101	
PHILOSOPHY	52.111	Philosophy I	I	4	Full yr.		
	52.112	Philosophy II	II	5	Full yr.	52.111	
SOCIOLOGY	53.111	Sociology I	I	4	Full yr.		
	53.112	Sociology II	II	4½	Full yr.	53.111	
POLITICAL SCIENCE	54.111	Political Science I	I	3½	Full yr.		
	54.112	Political Science II	II	3½	Full yr.	54.111	

* Day-time attendance for tutorials and practical work, including visits to institutions, etc., is required.

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

‡ In cases where students are unable to satisfy the day-time attendance requirements, the Head of the School may arrange alternative programmes for practical work and tutorials.

§ For details of Level II and Level III units, including pre- and co-requisites, refer to Science course details under Faculty of Science. If units are taken, three Level II units are equivalent to one Level II subject; four Level III units are equivalent to one Level III subject.

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.

The School of Applied Psychology offers a postgraduate formal course leading to the award of Master of Psychology (M. Psychol.). It is available to selected graduates with Honours in Psychology and provides professional training in either Experimental Clinical Psychology or Psychodynamic Clinical Psychology.

The School of Applied Psychology also offers a postgraduate course in applied psychology for the award of the Diploma in Psychology (Dip. Psychol.). It is specifically designed to provide professional training at an advanced level for graduates with at least three years of undergraduate training in psychology at an approved university; and in particular to train students in the application of psychological theory and techniques to vocational and educational guidance.

The School of Biological Technology, conjointly with the School of Chemical Engineering, offers a course in biochemical engineering which leads to the award of a postgraduate diploma (Dip.Biochem.Eng.). The course may be completed in one year of full-time study or part-time over two years and is intended for

graduates in chemical engineering, chemistry, biological sciences and agriculture.

The School of Mathematics offers a postgraduate course which covers a wide range of statistical theory and practice. It leads to the award of the degree of Master of Statistics, and is available on a two-year full-time basis or on a four-year part-time basis.

The course will provide advanced training for practising statisticians, and is available to graduates with a pass degree in statistics or an honours degree in a related field (commonly mathematics) with supporting study in statistics. Honours graduates in statistics may be exempted from a maximum of half the course.

The School of Physics offers a postgraduate course, with an emphasis on Solid State Physics, which leads to the award of M.Sc.(Physics). The course may be completed in one year of full-time study or two years of part-time study.

A formal graduate course for the degree of Master of Optometry (M. Optom.) is given by the School of Applied Physics and Optometry. For details see page 90.

SUBJECT INFORMATION AND TEXTBOOK LISTS

The following pages list details of textbooks, subject descriptions, etc. Reference books are not included here but the reference lists will be made available by the various schools. Information concerning general studies subjects is contained in the Handbook of the Board of General Studies which is available free of charge.

SCHOOL OF ANATOMY

The School of Anatomy will offer three Level II units for Science students in 1971, followed by four Level III units in 1971. Level II units comprise Mammalian Histology, Mammalian Embryology and Systematic Anatomy I (cardio-pulmonary). The Level III units will be Systematic Anatomy II (locomotion), Systematic Anatomy III (alimentary and urogenital), Systematic Anatomy IV (neuro-endocrine) and Comparative Histology. Students who major in Anatomy and who attain an adequate standard may proceed to a B.Sc. degree with honours. Each Anatomy unit will be offered once during the year as a day course only.

70.011A Mammalian Histology

Pre-requisite for Comparative Histology

Cell form and tissue structure. Cell structure and function. Cell function and evolution. Epithelial cells and tissue. Connective tissues and connective tissue cells. Muscle cell and muscle tissue. Nerve cell and nervous tissue. Cellular interrelations. Structure of organs and organ systems. Skin and derivatives. Development and structure of teeth. Circulatory System. Oral cavity. Alimentary canal and associated glands. Respiratory system. Urinary system. Eye, ear. Reproductive system.

TEXTBOOK

Bloom, W. & Fawcett, D. W. *A Textbook of Histology*. 9th ed. Saunders, 1968.

PRE-REQUISITES

17.001 General and Human Biology.

This unit consists of 6 hours per week throughout Session 1.

70.011B Mammalian Embryology

Pre-requisite for Comparative Embryology

History of embryology and its development as a science. The mammalian reproductive system. Gametogenesis. Fertilisation and cleavage. Development and implantation of blastocyst. Development of embryonic disc, embryonic membranes, placenta. Comparative mammalian placentation. Human embryogenesis. Development of human foetus. Characteristics of external form. Teratology. Human organology. Comparative mammalian development. Biochemistry and embryogenesis.

TEXTBOOK

Arey, L. B. *Developmental Anatomy*. 7th ed. Saunders, 1965.

PRE-REQUISITES

17.001 General and Human Biology.

This unit consists of 6 hours per week throughout Session 2.

70.011C Systematic Anatomy I

Pre- or co-requisite for Systematic Anatomy II, III, IV

Introduction to terms and concepts in systematic anatomy. Introduction to nervous system. Nerves of the thorax. Walls of the thorax. Thoracic movement. Circulation. Pericardium and heart. Blood vessels. Vascular distribution. Vascular anastomoses. The lymphatic system. Spleen and thymus. Skull, nasal cavity and sinuses. Larynx. Speech. Trachea and bronchi. Pleura and lungs. Living and radiological anatomy of air passages and thorax. Biomechanics of respiration.

TEXTBOOK

Lockhart, R. D., Hamilton, G. F. & Fyfe, F. W. *Anatomy of the Human Body*. Faber & Faber.

PRE-REQUISITES

17.001 General and Human Biology.

This unit consists of 3 hours per week throughout Sessions 1 and 2.

70.012A Systematic Anatomy II

Systematic Anatomy I is a pre- or co-requisite

Bone, cartilage and joints. Fascia and muscle. Bones, muscles and joints of limbs, trunk, head and neck. Course and distribution of peripheral nerve trunks. Vascular arrangements of the limbs. Biomechanics of movement, posture and locomotion. The hand as an organ. Living and radiological anatomy of trunk and limbs.

TEXTBOOK

Gardner, E., Gray, D. J., & O'Rahilly, R. *Anatomy*. 3rd ed. Saunders, 1969.

PRE-REQUISITES

70.011C Systematic Anatomy I*.

This unit consists of 3 hours per week throughout Sessions 1 and 2.

70.012B Systematic Anatomy III

Mouth and salivary glands. Pharynx. Oesophagus. Abdomino-pelvic cavity. Peritoneum. Stomach, intestine, liver, pancreas. Kidney, ureter, bladder, urethra. Male and female reproductive organs. Innervation, blood supply and lymph drainage of gastro-intestinal and urogenital systems. Living and radiological anatomy of alimentary and urogenital organs.

TEXTBOOK

Gardner, E., Gray, D. J., & O'Rahilly, R. *Anatomy*. 3rd ed. Saunders, 1969.

PRE-REQUISITES

70.011C Systematic Anatomy I*.

This unit consists of 3 hours per week throughout Sessions 1 and 2.

70.012C Systematic Anatomy IV

The neurons, neuronal satellite cells. Functional anatomy of the central nervous system. Blood supply of central nervous system. Organs of special sense. Endocrine glands. Principles of peripheral nerve distribution.

TEXTBOOKS

Noback, C. R. *The Human Nervous System*. McGraw-Hill, 1967.

Gardner, E., Gray, D. J., & O'Rahilly, R. *Anatomy*. 3rd ed. Saunders, 1969.

PRE-REQUISITES

70.011C Systematic Anatomy I*.

This unit consists of 3 hours per week throughout Sessions 1 and 2.

70.012D Comparative Histology

Comparative cellular and intracellular structure and function. Comparative tissue structure and function. Vertebrate and invertebrate cells and tissues. Detailed comparative study of skin and derivatives. Bone and skeletal structure. Haemopoietic tissues. Cells of circulating blood and tissue fluids. Blood vascular system. Muscle. Nervous tissue and sense organs. Alimentary system and associated glands. Excretory system. Genital and reproductive tissue.

TEXTBOOK

Bloom, W. & Fawcett, D. W. *A Textbook of Histology*. 9th ed. Saunders, 1968.

PRE-REQUISITES

70.011A Mammalian Histology.

This unit consists of 6 hours per week throughout Session 1.

* In some circumstances this unit may be taken as a co-requisite.

SCHOOL OF APPLIED PHYSICS AND OPTOMETRY

DEPARTMENT OF APPLIED PHYSICS

There are significant and increasing numbers of opportunities for employment of physicists along with other technologists in the research-and-development laboratories and other departments of Australian industrial firms. The kind of work done by industrial physicists is described as applied physics; and the Department of Applied Physics in this University has been set up to bring together industrial scientists and students and staff of the University.

Undergraduates who are majoring in Physics in the Science Course and whose interest is in applying their subject are offered the opportunity to achieve a B.Sc. with Honours in Applied Physics on the basis of the fourth-year course which the Department conducts.

In accordance with Science Course regulations, suitably-qualified students may apply to the Head of the School for admission to the Honours year on completing pass degree requirements. Suitable qualifications include, besides the major in Physics, completion of the majority of a range of Science Course subjects and units which give appropriate support to applied physics study. A recommended pass degree programme is:

Year 1	1.001 (or 1.011)	Physics I	(2 units each)
	2.001	Chemistry I	
	5.001	Engineering I	
	10.001 (or 10.011)	Mathematics I	
Year 2	1.112 (or 1.122)	Physics II (units A, B & C)	
	10.111 (or 10.121)	Pure Mathematics II (units A & B)	
	10.211 (or 10.221)	Applied Mathematics II (unit A)	
	2 further units from the "Preferred List" below		
Year 3	1.113 (or 1.123)	Physics III (units A, B, C and D)	
	At least 2 of		
	31.113	Applied Physics III (units A, B & C)	
	Further units from the "Preferred List" on next page, to comprise a total of 8 units for the year.		

"Preferred List" of Science Course units

Level I*	17.001	General and Human Biology	(2 units each)
	12.001	Psychology I	
	25.001	Geology I	
Level II	1.212T	Physics (including "A" option — Geometrical Optics)	(1 unit each)
	2.002	Chemistry II (units A, B & C)	
	6.601A	Introduction to Computing	
	10.311T	Statistics	
Level III	1.143	Physics III (units A, B, C & E)	
	31.113	Applied Physcis III (unit A, B or C)	

Completion of a 24-unit pass degree programme (as indicated), and a majority of graded passes in the Level II and Level III units, is normally required for admission to the Honours year.

The honours course comprises lectures, laboratory studies, and project work in areas of the application of physics to practical objectives, some of which areas may be chosen by the student from a number of electives. Also included is "Introduction to Industrial Practice" in which aspects of the work of scientists in industry will be critically studied in depth. In this course, and in other parts of the honours year work, the Department is assured of the support of a staff of visiting lecturers from industry.

The Department also offers certain Level III units (31.113A, B and C), both as part of preparation for applied physics honours study, and as units in a Science Course programme for those, not contemplating applied physics honours, but who are nevertheless interested in the application of physics in technology.

Graduates with honours in applied physics, or in physics, may register as research students in the Department working for the M.Sc. or the Ph.D. degree. Research work in the Department is directed towards practical objectives. Students working part-time or externally in appropriate fields for the M.Sc. are welcome and given full encouragement.

Graduates not holding an appropriate honours degree either must present evidence of research ability, or must complete a qualifying course prescribed by the Departmnt, before being accepted as higher-degree research students.

* The Science Course Regulations (see 2(a)(ii) on p. 42) require that not less than 8 nor more than 10 units be from Level I.

Students coming from outside the Science Course should note the "Rules governing Admission to the Science Degree Course with Advanced Standing" and in particular Rule 5, which relates to admission for the purpose of attaining an honours degree. The "special programme" which Faculty would be recommended to prescribe, in the case of a pass graduate or graduand with a major in physics, would normally comprise one year of preparatory studies followed by the normal applied physics honours year. Depending on circumstances, the preparatory work might be accomplished by one year's full-time study, or might involve more than one year if part-time.

31.113A Physics of Materials I*

(Session 1: 6 hours per week)

A study of the physical properties of all types of materials in relation to structure.

TEXTBOOK
Van Vlack, L. H. *Materials Science for Engineers.* Addison-Wesley, 1970.

31.113B Physics of Measurement*

(Full year: 3 hours per week)

The general principles of measuring physical quantities and analysing measurements. Techniques of measurement, their scope and limitations.

TEXTBOOK
Cook, N. H., & Rabinowicz, E. *Physical Measurement and Analysis.* Addison-Wesley, 1963.

31.113C Applications of Radiation*

(Session 2: 6 hours per week)

Long-wave to short-wave electromagnetic radiation; some uses of electron beams and other radiations.

TEXTBOOK
Details available from the Department of Applied Physics.

* The pre-requisite for each unit is *either* 1.112B *or* 1.112B *or* 1.212T.

Part of each unit will comprise relevant laboratory work and other exercises. In these, students will be to a significant extent associated with the current programme of research work of the Department.

DEPARTMENT OF OPTOMETRY

The following courses are offered by the Department:

(a) A four-year full-time course leading to the degree of Bachelor of Optometry at either pass or honours level. This degree (B.Optom.) fulfils the requirements defined in the N.S.W. Optometrists (Amendment Act, 1963), and is the only course of professional training for Optometrists given in this state. Full details of the course appear earlier in this handbook.

(b) An extended undergraduate course leading to the double degree B.Sc./B.Optom.

(c) A formal graduate course for the degree of Master of Optometry (M.Optom.). This course involves the study of three elective postgraduate subjects and advanced clinical optometry, together with the preparation of a thesis on an assigned project. It may be completed in one year of full-time study, or in the case of practising optometrists, in two or three years of part-time study.

(d) Facilities for individual research are available and students who are considered as eligible may enrol with the university as candidates for the degrees of Master of Science or Doctor of Philosophy.

Further information on the foregoing may be obtained from the brochures issued by the Department of Optometry.

OPTOMETRY TEXTBOOKS

31.811 Optometry I

TEXTBOOKS

Bennett, A. G. *Ophthalmic Lenses.* Hatton Press.

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

Fincham, W. H. A. *Optics.* Hatton Press.

31.812 Optometry II

TEXTBOOKS

Harrington, D. O. *The Visual Fields.* Mosby.

Sasieni, L. S. *The Principles and Practice of Optical Dispensing and Fitting.* Hammond.

Aust, W. *The Conservative Management of Squint.* Karger.

31.813 Optometry III

TEXTBOOKS

Burnham, R. W., Hanes, R. M., Bartleson, C. J. *Colour*. Wiley.

Mandel, R. B. *Contact Lens Practice: Basic and Advanced*. Charles C. Thomas.

Thomas, P. F. *Conoid Contact Lenses*. Corneal Lens Corporation.

31.821 Special Anatomy and Physiology

TEXTBOOKS

Adler, F. H. *Physiology of the Eye*. Mosby.

Hurvich, L. M. & Jameson, D. *The Perception of Brightness and Darkness*. Allyn & Bacon.

Wolff, B. *The Anatomy of the Eye and Orbit*. Lewis.

31.831 Diseases of the Eye

TEXTBOOKS

Boyd, W. *An Introduction to the Study of Disease*. Lea & Febiger.

Fairbrother, R. W. *Textbook of Bacteriology*. Heinemann.

Lyle, T. K. & Cross, A. G. *May & Worth's Manual of Diseases of the Eye*. Bailliere.

Perkins, E. S. & Hansell, P. *An Atlas of Diseases of the Eye*. Churchill.

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.

The course leading to the degree of Bachelor of Science in Applied Psychology has been introduced in order to meet the increasing demands of professional psychologists in the various fields of applied psychology. This course provides extensive study of psychological theory and practice, supported by an appropriate selection of studies in other subjects. The later years of the course lead to increasing specialization in either industrial psychology, clinical psychology, human engineering or guidance and counselling. Full details of this course are given on pages 73-82.

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

TEXTBOOKS

Part A: Theory

Birney, R. C. & Tecvan, R. C. eds. *Measuring Human Motivation.* Van Nostrand, 1962.

Hilgard, E. R. & Atkinson, R. C. *Introduction to Psychology.* 4th ed. Harcourt, N.Y., 1967.

Savage, R. D. *Psychometric Assessment of the Individual Child.* Penguin, 1968.

Hebb, D. O. *Textbook of Psychology.* 2nd ed. Saunders, London, 1966. (Recommended as an additional textbook for intending Honours students.)

Part B: Practical

Llewellyn, K. *Statistics for Psychology I.* N.S.W. U.P., 1968.

Lumsden, J. *Elementary Statistical Method.* Univ. of W.A. Press, 1969.

12.012 Psychology II

Part A: Personality

TEXTBOOKS

Part B: Learning

Kimble, G. A. *Hilgard & Marquis' Conditioning and Learning.* Appleton-Century-Crofts, 1968.

Part C: Research Methods II

Agnew, N. & Pyke, S. W. *The Science Game: An Introduction to Research in Behavioural Sciences.* Prentice-Hall, 1969.

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

Lumsden, J. *Elementary Statistical Method.* Univ. of W.A. Press, 1969.

12.013 Psychology III

TEXTBOOKS

Part A: Research Methods III

Hays, W. L. *Statistics for Psychologists.* Holt, Rinehart & Winston, 1963.

Heerman, E. F. & Braskamp, L. A. eds. *Readings in Statistics for the Behavioural Sciences.* Prentice-Hall, 1970.

Part B: Electives

Physiological Psychology

Butter, C. M. *Neuropsychology: The Study of Brain and Behaviour.* Brooks/Cole, Belmont, California, 1968.

Dethier, V. G. & Stellar, E. *Animal Behaviour.* 3rd ed. Prentice-Hall, 1970.

Abnormal Psychology

Buss, A. H. *Psychopathology*. Wiley, 1966.

Maher, B. A. *Principles of Psychopathology*. McGraw-Hill, 1966.

Child Psychology and Guidance

Baldwin, A. L. *Theories of Child Development*. Wiley, 1967.

Mussen, P. H., Conger, J. J. & Kagan, J. *Child Development and Personality*. 3rd ed. Harper International, 1969.

Social Psychology

Hollander, E. P. & Hunt, R. G. eds. *Current Perspectives in Social Psychology*. O.U.P., New York, 1967.

Lindgren, H. C. *An Introduction to Social Psychology*. Wiley, 1969.

Motivation

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

Learning

Kimble, G. A. *Hilgard & Marquis' Conditioning and Learning*. Appleton-Century-Crofts, 1961.

Psychometrics

Hammer, A. G. *Elementary Matrix Algebra for Psychologists*. Pergamon.

Nunnally, J. *Psychometric Theory*. McGraw-Hill, 1967.

Industrial Psychology and Human Factors Engineering

Bassett, S. A. *Management Styles in Transition*. American Mgt. Assoc., N.Y., 1966.

Gagne, R. M. *Psychological Principles in System Development*. Holt, 1963.

Likert, R. *New Patterns in Management*. McGraw-Hill, 1961.

McCormick, E. J. *Human Factors Engineerings*. 2nd ed. McGraw-Hill, 1964.

Schultz, D. P. *Psychology and Industry*. Macmillan, N.Y., 1970.

Thorndike, R. L. *Personnel Selection*. Wiley, N. Y., 1949.

Guidance and Counselling

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

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

Psychological Testing

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

12.042 Psychology IIA

TEXTBOOKS

Part A: Observation and Assessment of Behaviour

Bradford, L. P., Gibb, J. R. & Benne, K. D. *T-Group Theory and Laboratory Method.* Wiley, N.Y., 1964.

Kleinmuntz, B. *Personality Measurement.* Dorsey, 1967.

Vernon, P. E. *Personality Assessment: A Critical Survey.* Methuen, London, 1964.

Part B: Psychological Testing

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

12.044 Psychology IIIA

TEXTBOOKS

Part A: Electives (as for 12.013, Part B)

Part B: Computer Programming

Blatt, J. M. *Introduction to Fortran IV Programming: Using the Watfor Computer.* Goodyear, California, 1968.

12.045 Psychology IV (Industrial)

TEXTBOOKS

Part A: Industrial Psychology and Personnel Techniques

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

Schultz, D. P. *Psychology and Industry.* Macmillan, N.Y., 1970.

Thorndike, R. L. *Personnel Selection.* Wiley, N.Y., 1949.

Part B: Counselling

Bordin, E. S. *Psychological Counselling.* Appleton-Century-Crofts, N.Y., 1968.

Gorden, R. L. *Interviewing: Strategy, Techniques and Tactics.* Dorsey Press, Illinois, 1969.

Mahrer, A. R. ed. *The Goals of Psychotherapy.* Appleton-Century-Crofts, N.Y., 1967.

12.055 Psychology IV (Clinical)

Part A: Clinical Psychology

Part B: Counselling Procedures

TEXTBOOKS

As for 12.045 Part B.

12.402 Physiological Psychology

TEXTBOOKS

Butter, C. M. *Neuropsychology: The Study of Brain and Behaviour.* Brooks/Cole, Belmont, California, 1968.

Dethier, V. G. & Stellar, E. *Animal Behaviour.* 3rd ed. Prentice-Hall, 1970.

Sternbach, R. A. *Principles of Psychophysiology.* Academic Press, N.Y., 1966.

12.741 Psychology (Optometry)

TEXTBOOKS

Day, R. H. *Perception.* Wm. C. Brown Co., 1966.

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

Coleman, J. C. *Abnormal Psychology and Modern Life.* 3rd ed. Scott, 1964.

Fenichel, G. *The Psychoanalytic Theory of Neurosis.* Routledge, 1946.

12.651 Industrial Relations

TEXTBOOKS

Baritz, L. *Servants of Power.* Science Editions, N.Y., 1960. Paperback.

Brown, W. B. *Exploration in Management.* Heinemann, 1960.

Goldthorpe, J. H. et al. *The Affluent Worker.* C.U.P., 1968. Paperback.

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

An introduction to the study of the physico-chemical properties of biological systems. The chemical properties of amino acids, peptides and proteins, carbohydrates, nucleic acids, fatty acids, sterols and porphyrins, and the biological roles of these compounds. Practical work to illustrate the lecture course.

TEXTBOOKS

Loewy, A. G. & Seikevitz, P. *Cell Structure and Function.* 2nd ed. Holt, Rinehart & Winston, 1969.

The Molecular Basis of Life. An Introduction to Molecular Biology. Readings from Scientific American. Freeman, 1968.

Segal, I. H. *Biochemical Calculations.* Wiley, 1968.

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

PRE-REQUISITES

17.001 General and Human Biology.
2.001 Chemistry I.

CO-REQUISITES

41.101B Metabolism.

This unit is offered in Session 1, and consists of 28 hours' lecture and 56 hours' laboratory time.

41.101B Metabolism

The intermediary metabolism of carbohydrates, lipids and nitrogenous compounds. The molecular mechanism of gene expression and protein synthesis. Practical work to illustrate the lecture course.

TEXTBOOKS
As for 41.101A.

PRE-REQUISITES
17.001 General and Human Biology.
2.001 Chemistry I.

CO-REQUISITES
41.101A Chemistry of Biologically Important Molecules.

This unit is offered in Session 1, and consists of 28 hours' lecture and 56 hours' laboratory time.

41.101C Control Mechanisms

The relation between structure and function of enzymes, hormones, vitamins and membranes. Photosynthesis. Metabolic networks and control mechanisms. Practical work to illustrate the lecture course.

TEXTBOOKS
As for 41.101A.

PRE-REQUISITES
17.001 General and Human Biology.
2.001 Chemistry I.

CO-REQUISITES

This unit is offered in Session 2, and consists of 28 hours' lecture and 56 hours' laboratory time.

41.102A Biochemistry of Macromolecules and Cell Biochemistry

The bacterial cell. Polysaccharides and glycoproteins including bacterial cell walls. Chemistry and biology of polynucleotides. Methods of amino acid sequence analysis. Protein structure and synthesis. Active centres of some proteins. Sub-unit organization of proteins and membranes. Cellular degradation. Practical work to illustrate the lecture course and to provide experience in modern biochemical techniques.

TEXTBOOKS
Davidson, J. N. *The Biochemistry of the Nucleic Acids.* 6th ed. Methuen, 1969.
The Molecular Basis of Life. An Introduction to Molecular Biology. Readings from Scientific American. Freeman, 1968.

Segal, I. H. *Biochemical Calculations.* Wiley, 1968.
White, A., Handler, R. & Smith, E. L. *Principles of Biochemistry.* 4th ed. McGraw-Hill, 1968.

PRE-REQUISITES
2.002B Organic Chemistry and one other level II Chemistry unit (preferably 2.002A).
41.101A Chemistry of Biologically Important Molecules.
41.101B Metabolism (41.101C is advisable).

This is a two-unit course which is offered in Session 1, and consists of 4 hours' lecture and 8 hours' laboratory time per week.

41.102B Metabolic Pathways and Control Mechanisms

Photosynthesis, photophosphorylation and oxidative phosphorylation. The nature and function of co-enzymes. Interrelationships in mammalian intermediary metabolism. Biochemical control mechanisms including hormones and allosteric interactions. Enzyme kinetics. Practical work to illustrate the lecture course and to provide experience in modern biochemical techniques.

TEXTBOOKS
As for 41.102A above.

This is a two-unit course which is offered in Session 2, and consists of 4 hours' lecture and 8 hours' laboratory time per week.

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.

The subject Fermentation Technology is offered as one of the units available to students undertaking a major sequence in Microbiology in the Science Course.

Honours year programmes in the fourth year of the Science course can be undertaken 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.

42.102 Fermentation Technology

An introduction to the basic factors involved in the operation of microbial processes on an industrial scale, including: The selection, maintenance and improvement of micro-organisms; the influence of physical and chemical factors on the microbial environment; the control of environmental factors; the effects of operational patterns in batch and continuous flow cultivation; the harvesting, purification and standardisation of products; process optimisation; disposal of waste materials; an examination of selected microbial processes for chemical, pharmaceutical and food production, against the basic characteristics of large-scale fermentation processes; practical exercises, including the operation of various types of fermenters, to illustrate the principal aspects of the lecture course.

TEXTBOOK
Casida, L. E. Jr. *Industrial Microbiology*. Wiley, 1968.

PRE-REQUISITES
44.102A Basic General Microbiology
and/or
44.102B Microbial Physiology.

This unit is offered in Session 2 and consists of 28 hours of lectures and tutorials and 56 hours of laboratory and project work.

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.

43.101A/45.101A 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

Clarke, M. C. *Statistics and Experimental Design.* Arnold, 1969.

Rohlf, F. T. & Sokal, R. *Statistical Tables.* Freeman, 1969.

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

PRE-REQUISITES

17.001 General and Human Biology.

This unit is offered jointly by the Schools of Botany and Zoology during Session 1. It consists of 3 hours' lecture and 3 hours' tutorial and laboratory time per week.

43.101B Plant Evolution and Ecology

A study of the evolution of vegetative form and structure of vascular plants; an examination of their organisation into terrestrial communities; identification, evolution and distribution of elements of the Australian flora. Field excursions, including a vacation camp are an integral part of the course.

TEXTBOOKS

Beadle, N. C. W., Evans, O. D., & Carolin, R. C. *Handbook of the Vascular Plants of the Sydney District and Blue Mountains.* Authors, Armidale, 1962.

Billings, W. D. *Plants and Ecosystem.* MacMillan, 1964.

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 Session 2, and consists of 2 hours' lecture and 4 hours' laboratory time per week. In addition, students will be required to attend excursions as arranged during the course.

43.101C Plant Physiology

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

TEXTBOOKS

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

Salisbury, F. B. & Ross, C. *Plant Physiology.* Wadsworth, 1969.

PRE-REQUISITES

17.001 General and Human Biology.
2.001 Chemistry I *or*
1.001 Physics I* *or*
1.041 Physics IC*

This unit is offered in Session 2, and consists of 2 hours' lecture and 4 hours' laboratory time per week.

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* In some circumstances this unit may be taken as a co-requisite.

43.102A Advanced Genetics

Human genetics including chromosome analysis, genetics of haemoglobin variation and drug response. Twin studies. Serum and enzyme polymorphisms. DNA studies including polarity and transcription concepts. Hypothesis of genetic recombination. Evolutionary genetics. Allelic complementation and fine structure. Polyploid cytogenetics, particularly wheat cytogenetics. Genetics of pathogenicity. Quantitative genetics. Heritability estimates and selection.

PRE-REQUISITES
43.101A/45.101A Genetics and Biometry.

This unit is offered in Session 2, and consists of 3 hours' laboratory and 3 hours' lecture and tutorial time per week. Students may be required occasionally to attend to long-term experiments outside formal class time.

43.102B Plant Taxonomy

Considers the assessment analysis and presentation of data for classifying plants both at the specific and spura-specific level. Some field excursions are necessary.

TEXTBOOKS
Beadle, N. C. W., Evans, O. D. & Carolyn, R. C. *Handbook of the Vascular Plants of the Sydney District and Blue Mountains.* Authors, Armidale, 1962.
Sporne, K. R. *The Morphology of the Gymnosperms.* Hutchinson, 1967.
Cronquist, A. *The Evolution and Classification of Flowering Plants.* Nelson, 1968.

PRE-REQUISITES
43.101B Plant Evolution and Ecology (Plant Morphology).

CO-REQUISITE
43.101A/45.101A Genetics and Biometry.

This unit is offered in Session 1, and consists of 2 hours' lecture and 4 hours' laboratory time per week. In addition, students will be required to attend some weekend day field trips.

43.102C Plant Physiology and Biochemistry

Aims to introduce students to the application of scientific methods to problems in the biochemistry and physiology of plants. Students will design and carry out appropriate experiments and interpret the results in the light of information received from

lectures, tutorials and reading scientific literature. The following topics will be emphasized: (a) plant metabolism; (b) hormone physiology; (c) developmental physiology.

TEXTBOOK
Salisbury, F. B. & Ross, C. *Plant Physiology*. Wadsworth, 1969.

PRE-REQUISITES
41.101A Chemistry of Biologically Important Molecules.
41.101B Metabolism.

This unit is offered in Session 1, and consists of 2 hours' lecture and 4 hours' laboratory time per week.

43.102D Mycology

General structure and ultrastructure of the fungal cell. Morphology of members of the major taxonomic groups. Spore liberation, dispersal, deposition and germination. Cytology, genetics and patterns of life cycles. Growth and differentiation of hyphae and fruit bodies. Response to nutritional and environmental conditions for growth and reproduction. Transport processes, metabolism and metabolic products. Ecological considerations of fungi in specialised habitats.

TEXTBOOKS
Alexopoulos, C. J. *Introductory Mycology*. Wiley, 1962.
Burnett, J. H. *Fundamentals of Mycology*. Arnold, 1968.

PRE-REQUISITES
17.001 General and Human Biology.

This unit is offered in Session 2 and consists of 2 hours' lecture and 4 hours' laboratory time per week.

43.102E Environmental Botany

An introduction to the soil and atmospheric environment in which terrestrial plants exist and a study of the behaviour and response of the flowering plant to its environment, both in nature and agriculture.

PRE-REQUISITES
17.001 General and Human Biology.
1.001 Physics I *or*
1.031 Physics IAS *or*
1.041 Physics IC.

This unit is offered in Session 1, and consists of 2 hours' lecture and 4 hours' laboratory time per week.

43.102F Plant Pathology

History of plant pathology; pathogenic organisms; symptoms of disease. Specific diseases caused by fungi, nematodes, bacteria and viruses. Host-pathogen relationships including stages of infection, evolution of host-pathogen relationships, adaptation for successful parasitism, resistance mechanisms and genetics of resistance. Control of disease by the use of fungicides, nematocides, crop rotation and breeding for resistance.

TEXTBOOKS
Alexopoulos, C. J. *Introductory Mycology*. Wiley, 1962.
Walker, J. C. *Plant Pathology*. 3rd ed. McGraw-Hill, 1968.

PRE-REQUISITES
17.001 General and Human Biology.

This unit is offered in Session 1, and consists of 2 hours' lecture and 4 hours' laboratory time per week.

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, Ceramic Engineering, Food Technology, Chemical Engineering, Textile Technology 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, a combination of level III Chemistry with level III Mathematics will provide a useful basis for later specialization in X-ray crystallography or theoretical chemistry; a combination of level III Chemistry with level III Geology will be of assistance to those who later wish to specialize in geochemistry. Another

possibility is to combine level III Chemistry with level III Biochemistry units. These courses are suitable for those who 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.

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 on which a written thesis is submitted. 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 at least eight level III units, of which at least four must be in Chemistry. 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 the level III Chemistry units.

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

CHEMISTRY TEXTBOOKS

2.001 Chemistry I

TEXTBOOKS

Ander, P. & Sonnessa, A. J. *Principles of Chemistry*. Collier Macmillan, 1966.

Aylward, G. A. & Findlay, T. J. V. eds. *Chemical Data Book*. 2nd ed. Wiley, 1966.

Barrow, G. M., Kenney, M. E., Lassila, J. D., Litle, R. L. & Thompson, W. E. *Understanding Chemistry*. Benjamin, N.Y., 1969.

Chemistry I Laboratory Manual. Univ. of N.S.W., 1971.

Hart, H. & Schuetz, R. D. *Organic Chemistry*. 4th ed. Feffer & Simons, 1967.

O'Malley, R. F. *Problems in Chemistry*. McGraw-Hill, 1968.

Turk, A., Meislich, H., Brescia, F. & Arents, J. *Introduction to Chemistry*. Academic Press, 1968.

2.021 Chemistry IE

TEXTBOOKS

Aylward, G. A. & Findlay, T. J. V. *Chemical Data Book*. 2nd ed. Wiley, Sydney, 1966.

Barrow, G. M., Kenney, M. E., Lassila, J. D., Litle, R. L. & Thompson, W. E. *Understanding Chemistry*. Benjamin, N.Y., 1969.

Chemistry IE—Laboratory Manual. Univ. of N.S.W., 1971.

Turk, A., Meislich, H., Brescia, F. & Arents, J. *Introduction to Chemistry*. Academic Press, 1968.

2.002A Chemistry II (Physical Chemistry)

TEXTBOOKS

Aylward, G. H. & Findlay, T. J. V. *Chemical Data Book*. 2nd ed. Wiley, 1966.

Barrow, G. M. *Physical Chemistry*. 2nd ed. McGraw-Hill, 1966.

Daniels, F. et al. *Experimental Physical Chemistry*. 6th or 7th ed. McGraw-Hill, 1962 or 1970.

Shaw, D. J. *Introduction to Colloid and Surface Chemistry*. Butterworths, 1966.

2.002B Chemistry II (Organic Chemistry)

TEXTBOOKS

1. Roberts, J. D. & Caserio, M. C. *Modern Organic Chemistry*. Benjamin, 1967.

Students intending to study Organic Chemistry in later years may consider either of the following which are suitable alternatives and are the recommended textbooks for third year:

Morrison, R. T. & Boyd, R. N. *Organic Chemistry*. 2nd ed. Allyn & Bacon, 1966.

Roberts, J. D. & Caserio, M. C. *Basic Principles of Organic Chemistry*. Benjamin, 1964.

2. One of the following:

Cheronis, N. D. & Entrikin, J. B. *Identification of Organic Compounds*. Wiley International Edition.

Shriner, R. L., Fuson, R. C. & Curtin, D. Y. *Systematic Identification of Organic Compounds*. 5th ed. Wiley, 1964.

Vogel, A. I. *Elementary Practical Organic Chemistry*. Pt. II. Qualitative Organic Analysis. Longmans, 1957.

2.002C Chemistry II (Inorganic/Analytical Chemistry)

TEXTBOOKS

Flaschka, H. H., Barnard, A. J. & Sturrock, P. E. *Quantitative Analytical Chemistry*. Vols. I & II. Barnes & Noble, 1969.

Hamilton, L. E. & Simpson, S. *Calculations of Analytical Chemistry*. 7th ed. McGraw-Hill, 1968.

Jolly, W. L. *The Chemistry of the Non-Metals*. Prentice-Hall, 1966.

Larsen, E. M. *Transitional Elements*. Benjamin, 1965.

Quagliano, J. V. & Vallarino, L. M. *Coordination Chemistry*. Heath & Co., Lexington, 1969.

2.003A Chemistry III (Physical Chemistry)

TEXTBOOKS

Barrow, G. M. *Physical Chemistry*. 2nd ed. McGraw-Hill, 1966.

Daniels, F. et al. *Experimental Physical Chemistry*. 6th or 7th ed. McGraw-Hill, 1962 or 1970.

Dixon, R. N. *Spectroscopy and Structure*. Methuen, 1965.

Laidler, K. J. *Chemical Kinetics*. 2nd ed. McGraw-Hill, 1965.

2.003B Chemistry III (Organic Chemistry)

TEXTBOOKS

1. Morrison, R. T. & Boyd, R. N. *Organic Chemistry*. 2nd ed. Allyn & Bacon, 1966, *or*
   Roberts, J. D. & Caserio, M. C. *Basic Principles of Organic Chemistry*. Benjamin, 1964.
2. One of the following:
   Cheronis, N. D. & Entrikin, J. B. *Identification of Organic Compounds*. International Edition. Wiley.
   Shriner, R. L., Fuson, R. C. & Curtin, D. Y. *Systematic Identification of Organic Compounds*. 5th ed. Wiley, 1964.
   Vogel, A. I. *Elementary Practical Organic Chemistry*. Pt. II. Qualitative Organic Analysis. Longmans, 1957.

2.003C Chemistry III (Inorganic Chemistry)

TEXTBOOKS

Cotton, F. A. & Wilkinson, G. *Advanced Inorganic Chemistry*. 2nd ed. Wiley, 1966.

Vogel, A. I. *A Textbook of Macro & Semi-micro Qualitative Inorganic Analysis*. Longmans.

2.003D Chemistry III (Analytical Chemistry)

TEXTBOOKS

Eckschlager, K., Chalmers, R. A. trans. ed. *Errors and Measurement in Chemical Analysis*. Van Nostrand, 1969.

Ewing, G. W. *Instrumental Methods of Chemical Analysis*. McGraw-Hill, 1969.

Fischer, R. B. & Peters, D. G. *Quantitative Chemical Analysis*. Saunders, 1968.

Hamilton, L. F. & Simpson, S. *Calculations of Analytical Chemistry*. McGraw-Hill, 1968.

Stock, R. & Rice, C. B. F. *Chromatographic Methods*. 2nd ed. Chapman Hall, 1967.

2.003E Chemistry III (Nuclear and Radiation Chemistry)

TEXTBOOKS

Carswell, D. J. *Introduction to Nuclear Chemistry*. Elsevier, 1967.

or

Friedlander, G., Kennedy, J. & Miller, J. M. *Nuclear and Radiochemistry*. 2nd ed. Wiley, 1964.

or

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

2.013A Theoretical Chemistry

TEXTBOOKS

Daniels, F. et al. *Experimental Physical Chemistry*. 7th ed. McGraw-Hill, 1970.

Golding, R. M. *Applied Wave Mechanics*. Van Nostrand, 1969.

Laidler, K. J. *Chemical Kinetics*. 2nd ed. McGraw-Hill, 1965.

2.023A Chemical Physics

TEXTBOOK

Golding, R. M. *Applied Wave Mechanics*. Van Nostrand, 1969.

2.022 Chemistry II(M)

Units 2.002A (Physical Chemistry) and 2.002C (Inorganic Chemistry) of 2.002 Chemistry II (Science).

2.211 Applied Organic Chemistry

No prescribed textbook.

2.221 Applied Organic Chemistry (Food)

No prescribed textbook.

2.261 Applied Organic Chemistry (Food)

No prescribed textbook.

2.303 Theoretical Chemistry

TEXTBOOKS

Golding, R. M. *Applied Wave Mechanics*. Van Nostrand, 1969.

2.311 Physical Chemistry I

TEXTBOOKS

Aylward, G. H. & Findlay, T. J. V. *Chemical Data Book*. 2nd ed. Wiley, 1966.

Barrow, G. M. *Physical Chemistry*. 2nd ed. McGraw-Hill, 1966.

Daniels, F. et al. *Experimental Physical Chemistry*. 6th or 7th ed. McGraw-Hill, 1962 or 1970.

Shaw, D. J. *Introduction to Colloid and Surface Chemistry*. Butterworths, 1966.

2.322 Physical Chemistry II

TEXTBOOKS

Barrow, G. M. *Physical Chemistry*. 2nd ed. McGraw-Hill, 1966.

Daniels, F. et al. *Experimental Physical Chemistry*. 6th or 7th ed. McGraw-Hill, 1962 or 1970.

Dixon, R. N. *Spectroscopy and Structure*. Methuen, 1965.

Laidler, K. J. *Chemical Kinetics*. 2nd ed. McGraw-Hill, 1965.

2.331 Applied Physical Chemistry

No prescribed textbook.

2.333 Physical Chemistry

TEXTBOOK

Dixon, R. N. *Spectroscopy and Structure.* Methuen, 1965.

2.411 Inorganic Chemistry I

TEXTBOOKS

Jolly, W. L. *The Chemistry of the Non-Metals.* Prentice Hall, 1966.

Larsen, E. M. *Transitional Elements.* Benjamin, 1965.

Quagliano, J. V. & Vallarino, L. M. *Coordination Chemistry.* Heath, Lexington, 1969.

2.422 Inorganic Chemistry II

TEXTBOOK

Cotton, F. A. & Wilkinson, G. *Advanced Inorganic Chemistry.* 2nd ed. Wiley, 1966.

2.433 Inorganic Chemistry III

TEXTBOOK

Cotton, F. A. & Wilkinson, G. *Advanced Inorganic Chemistry.* 2nd ed. Wiley, 1966.

2.511 Analytical Chemistry I

TEXTBOOKS

Ewing, G. W. *Instrumental Methods of Chemical Analysis.* McGraw-Hill, 1969.

Flaschka, H. H. & Barnard, A. J. & Sturrock, R. E. *Quantitative Analytical Chemistry.* Vols. I & II. Barnes & Noble, 1969.

Hamilton, L. F. & Simpson, S. *Calculations of Analytical Chemistry.* 7th ed. McGraw-Hill, 1968.

2.513 Analytical Biochemistry

No prescribed textbooks.

2.522 Analytical Chemistry II

TEXTBOOKS

Eckschlager, K., Chalmers, R. A. trans. ed. *Errors and Measurements in Chemical Analysis.* Van Nostrand, 1969.

Ewing, G. W. *Instrumental Methods of Chemical Analysis.* McGraw-Hill, 1969.

Flaschka, H. H., Barnard, A. J. & Sturrock, P. E. *Quantitative Analytical Chemistry.* Vols. I & II. Barnes & Noble, 1969.

Hamilton, L. F. & Simpson, S. *Calculations of Analytical Chemistry.* 7th ed. McGraw-Hill, 1968.

Stock, R. & Rice, C. B. F. *Chromatographic Methods.* 2nd ed. Chapman-Hall, 1967.

2.533 Analytical Chemistry III

TEXTBOOKS

Eckschlager, K., Chalmers, R. A. trans. ed. *Errors and Measurements in Chemical Analysis.* Van Nostrand. 1969.

Ewing, G. W. *Instrumental Methods of Chemical Analysis.* McGraw-Hill, 1969.

Flaschka, H. H., Barnard, A. J. & Sturrock, P. E. *Quantitative Analytical Chemistry.* Vols. I & II. Barnes & Noble, 1969.

Hamilton, L. F. & Simpson, S. *Calculations of Analytical Chemistry.* 7th ed. McGraw-Hill, 1968.

Kolthoff, I. M., Sandell, E. B., Meehan, E. J. & Bruckenstein, S. *Quantitative Chemical Analysis.* Macmillan, 1969.

Schwarzenbach, G. & Flaschka, H., Irving, H. M. trans. *Complexometric Titrations.* 2nd ed. Methuen, 1969.

Stock, R. & Rice, C. B. F. *Chromatographic Methods.* 2nd ed. Chapman Hall, 1967.

2.611 Organic Chemistry I

TEXTBOOKS

1. Roberts, J. D. & Caserio, M. C. *Modern Organic Chemistry.* Benjamin, 1967.

   Students intending to study Organic Chemistry in later years may consider either of the following which are suitable alternatives and are the recommended textbooks for third year:

   Morrison, R. T. & Boyd, R. N. *Organic Chemistry.* 2nd ed. Allyn & Bacon, 1966.

   Roberts, J. D. & Caserio, M. C. *Basic Principles of Organic Chemistry.* Benjamin, 1964.

2. One of the following:

   Cheronis, N. D. & Entrikin, J. B. *Identification of Organic Compounds.* Wiley International Edition.

   Shriner, R. L., Fuson, R. C. & Curtin, D. Y. *Systematic Identification of Organic Compounds.* 5th ed. Wiley, 1964.

   Vogel, A. I. *Elementary Practical Organic Chemistry.* Pt. II. Qualitative *Organic Analysis.* Longmans, 1957.

2.622 Organic Chemistry II

TEXTBOOKS

1. Morrison, R. T. & Boyd, R. N. *Organic Chemistry.* 2nd ed. Allyn & Bacon, 1966

   or

   Roberts, J. D. & Caserio, M. C. *Basic Principles of Organic Chemistry.* Benjamin, 1964.

2. One of the following:

   Cheronis, N. D. & Entrikin, J. B. *Identification of Organic Compounds.* Wiley International Edition.

   Shriner, R. L., Fuson, R. C. & Curtin, D. Y. *Systematic Identification of Organic Compounds.* 5th ed. Wiley, 1964.

   Vogel, A. I. *Elementary Practical Organic Chemistry.* Pt. II. *Qualitative Organic Analysis.* Longmans, 1957.

3. Dyer, J. R. *Applications of Absorption Spectroscopy of Organic Compounds.* Prentice-Hall, 1965.

2.633 Organic Chemistry

TEXTBOOKS

Dyer, J. R. *Applications of Absorption Spectroscopy of Organic Compounds.* Prentice-Hall, 1965.

Hill, H. C. *Introduction to Mass Spectrometry.* Heyden, 1966.

2.811 Nuclear and Radiation Chemistry

Carswell, D. J. *Introduction to Nuclear Chemistry.* Elsevier, 1967.

or

Friedlander, G., Kennedy, J. & Miller, J. M. *Nuclear and Radiochemistry.* 2nd ed. Wiley, 1964.

or

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

2.711 Solid State Chemistry

TEXTBOOKS

Bond, G. C. *Catalysis by Metals.* Academic, 1965.

Greenwood, N. N. *Ionic Crystals, Lattice Defects and Non-stoichiometry.* Butterworth, 1969.

Moore, W. J. *Seven Solid States.* Benjamin, 1967.

2.911 Applied Chemistry

No prescribed textbook.

COMPUTER SCIENCE

FOR STUDENTS IN THE SCIENCE COURSE

Students in the Science course may major in Computer Science. This course is provided by the Department of Electronic Computation within the School of Electrical Engineering; the course is available on a full-time basis only and leads to the degree of B.Sc. (pass or honours).

Students of sufficient merit who have completed the undergraduate units in Computer Science may be admitted to the honours course in fourth year. Permission to enter the course is granted by the Head of the Department of Electronic Computation. The honours course consists of prescribed lectures, seminars and reading in the areas of mathematical theory of computation, computer applications, computer logic and organization.

6.601A Introduction to Computing

Algorithms, programmes and computers. Computer solution of several numerical and non-numerical problems using FORTRAN or PL/1. Debugging and verification of programmes. Data representation, organization and characteristics of computers. Computability.

TEXTBOOK

Rice, J. K. & Rice, J. R. *Introduction to Computer Science.* Holt, Rinehart & Winston.

6.601B Assembler Programming and Non-numeric Processing

Computer structure, machine language, instruction execution, addressing techniques and digital representation of data. Symbolic coding. Manipulation of strings, lists and other data structures.

TEXTBOOKS

Computer Usage Company. *360 Assembler Programming.* McGraw-Hill.

Griswald, R. E., Peage, J. F. & Polansky, I. P. *The SNOBOL 4 Programming Language.* Prentice-Hall.

6.602A Computer Systems I

Switching algebra, simplification of switching functions, level sequential and pulse sequential analysis. Flow tables, cycles, races, hazards. Number systems, codes. Assembler programming system elements, techniques, organization and structure. Translators, loaders, subroutines, macroroutines, programme segmentation and linkage, libraries, input/output routines, buffering and overlapped processing.

TEXTBOOKS
Bartee, T. C. *Digital Computer Fundamentals.* Student edition. McGraw-Hill.
Gear, C. W. *Computer Organisation and Programming.* McGraw-Hill.

6.602B Computer Systems II

Organization and components of digital computing systems. Alternate organizations. Operating system elements, techniques and structure. Filing systems, libraries and storage management. Supervisor functions. Input/output control systems. Batch processing, multiprogramming and time-sharing operating systems. Command language and job control.

TEXTBOOK
No set text.

6.602C Computer Applications

Simulation and modelling of discrete systems on a computer. Application to queueing systems. Comparison of languages. Random number generation. Theory of linear programming. The Simplex technique. Computer solution of linear programming problems.

TEXTBOOK
Gass, S. I. *Linear Programming.* McGraw-Hill.

6.602D Programming Languages

History of programming languages. Language description. Backus-Naur form notation. Syntax and semantics. Classification and comparison of high-level languages. Compiling and interpreting. Bootstrapping.

TEXTBOOKS
No set text.

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. The 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, M., Hickman, C. J. & Johnson, M. L. *A Dictionary of Biology*. Penguin, 1967.

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

REQUIREMENTS FOR PRACTICAL WORK

A list of equipment required for practical work will be posted on the notice board in the ground floor of the Biological Sciences Building. Students must purchase this material *before* the first practical class.

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.

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

27.031 Geography IS	**Hours per week for 2 sessions**
Lectures	2
Laboratory	1½
Tutorials	1

Plus 3 days fieldwork

GEOGRAPHY TEXTBOOKS

27.031 Geography IS

TEXTBOOKS

Part I: An Introduction to Physical Geography

CSIRO. *The Australian Environment.* Melbourne U.P.
Strahler, A. N. *Physical Geography.* Wiley International.
Twidale, C. R. *Geomorphology.* Nelson Paperback.

Part 2: Economic Geography

Cole, J. P. & King, C. A. M. *Quantitative Geography.* Wiley.
McCarty, H. H. & Lindberg, J. B. *A Preface to Economic Geography.* Prentice-Hall.

Practical classes throughout the year will introduce the use of maps and diagrams, air photographs and geographical statistics. The approximate cost to students will be about $4.00 for field tutorials and about $8.00 for the required drawing equipment and a topographic map.

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, Photogeology, Oceanography, Geochemistry and Geophysics. Candidates may select two of the following in Section (b) Mineragraphy, Structural Analysis, Stratigraphy and Micropalaeontology, 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 to the course which would include some 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 TEXTBOOKS

25.001 Geology I

TEXTBOOKS

Bryan, J. H., McElroy, C. T. & Rose, G. *Explanatory Notes to Accompany the Sydney 4-mile Geological Map (with map).* 3rd ed. Bureau of Mineral Resources, Canberra, 1966.

Hurlbut, C. S., Jnr. *Dana's Minerals and How to Study Them.* 3rd Science ed. Wiley, 1963.

Longwell, C. R. & Flint, R. F. *Introduction to Physical Geology.* Wiley.

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

Tyrrell, G. W. *Principles of Petrology, An Introduction to the Science of Rocks.* Methuen, London.

25.002A Structural Geology and Palaeontology

TEXTBOOKS

Palaeontology I

Easton, W. H. *Invertebrate Paleontology.* Harper & Bros., 1960.

or

Moore, R. C., Lalicker, C. G., & Fischer, A. G. *Invertebrate Fossils.* McGraw-Hill, 1952.

25.002B Mineralogy, Petrology and Stratigraphy

TEXTBOOKS

Petrology I

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

Williams, H., Turner, F. J. & Gilbert, C. M. *Petrography*. Freeman, 1954.

Mineralogy

Bloss, F. D. *An Introduction to the Methods of Optical Crystallography*. Holt, Rinehart & Winston, 1967.

or

Wahlstrom, E. E. *Optical Crystallography*. 4th ed. Wiley, N.Y., 1969.

Deer, W. A., Howie, R. A. & Zussman, J. *An Introduction to the Rock-forming Minerals*. Longmans, 1966.

Heinrich, E. W. *Microscopic Identification of Minerals*. McGraw-Hill, 1965.

or

Kerr, P. F. *Optical Mineralogy*. 3rd ed. McGraw-Hill, 1959.

Mason, B. & Berry, L. G. *Elements of Mineralogy*. 2nd ed. Freeman, 1968.

Stratigraphy I

Dunbar, C. O. & Rodgers, J. *Principles of Stratigraphy*. Wiley, 1957.

25.003A Mineralogy, Petrology and Stratigraphy

TEXTBOOKS

Stratigraphy II

Krumbein, W. C. & Sloss, L. L. *Stratigraphy and Sedimentation*. 2nd ed. Freeman, 1963.

Mineralogy

As for 25.002 Mineralogy, *plus:*

Azaroff, L. V. & Donabue, R. J. *Laboratory Experiments in X-ray Crystallography*. McGraw-Hill, 1969.

Zussman, J. ed. *Physical Methods in Determinative Mineralogy*. Academic, 1967.

Petrology II

Deer, W. A., Howie, R. A. & Zussman, J. *Rock Forming Minerals*. Longmans, 1966.

Turner, F. J. & Verhoogen, J. *Igneous and Metamorphic Petrology*. McGraw-Hill, 1960.

25.003B Geophysics, Stratigraphic Palaeontology, Structural Geology, Economic Geology

TEXTBOOKS

Geophysics

Garland, G. D. *The Earth's Shape and Gravity*. Pergamon, 1964.
Howell, B. *Introduction to Geophysics*. McGraw-Hill, 1959.
Jacobs, J. A. *The Earth's Core and Geomagnetism*. Pergamon, 1963.
Stacey, F. P. *Physics of the Earth*. Wiley, 1969.

Stratigraphical Palaeontology

Colbert, E. H. *Evolution of the Vertebrates*. Wiley.
Von Koenigswald, G. H. R. *The Evolution of Man*. Univ. of Michigan, 1962.

Structural Geology

Hills, E. S. *Elements of Structural Geology*. Methuen, 1963.
Phillips, F. C. *Use of Stereographic Projection in Structural Geology*. Arnold, 1960.

25.013 Geology III (Supplementary)

TEXTBOOKS

Coal

Raistrick, H. & Marshall, C. E. *The Nature and Origin of Coal and Coal Seams*. E.U.P., 1952.

Oil

Levorsen, A. I. *Petroleum Geology*. Freeman, 1954.

Oceanography

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

Micropalaeontology

Glaessner, M. F. *Principles of Micro-palaeontology*. M.U.P., 1955. Hafner, 1963.

Stratigraphy III

See list for Stratigraphy II (25.003).

Structural Analysis

Turner, F. J. & Weiss, L. E. *Structural Analysis of Metamorphic Tectonites*. McGraw-Hill, 1963.

Geophysics II

Dobrin, M. B. *Introduction to Geophysical Prospecting.* McGraw-Hill, 1960.
Parasnis, D. S. *Principles of Applied Geophysics.* Methuen, 1962.

Geochemistry

Ahrens, L. H. *Distribution of the Elements in Our Planet.* McGraw-Hill, 1965.
Fyfe, W. S. *Geochemistry of Solids.* McGraw-Hill, 1964.
Loughnan, F. C. *Chemical Weathering of Silicate Minerals.* American Elsevier.
Siegel, S. *Nonparametric Statistics for the Behavioural Sciences.* McGraw-Hill, 1956.
Zussman, J. ed. *Physical Methods in Determinative Mineralogy.* Academic, 1967.

Mineragraphy

Edwards, A. B. *Textures of the Ore Minerals.* 2nd ed. Aus. I.M.M., 1954.
Hallimond, A. F. *1953 Manual of the Polarizing Microscope.* Cooke.
Uytenbogaardt, W. *Tables for Microscopic Identification of Ore Minerals.* Princeton.

25.014 Geology IV

TEXTBOOKS

Mining and Petroleum Geology

Lawrence, L. J. ed. *Exploration and Mining Geology.* Aust. Inst. Min. Met., Melbourne, 1965.

Geophysics

Dobrin, N. B. *Introduction to Geophysical Prospecting.* McGraw-Hill, 1960.
Grant, F. S. & West, G. F. *Interpretation Theory in Applied Geophysics.* McGraw-Hill, 1964.
Parasnis, D. S. *Principles of Applied Geophysics.* Methuen, 1962.

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.

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.

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.

FIRST YEAR MATHEMATICS

All students in the Faculties of Applied Science, Biological Sciences, Engineering and Science are required to take mathematics in their first year. In addition, a first year course is optional in the Faculties of Arts, Commerce and Medicine. The School offers three courses at first year level.

10.001 Mathematics I

This is the ordinary course and is generally selected by the majority of students in the Faculties of Biological Sciences, Science, Engineering and Applied Science who intend to pursue further studies in mathematics, physics or chemistry. For example, in the case of Science students it is the basic course for a pass degree with a major in mathematics.

For entry into 10.001 Mathematics I, students are required to have passed H.S.C. mathematics at Level 2F or higher; or mathematics at Level 2S provided that the student's performance in mathematics and his general level of attainment are at standards acceptable to the Professorial Board. Students at the latter level are advised to undertake a bridging course before the beginning of lectures.

10.011 Higher Mathematics I

Covers all the material in 10.001 Mathematics I, plus other topics, at greater depth and sophistication. Though this course starts where Level I of the Higher School Certificate ends, some Level 2F students with ability might find it within their capabilities.

While it is expected that students aiming at the honours level in mathematics will take this course, it would be equally valuable for any mathematically able student whose course requires a considerable amount of mathematics.

10.021 Mathematics IT

This course has been designed for the student who intends to complete only the first year in mathematics or chemistry, but whose specialized studies require knowledge of certain mathematical tools such as calculus, matrices, probability, etc. Students in Wool and Pastoral Sciences, Optometry and Applied Psychology will find this course valuable.

Students who select this course should weigh seriously the implications of their choice because no further mathematics units are normally available. However, a student with a meritorious performance in 10.021 may be permitted to proceed to any of 10.311, 10.311T and 10.031.

HIGHER LEVEL MATHEMATICS

Many subjects in the School are offered at two levels. The Higher caters for students with superior mathematical ability. Where both levels are offered, the highest grade awarded in the ordinary level is Credit, except in exceptional cases.

MATHEMATICS MAJORS AT PASS LEVEL

In the *Faculty of Science* students may take any combination of mathematics units which are allowed by the system of prerequisites and co-requisites. However, for students who wish to devote a major part of their undergraduate study to mathematics, the following guidelines are set out for majors in Pure Mathematics, Applied Mathematics and Statistics.

In view of the increasing demand for graduates with a mathematical background, students should consider the merits of combining courses in Pure Mathematics, Applied Mathematics, Statistics and Computer Science in accordance with their future interests. Senior members of staff in the School of Mathematics are available for consultation by students who wish to discuss their courses.

MATHEMATICS MAJORS IN THE FACULTY OF SCIENCE

Any student who completes at least four Level III units in Mathematics is regarded as having majored in Mathematics as part of his B.Sc. degree.

If students wish to specialize and major in Pure Mathematics, Applied Mathematics or Statistics, the following minimum courses are suggested.

(i) *Pure Mathematics Majors*

In order to major in Pure Mathematics at the ordinary level, a student should pass in seven at least of the following units:

10.211 Applied Mathematics II, Unit A;
10.111 Pure Mathematics II, Units A, B, C;
10.112 Pure Mathematics III, Units A, B, C, D, E.

In all cases the student must pass complementary units or subjects in accordance with Faculty rules.

(ii) *Applied Mathematics Majors*

In second year the student should take Units A, B and C of 10.211 Applied Mathematics II, together with Units A and B of 10.111 Pure Mathematics II. In third year the student should take Units A, B, C and D of 10.212 Applied Mathematics III. Complementary units should be chosen in accordance with Faculty rules.

(iii) *Statistics Majors*

In second year the student should take 10.311 Theory of Statistics II; in addition, since he will be expected to take some units in 10.112 Pure Mathematics III in third year, he should take the Units 10.111A and 10.111B of Pure Mathematics II and 10.211A of Applied Mathematics II, passes in which will qualify him to enter level III Units in Pure Mathematics; he should also take complementary units in accordance with Faculty rules. In third year he should take the four units A, B, C and D of 10.312 of Theory and Statistics III, together with at least three level III Mathematics units (Pure or Applied); he should also take complementary units in accordance with Faculty rules.

HONOURS COURSES IN MATHEMATICS SCHOOLTEACHERS

There are three separate fourth year honours courses: 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 mathematical physicists or applied mathematicians, but will prove of

interest also to intending specialists in fields such as theoretical physics, engineering and all other theoretical sciences. The minimum requirements for each honours course are given below but students seeking an honours degree in mathematics are advised to choose units or courses in mathematics according to their individual interests in consultation with senior members of staff of the School.

(i) *Honours Course in Pure Mathematics*

In the *Faculty of Science* in second year the student should attempt 10.121 Higher Pure Mathematics II, Units A, B and D and 10.221 Higher Applied Mathematics II, Unit A. In third year he should attempt 10.122 Higher Pure Mathematics III, Units A, C and F together with at least one unit selected from Higher Pure Mathematics III, Unit D and Pure Mathematics III, Units B and E.

In all cases complementary units or subjects must be chosen in accordance with Faculty rules.

Permission to enter fourth year in Pure Mathematics is granted only on the recommendation of one of the Professors of Pure Mathematics. Such recommendation is not usually granted unless the student's record contains a satisfactory number of graded passes.

(ii) *Honours Course in Applied Mathematics*

In the *Faculty of Science* in second year the student should attempt 10.221 Higher Applied Mathematics II, Units A, B and C, 10.121 Higher Pure Mathematics II, Units A and B, and 1.122 Higher Physics II, Unit C. Students intending to take mathematical physics options in later years of Applied Mathematics should also take at least one other unit of Higher Physics II.

In third year the student should attempt four units of 10.222 Higher Applied Mathematics III, including Units A and C, one of Units B and F and one of Units D and E; and at least one unit of 10.122 Higher Pure Mathematics III. Students wishing to enter the third year of the honours course are advised to consult members of staff of the Department of Applied Mathematics before enrolment. Permission to enter fourth year is granted on the permission of a Professor of Applied Mathematics.

(iii) *Honours Course in Statistics*

In the *Faculty of Science* in second year the student should take 10.321 Higher Theory of Statistics II, Units A and B of either 10.111 Pure Mathematics II or 10.121 Higher Pure Mathematics and Unit A of either 10.211 Applied Mathematics II or 10.221 Higher Applied Mathematics II.

In third year he should take 10.322 Higher Theory of Statistics III, Units A, B, C and D, together with at least three level III mathematics units (Pure or Applied).

In all cases complementary units or subjects must be chosen in accordance with Faculty rules.

Students wishing to attempt Third Year honours courses are advised to discuss their courses with a Professor of the Department of Statistics. Permission to enter the Fourth Year course in the Theory of Statistics is granted on the recommendation of a Professor of Statistics. Such permission will not usually be granted unless the applicant has passed in 10.321 Higher Theory of Statistics II, and the student's record contains a satisfactory number of graded passes.

MATHEMATICS AS A SUBSIDIARY SUBJECT

The School also provides the sequence of two Units 10.031 and 10.032, at the second and third levels respectively, for students in the Faculty of Science who are mainly interested in the chemical and biological sciences. These courses offer an introduction to mathematical techniques for scientists and engineers. It should be noted, however, that these two units cannot be counted together with any second level or third level units in Pure and Applied Mathematics.

There is also a single unit in Statistics, 10.311T, which is recommended for those scientists who wish to have some knowledge of Statistics but who do not wish to proceed to any further courses in this subject.

For both the above courses the entry qualification is a pass in 10.001 Mathematics I, but in appropriate cases students who have passed in 10.021 Terminating Mathematics I at a satisfactory level may be given permission to enrol.

SCHOOLTEACHERS

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 schoolteachers.

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.

In addition to the Radio Course, a Bridging Course in Mathematics consisting of eleven three or four hour sessions will be held at the University during the period 26th January to 19th February, 1971. A feature of these courses will be the contact between staff and students particularly in discussion and tutorials.

The Course is designed mainly for students who have passed Mathematics at the 2S level and intend to take Mathematics I for which subject a knowledge of Mathematics at the 2F level is necessary. The Bridging Course covers the gap between 2S and 2F Mathematics and is a very useful refresher course generally. Its emphasis in Calculus is on the application of techniques

already known whereas the Radio Calculus Course explains the ideas of Calculus and assumes no previous knowledge of the subject.

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 prizes available for certain courses in the School of Mathematics. They are open to all Kensington students proceeding to an undergraduate degree or diploma but will not be awarded if there is no candidate of sufficient merit. An award of $25 and a suitably inscribed certificate are available in the following subjects: Higher Mathematics I, Higher Pure Mathematics II, Higher Applied Mathematics II, Higher Pure Mathematics III, Higher Applied Mathematics III.

Similarly there are prizes of $40 available in Theory of Statistics subjects.

MATHEMATICS TEXTBOOKS

10.001 Mathematics I

TEXTBOOKS

Blatt, J. M. *Introduction to Fortran IV Programming.* Prentice-Hall.
Kelly, G. M. *Algebra.* N.S.W.U.P.
Purcell, E. J. *Calculus with Analytic Geometry.* Appleton-Century-Crofts.

10.011 Higher Mathematics I

TEXTBOOKS
Blatt, J. M. *Introduction to Fortran IV Programming.* Prentice-Hall.
Fagg, S. V. *Differential Equations.* E.U.P.
Kelly, G. M. *Algebra.* N.S.W.U.P.
Spivak, M. *Calculus.* Benjamin.

10.021 Mathematics IT

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

10.031 Mathematics

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

10.032 Mathematics

TEXTBOOK
Wylie, C. R. *Advanced Engineering Mathematics.* 3rd ed. McGraw-Hill.

10.111A Pure Mathematics II (Algebra)

TEXTBOOKS
Gass, H. *Linear Programming.* I. S. E. McGraw-Hill.
Tropper, A. M. *Linear Algebra.* Nelson. Paperback.

10.111B Pure Mathematics II (Analysis)

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

10.111C Pure Mathematics II (Abstract Algebra)

TEXTBOOKS
Dean, R. A. *Elements of Abstract Algebra.* Wiley.
Gans, D. *Transformations and Geometries.* Appleton-Century-Crofts.

10.112A Pure Mathematics III (Algebra)

TEXTBOOK
Miller, K. *Elements of Modern Abstract Algebra.* I. S. R. Harper.

10.112B Pure Mathematics III (Functional Analysis)

TEXTBOOK
Berberian, S. K. *Introduction to Hilbert Space.* Oxford, 1961.

10.112C Pure Mathematics III (Differential Geometry)

TEXTBOOK
O'Neill, B. *Elementary Differential Geometry.* Academic.

10.112D Pure Mathematics III (Set Theory)

TEXTBOOKS

Frechet, M. & Fan, K. *Initiation to Combinatorial Topology*. Prindle, Weber & Schmidt.

Halmos, P. R. *Naive Set Theory*. Van Nostrand.

10.112E Pure Mathematics III (Differential Equations)

TEXTBOOKS

Hurewicz, W. *Lectures in Ordinary Differential Equations*. M.I.T.

Smith, M. G. *Introduction to the Theory of Partial Differential Equations*. The New University Mathematics Series. Van Nostrand.

Sneddon, I. *Elements of Partial Differential Equations*. McGraw-Hill.

10.121A Higher Pure Mathematics II (Algebra)

TEXTBOOK

Herstein, I. N. *Topics in Algebra*. Blaisdell.

10.121B Higher Pure Mathematics II (Analysis)

TEXTBOOK

Duncan, J. *The Elements of Complex Analysis*. Wiley. Paperback.

10.121D Higher Pure Mathematics II (Real Variable Theory)

TEXTBOOK

Goldberg, R. R. *Methods of Real Analysis*. Blaisdell.

10.122A Higher Pure Mathematics III (Algebra)

TEXTBOOKS

Burrow, M. *Representation of Finite Groups*. Academic. Paperback.

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

10.122C Higher Pure Mathematics III (Differential Geometry and Additional Analysis)

TEXTBOOKS

Birkhoff, G. & Rota, G. *Ordinary Differential Equations*. Blaisdell.

Wilmore, T. J. *An Introduction to Differential Geometry*. O.U.P.

10.122D Higher Pure Mathematics III (Number Theory and Logic)

TEXTBOOKS

Hardy, G. H. & Wright, E. M. *Introduction to the Theory of Numbers*, O.U.P.

Wilder, R. L. *Introduction to Foundations of Mathematics*. International ed. Wiley.

10.122F Higher Pure Mathematics III (Topology and Integration)

TEXTBOOKS

Royden, H. L. *Real Analysis.* Collier-MacMillan.

Simmons, G. F. *Introduction to Topology and Modern Analysis.* McGraw-Hill, 1963.

10.211A Applied Mathematics II (Mathematical Methods)

TEXTBOOKS

Bowman, F. *Introduction to Bessel Functions.* Dover.

Hilton, P. J. *Partial Derivatives.* Dover.

Sneddon, I. N. *Fourier Series.* Routledge.

Spiegel, M. R. *Theory and Problems of Vector Analysis.* Schaum.

10.211B Applied Mathematics II (Analytical Dynamics)

TEXTBOOK

Symon, K. R. *Mechanics.* Addison-Wesley.

10.211C Applied Mathematics II (Hydrodynamics)

TEXTBOOK

Rutherford, D. E. *Fluid Dynamics.* Oliver & Boyd.

10.221A Higher Applied Mathematics II (Mathematical Methods)

TEXTBOOKS

Queen, N. M. *Vector Analysis.* McGraw-Hill, 1967.

Stephenson, G. *An Introduction to Partial Differential Equations for Science Students.* Longmans. Paperback.

10.221B Higher Applied Mathematics II (Analytical Dynamics)

TEXTBOOK

McCuskey, S. W. *Introduction to Advanced Dynamics.* Addison-Wesley.

10.221C Higher Applied Mathematics II (Hydrodynamics)

TEXTBOOK

Curle, N. & Davies, H. J. *Modern Fluid Dynamics.* Vol. 1. Van Nostrand.

10.212A Applied Mathematics III (Numerical Analysis)

TEXTBOOK

Conte, S. D. *Elementary Numerical Analysis.* McGraw-Hill.

10.212B Applied Mathematics III (Continuum Mechanics)

TEXTBOOK

Fung, Y. C. *A First Course in Continuum Mechanics.* Prentice-Hall.

10.212C Applied Mathematics III (Maxwell's Equations)

TEXTBOOK

Corson, D. & Lorrain, P. *Introduction to Electromagnetic Fields and Waves.* Freeman.

10.212D Applied Mathematics III (Mathematical Methods)

TEXTBOOK

Rabenstein, A. L. *Introduction to Ordinary Differential Equations.* Academic, 1966.

10.222A Higher Applied Mathematics III (Numerical Analysis)

TEXTBOOK

Conte, S. D. *Elementary Numerical Analysis.* McGraw-Hill.

10.222B Higher Applied Mathematics III (Continuum Mechanics)

TEXTBOOK

Fung, Y. C. *First Course in Continuum Mechanics.* Prentice-Hall.

10.222C Higher Applied Mathematics III (Maxwell's Equations and Special Relativity)

TEXTBOOKS

Lawden, D. F. *Tensor Calculus and Relativity.* Methuen.

Tralli, N. *Classical Electromagnetic Theory.* I.S.E. McGraw-Hill.

10.222D Higher Applied Mathematics III (Complex Variables and Integral Transforms)

No textbook prescribed.

10.222E Higher Applied Mathematics III (Boundary Value Problems and Special Functions

No textbook prescribed.

10.222F Higher Applied Mathematics III (Quantum Mechanics)

TEXTBOOK

Schiff, L. I. *Quantum Mechanics.* 3rd ed. I.S.E. McGraw-Hill.

10.223 Applied Mathematics IV

No textbook prescribed.

STATISTICS TEXTBOOKS

10.311 Theory of Statistics II

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. & Craig, A. T. *Introduction to Mathematical Statistics.* Macmillan.

Statistical Tables.

10.321 Higher Theory of Statistics II

As for 10.311, *plus:*

Kendall, M. G. & Stuart, A. *The Advanced Theory of Statistics.* Vols. I and II. 2nd ed. Griffin.

10.311T Statistics

TEXTBOOKS

Miller, I. & Freund, J. E. *Probability and Statistics for Engineers.* Prentice-Hall.

Statistical Tables.

10.312A Stochastic Processes and Applications

TEXTBOOK

Bailey, N. J. T. *Elements of Stochastic Processes with Applications to the Natural Sciences.* Wiley.

10.322A Higher Stochastic Processes and Applications

TEXTBOOKS

As for 10.312A, *plus:*

Cox, D. R. & Miller, H. D. *The Theory of Stochastic Processes.* Methuen.

10.312B Experimental Design (Applications) and Sampling

10.322B Higher Experimental Design (Applications) and Sampling

TEXTBOOKS

Johnson, N. L. & Leone, F. C. *Statistics and Experimental Design.* Vol. II. Wiley.

Statistical Tables.

10.312C Experimental Design (Theory) and Project

TEXTBOOK

Graybill, F. A. *An Introduction to Linear Statistical Models.* McGraw-Hill.

10.322C Higher Experimental Design (Theory) and Project

As for 10.312C.

10.312D Contingency Tables and Probability Theory

10.322D Higher Contingency Tables and Probability Theory

TEXTBOOK

Lamperti, J. *Probability.* Benjamin.

10.323 Theory of Statistics IV

TEXTBOOKS

Anderson, T. W. *Multivariate Statistical Analysis.* Wiley.
Cochran, W. G. *Sampling Techniques.* Wiley.
Cox, D. R. & Smith, W. *Queues.* Methuen.
Feller, W. *An Introduction to Probability Theory and its Applications.* Vol. 2. Wiley.
Graybill, F. A. *An Introduction to Linear Statistical Models.* McGraw-Hill.
Hartley, H. O. & Pearson, E. S. *Biometrika Tables for Statisticians.* C.U.P.
Jenkins, G. M. & Watts, D. G. *Spectral Analysis and its Applications.* Holden-Day.
Kempthorne, O. *The Design and Analysis of Experiment.* Wiley.
Noether, G. E. *Elements of Non-parametric Statistics.* Wiley.
Wald, A. *Statistical Decision Functions.* Wiley.
Wetherill, G. B. *Sequential Methods in Statistics.* Methuen.

10.331 Statistics

TEXTBOOKS

As for 10.311T.

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, or in Food Technology, Biological Technology, Public Health Engineering and Drug Analysis, or for the degree of B.Sc.(Ed.).

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 Science (Medicine) 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, which may be waived or varied only under certain circumstances. He is advised to consult the School's education officer for advice on the best course structure for his particular interests.

Students taking microbiology as a major subject for graduation will be expected ordinarily to undertake at least four level III microbiological units which will include Basic General Microbiology (44.102A Nature of Microorganisms and 44.102B Microbial Physiology and Ecology) and others chosen from Higher Microorganisms (44.102C)—alternatively Mycology (43.102D) given in the School of Botany—General Applied Microbiology (44.102D), Medical Microbiology (44.102E), Immunology (44.102F) and Fermentation Technology (42.102, in the School of Biological Technology). Three stage III units in microbiology will be acceptable with certain combinations that include four stage III biochemistry units.

Students not majoring in microbiology may choose one or more units from Basic General Microbiology (44.102A), Basic General Microbiology (44.102B), Immunology (44.102F) and Higher Microorganisms (44.102C, alternatively Mycology 43.102D). Ordinarily 44.102D, 44.102E or 42.102 should not be taken without having done 44.102A and 44.102B.

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.

44.101 Introductory Microbiology

The general nature, occurrence and importance of microorganisms. A systematic review of the major groups of microorganisms: the eucaryotic protista (micro-algae, protozoa and fungi); procaryotic protista (blue-green algae, "higher" bacteria, typical unicellular bacteria and small bacteria-like forms); plant, animal and bacterial viruses. The composition and fine structure of microorganisms. Microbial physiology and genetics. The relationship between microorganisms and their environment; ecological considerations. Interactions between microorganisms and higher organisms; symbiosis, parasitism and pathogenesis, immunology.

TEXTBOOKS
Brock, T. D. *Biology of Microorganisms.* Prentice-Hall, 1970.
or, if unavailable,
Frobisher, M. *Fundamentals of Microbiology.* 8th ed. Saunders, 1968.
or
Stanier, R. Y., Doudoroff, M. & Adelberg, E. A. *General Microbiology.* 2nd ed. Macmillan, 1963 (also published under the title *The Microbial World.* Prentice-Hall).

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.

44.102A Basic General Microbiology: Nature of Microorganisms

Systems for the identification and taxonomic description of bacteria; more detailed treatment of the fine structure, cytochemistry, genetics, and antigenicity of microorganisms (including viruses).

TEXTBOOK
Davis, B. D., Dulbecco, R., Eisen, H. N., Ginsberg, H. S. & Wood, W. B. *Principles of Microbiology and Immunology* (or the larger version entitled *Microbiology*, if the Medical Microbiology unit 44.102E is also chosen). Hoeber Medical Division, Harper & Row, 1968.

PRE-REQUISITES
41.101A Chemistry of Biologically Important Molecules.
41.101B Metabolism.
43.101A/45.101A Genetics and Biometry.
44.101A Introductory Microbiology.

This unit consists of 6 hours per week throughout Session 1.

44.102B Basic General Microbiology: Microbial Physiology and Ecology

The metabolic requirements of microorganisms; relationship between the microorganism and its environment: growth, inhibition, death; energy-yielding and biosynthesising systems; genotypic and phenotypic control systems.

TEXTBOOK
As for 44.102A.

PRE-REQUISITES
As for 44.102A.

CO-REQUISITE
44.102A.

This unit consists of 6 hours per week throughout Session 1.

44.102C Higher Micro-organisms

Aims to round out the brief treatment these, mostly eucaryotic protista, received in the introductory course. The filamentous fungi, yeasts, micro-algae and protozoa will each be dealt with in a short taxonomic fashion but giving attention also to particular features associated with their morphology, cytology, cytochemistry, physiology, genetics and their relationship to other organisms and human welfare generally.

Note: Mycology (43.102D) as alternative to this unit. (See entry under Botany).

TEXTBOOKS
To be advised by the School.

PRE-REQUISITES
As for 44.102A above.

This unit consists of 6 hours per week throughout Session 2.

44.102D General Applied Microbiology

Endeavours to relate basic facts about microorganisms to practical conditions affecting the occurrence, importance, activity and control of microorganisms in soil, air, water, in their relationship to higher organisms (other than Man); their relationship to the manufacture, preservation and spoilage of food, including dairy products; and their industrial application.

TEXTBOOK
Rhodes, A. & Fletcher, E. L. *Principles of Industrial Microbiology*. Pergamon, 1966.

PRE-REQUISITES
44.102A Basic General Microbiology.
44.102B Basic General Microbiology.

This unit consists of 6 hours per week throughout Session 2.

44.102E Medical Microbiology (for Science Students)

The nature of bacterial and viral diseases of man: cultural and serological diagnostic procedures; epidemiology of infectious disease; fundamentals of chemotherapy, immunoprophylaxis, immunotherapy; mycology and parasitology in relation to human disease.

TEXTBOOKS
Davis, B. D., Dulbeco, R., Eisen, H. N., Ginsberg, H. S. & Wood, W. B. *Microbiology*. Hoeber Medical Division, Harper & Row. Reprinted and corrected 1968.
Stokes, E. J. *Clinical Bacteriology*. 3rd ed. Arnold, 1968.

PRE-REQUISITES
44.102A Basic General Microbiology.
44.102B Basic General Microbiology.

This unit consists of 6 hours per week throughout Session 2.

44.102F Immunology

Basic immunology and immunological techniques. The interdisciplinary nature of the subject makes this unit suitable for students taking any major sequence in biological science and also for higher degree students who require a background training in immunology. The course includes phylogeny and ontogeny of the immune response; antigen and antibody structure; antigen-antibody reaction; immunochemistry; immunogenetics; clinical immunology; transplantaton.

TEXTBOOK
Weiser, R. S., Myrvik, Q. N. & Pearsall, N. N. *Fundamentals of Immunology*. Lea & Febiger, 1969.

PRE-REQUISITES
17.001 General and Human Biology.
41.101A Chemistry of Biologically Important Molecules.
41.101B Metabolism.

This unit consists of 6 hours per week throughout Session 2.

SCHOOL OF PHILOSOPHY

The study of philosophy is partly the study of perennial problems of common interest to everyone; for example, the foundations of morality, the grounds of religious belief, the source and reliability of knowledge, and the relation between body and mind. 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 a philosophical interest 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. It is broken into two sessions, with an examination at the end of each session, but Arts students take it as a whole and other students are advised to do so. There is no distinction between Pass and Honours.

For second year, Pass courses are presented and examined in session-length units. This arrangement makes it possible to offer a wide range of units from which students may select freely, subject only to certain stipulations regarding pre-requisites. In a normal course, students take two course units in each session.

SELECTION OF UNITS

The pattern of courses after the first year is intended to give students a wide range. Constraints are imposed by, firstly, the pre-requisites of the various subjects; secondly, the distribution of courses as between Sessions 1 and 2; and to some extent, time-tabling. The following details will assist students with their initial choice.

The course-units available in session I and having no pre-requisite apart from Introductory Philosophy A and B, are:

Predicate Logic;
Descartes;
British Empiricism;
Early Greek Philosophy;
Scientific Method.

Of these, Predicate Logic is pre-requisite to a range of advanced logic courses, and some of the others are also pre-requisites, alone or as alternatives, to certain other subjects.

HONOURS COURSES

There is no division of students into Pass and Honours during the first year. From the second year special additional course-units are provided for Honours students.

52.111 Philosophy I

The course-units Introductory Philosophy A and Introductory Philosophy B as detailed below. There will be examinations at the end of each session but for Arts students the course will be treated as an integrated whole-year one.

52.112 Philosophy II

Four course-units, normally two in each session.

52.122 Philosophy II (Honours)

As for Pass course, plus Honours Seminars A and B.

NOTE ON PRE-REQUISITES

"Introductory Philosophy A and B" is equivalent to "Philosophy I".

Where "Predicate Logic" is shown as a pre-requisite it may be regarded as equivalent to the Logic unit of Philosophy II (in courses up to 1970).

Where "British Empiricism" is shown as a pre-requisite it may be regarded as equivalent to the British Empiricism unit of Philosophy II (in courses up to 1970).

In other cases, students wishing to substitute an old course as pre-requisite should consult the School.

Introductory Philosophy A (Session 1)

A first course for students new to the subject. The course divides into three parts 1. *Plato:* A study of some dialogues of Plato, paying special attention to the theory of definition, and to questions of conceptual analysis as these arise from attempts to

define virtue and to prove the immortality of the soul. 2. *Hume:* A study of those sections of Hume's *Enquiry* concerned with the existence of God and with miracles. 3. *Informal Logic:* An approach to logic by way of language, treating such topics as the uses of utterances, the truth and significance conditions of statements, the non-formal analysis of arguments, and the logical relations of propositions.

RECOMMENDED FOR PRELIMINARY READING

Popkin, R. H. & Stroll, A. *Philosophy Made Simple.* Made Simple Books.
Russell, B. *The Problems of Philosophy.* Oxford H.U.L.

TEXTBOOKS

Berofsky, B. *Free Will and Determinism.* Harper & Row.
Halverson, W. H. *A Concise Introduction to Philosophy.* Random House.
Hamblin, C. L. *Elementary Formal Logic—A Programmed Course.* Hicks Smith and University Paperbacks.
Hume, D. *On Human Nature and the Understanding.* Flew, A. ed. Collier.
Plato. *Protagoras and Meno.* Guthrie, W. K. C. trans. Penguin Classics.
Plato. Tredennick, H. trans. *The Last Days of Socrates.* Penguin Classics.

Introductory Philosophy B (Session 2)

A continuation of Introductory Philosophy A. The three parts of the course will be: 1. *Plato:* The further study of some dialogues of Plato, with special reference to problems of knowledge and the theory of universals. 2. *Hume:* The further study of Hume's *Enquiry*, with special reference either to the mind-body problem and personal identity, or else to the freedom of the will. 3. *Formal Logic:* An introduction to a system of Natural Deduction sufficient for the symbolization of such ordinary language arguments and the construction of such proofs as lie within the field of propositional logic and simple predicate logic.

TEXTBOOKS

As for Introductory Philosophy A, *plus:*
Kalish, D. & Montague, R. *Logic: Techniques of Formal Reasoning.* Harcourt, Brace & World.

Predicate Logic (Session 1)

Pre-requisite: Introductory Philosophy A and B.

A system of natural deduction is presented for the first order predicate calculus, including identity and definite descriptions. Emphasis is upon construction of formal derivations, methods of showing the invalidity of formal arguments, and the evaluation of informal arguments by symbolization.

TEXTBOOK

Kalish, D. & Montague, R. *Logic: Techniques of Formal Reasoning.* Harcourt, Brace & World.

Descartes (Session 1)

Pre-requisite: Introductory Philosophy A and B.

A study of the main issues raised in the philosophy of Descartes and their importance for the development of modern philosophy. Emphasis is on the *cogito ergo sum* argument, the Cartesian method and the search for rational certainty, his theory of ideas, the body-mind problem, and his account of freedom.

TEXTBOOK

Anscombe, G. E. M. & Geach, P. T. eds. *Descartes's Philosophical Writings.* Nelson.

British Empiricism (Session 1)

Pre-requisite: Introductory Philosophy A and B.

A survey of the empiricist tradition with special concentration on Berkeley and Hume.

TEXTBOOKS

Armstrong, D. M. *Berkeley's Philosophical Writings.* Collier. Paperback.
Hume, D. *Treatise of Human Nature.* 2 vols. Everyman.
Locke, J. *An Essay Concerning Human Understanding.* Fontana.

Early Greek Philosophy (Session 1)

Pre-requisite: Introductory Philosophy A and B.

The leading ideas of the Greek philosophers from Thales to Plato, with special reference to the Pre-Socratics.

Scientific Method (Session 1)

Pre-requisite: Introductory Philosophy A and B.

A study of the nature of empirical knowledge as exemplified in the physical and social sciences and in history, with emphasis on the concept of explanation, the nature of induction and scientific laws, counterfactual statements, and the paradoxes of confirmation.

TEXTBOOKS

Hempel, C. G. *Philosophy of Natural Science.* Prentice-Hall.
Rudner, R. S. *Philosophy of Social Science.* Prentice-Hall.

Foundations of Mathematics (Session 2)

Pre-requisite: Predicate Logic.

An introduction to a selection of problems concerning the foundations of Mathematics including the following topics. Non-Euclidean Geometry and consistency proofs, Axiomatics, Anti-

nomies of naive set theory, Logicism, Intuitionism, Formalism, Gödel's Incompleteness result.

TEXTBOOK
Wilder, R. S. *An Introduction to the Foundations of Mathematics.* Wiley.

Argument (Session 2)

Pre-requisite: Introductory Philosophy A and B.

A theoretical study of practical argumentation in the court-room, politics and everyday life as compared with argument in logic, mathematics and theoretical science. Confirmation and probability, authority, testimony, precedent; rules of debate; criteria of validity; problem of mechanization of practical arguments; logical rationalism and scepticism.

Logical Atomism (Session 2)

Pre-requisite: Introductory Philosophy A and B.

A survey of the logical atomism of Russell and Wittgenstein and of the logical positivist movement.

TEXTBOOKS
Ayer, A. J. ed. *Logical Positivism.* Macmillan.
Russell, B. *Logic and Knowledge.* ed. Mash, R. S. Allen & Unwin.

Philosophy of Psychology (Session 2)

Pre-requisite: Scientific Method.

A critical examination of some aspects of fundamental theory of psychology, with special emphasis on classical and contemporary behaviourism and behaviourist orientated psychology, and on the general conceptions of 'behaviour' and 'purpose'.

While Psychology I is not a pre-requisite for this course, a preparatory survey of the introductory chapters of J. O. Whittaker's *Psychology* will be of value to students.

Philosophy of Biology (Session 2)

Pre-requisite: Introductory Philosophy A and B.

An introduction to some of the problems associated with the philosophy of biology. Main consideration is the autonomy of biology; i.e., whether biology is in principle reducible to the physical sciences and, ultimately, to physics, or whether the biologist necessarily employs types of description and explanation that have no application in the explanation and description of

merely physical phenomena. No prior knowledge of biology is assumed but candidates will be expected to familiarize themselves with the attitudes of various biologists to these issues.

TEXTBOOK
Nagel, E. *The Structure of Science.* Routledge.

Aesthetics (Session 2)

Pre-requisite: Introductory Philosophy A and B.

An examination of the central concepts, types of judgment and theories occurring in the fields of aesthetics, art criticism and literary criticism.

TEXTBOOK
Coleman, F. J. ed. *Contemporary Studies in Aesthetics.* McGraw-Hill.

Existentialism (Session 2)

Pre-requisite: Descartes.

Sartre's account of man-in-the-world. Sartre's ontology, his use of a phenomenological method and his ethics.

TEXTBOOKS
Sartre, J. P. *Being and Nothingness.* Methuen.
Manser, A. *Sartre, A Philosophic Study.* Athlone Press.

Plato and Aristotle (Session 2)

Pre-requisite: Early Greek Philosophy.

A course centred around some of the later dialogues of Plato *(Parmenides, Theacletus, Sophist)* and the *Categories* and *De Interpretations* of Aristotle.

TEXTBOOKS
Cornford, F. M. *Plato and Parmenides.* Routledge.
Cornford, F. M. *Plato's Theory of Knowledge.* Routledge.
Aristotle. *The Works of Aristotle Translated into English.* Vol. I. Logic. O.U.P.

Spinoza and Leibniz (Session 2)

Pre-requisite: Descartes.

A study of the main issues raised in the philosophy of the two great seventeenth century rationalists, with emphasis upon the development of their metaphysical systems in response to unresolved problems in the philosophy of Descartes and to contemporary scientific thinking. Their ethical views.

TEXTBOOKS
Leibniz, G. W. *Selections.* Wiener, P. P. ed. Scribner.
Spinoza, B. *Ethics* and *On the Improvement of the Understanding.* Both available in *Works of Spinoza.* Elwes, R. H. M. trans. Dover.

Honours Seminar A (Session 1)

For Honours students in their second year. An examination of contemporary philosophical thought concerning, broadly speaking, the nature of ethical judgment.

TEXTBOOKS
Foot, P. *Theories of Ethics.* O.U.P.
Warnock, G. J. *Contemporary Moral Philosophy.* Macmillan.

Honours Seminar B (Session 2)

For Honours students in their second year. The course is based on articles from recent issues of philosophy journals. Students will be expected to read and prepare papers on an individual basis.

SCHOOL OF PHYSICS

The School of Physics provides both pass and honours courses. The pass course with major studies is available by taking Physics or Higher Physics units and may be completed in three years. This course may include the core units which aim to present a broad and balanced treatment of all branches of physics without undue emphasis on topics which may be temporarily prominent, and also a choice of elective units which aim to present more specific and detailed study in certain specialized areas. The course including Higher Physics units is normally a prelude to entry into the Honours year. These studies which are completed within the framework of the Science Course (see earlier) provide unit groupings which are 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 complete Physics 1.001, three level II Physics units and four level III Physics units of which three must be from 1.113 A, B, C or D. Note that 10.001 Mathematics is a pre-requisite of all Physics level II units and that 10.211A Applied Mathematics is a co-requisite of all Physics level II units. Students are also advised to take units 10.111A and 10.111B of Pure Mathematics in second year. Additional Mathematics units are pre-requisite to Higher Physics level III units (see regulations). Students are also advised to complete supporting units in accordance with the Science Course regulations and will normally include 2.001 Chemistry I. It should be understood that units of corresponding higher subjects can often be substituted for those mentioned above.

Honours

A student intending to take Honours in Physics will normally complete the sequence of Higher Physics units 1.011; 1.122 A, B and C; 1.123 A, B, C, and D. However, students with a very good record in Physics 1.001 or in 1.112 A, B and C may be considered for admission to Higher Physics units on application to the Head of School. Applied Mathematics 10.211A (or the

Higher Applied Mathematics equivalent) is a co-requisite of Higher Physics level II units and Pure Mathematics 10.111A and B (or the Higher Pure Mathematics equivalents) are pre-requisites to Higher Physics level III units. Students are also strongly advised to take Applied Mathematics units 10.212A and D (or equivalents) in their third year of study.

The following show typical programmes which, together with the prescribed General Studies subjects, complete requirements for a degree.

A. Pass Course Majoring in Physics (suitable for Science Teachers)

		Level	No. Units
	FIRST YEAR		
1.001	Physics	I	2
10.001	Mathematics	I	2
2.001	Chemistry	I	2
17.001	General and Human Biology	I	2
	SECOND YEAR		
1.112A, B, C	Physics	II	3
10.221A	Applied Mathematics	II	1
25.001	Geology	I	2
	Other Units	II	2
	THIRD YEAR		
1.113A, B, C, D	Physics	III	4
2.002A, B, C	Chemistry	II	3
	Other Units	II/III	1

OR

B. Pass Course Majoring in Physics

		Level	No. Units
	FIRST YEAR		
1.001	*Physics	I	2
10.001	Mathematics	I	2
2.001	Chemistry	I	2
	Other Units	I	2
	SECOND YEAR		
1.112A, B, C	*Physics	II	3
10.211A	Applied Mathematics	II	1
	Other Units	II	4
	THIRD YEAR		
1.113A, B, C, D	Physics†	III	4
	Other Units	II/III	4

C. Leading to Honours in Physics

		Level	No. Units
	FIRST YEAR		
1.011	Higher Physics	I	2
10.001	Mathematics	I	2
2.001	Chemistry	I	2
	Other Units	I	2
	SECOND YEAR		
1.122A, B, C	Higher Physics	II	3
10.111A, B	Pure Mathematics	II	2
10.211A	Applied Mathematics	II	1
	Other Units	II	2
	THIRD YEAR		
1.123A, B, C, D	†Higher Physics	III	4
	‡Other Units	III	4

* Admission to Physics Level II units or to Higher Physics Level II units normally requires completion of 1.001 Physics or 1.011 Higher Physics. Students who gain a superior pass in 1.041 Physics IC and who have also passed 10.001 Mathematics or 10.011 Higher Mathematics may, subject to the approval of the Head of School, be permitted to proceed to 1.112 Physics Level II units.

† Students must note that certain Applied Mathematics Level III units cannot be counted with certain Physics Level III units.

‡ Entry to the Honours year may, subject to the approval of the Head of School, be permissible from a course containing as a minimum the four Higher Physics Level III Units, A, B, C and D, plus four other Level III units. Students are strongly advised to include Applied Mathematics Level III units. Numerical Analysis, 10.212A and Mathematical Methods, 10.212D among the four elective units.

Physics Prizes

The following prizes are offered annually:

The School Prize, for the best overall performance in Physics level II units or Higher Physics level II units, value $40.

The Physics Staff Prize, for the best overall performance in Physics Level III Units or Higher Physics Level III Units, value $60.

The Head of School's Prize, for the best performance in laboratory work at Level III in the School of Physics, value $20.

The Physics IV Prize for the best performance in Physics IV, value $40.

PHYSICS TEXTBOOKS

1.001 Physics I
1.011 Higher Physics I } For students taking 2 full years of Physics

TEXTBOOKS
Dunlop, J. I. & Mann, K. *Introductory Electronics.* Clarendon.
Halliday, D. & Resnick, R. *Physics for Students of Science and Engineering.* Vols. I & II, or combined volume. Wiley.
Russell, G. J. & Mann, K. *Alternating Current Circuit Theory.* Univ. of N.S.W. Press.

1.041 Physics IC (for students taking only one full year of Physics)

TEXTBOOKS
Giutronich, J. E. *Electricity.* Clarendon.
Halliday, D. & Resnick, R. *Physics for Students of Science and Engineering.* Vol. I. Wiley.
Russell, G. J. & Mann, K. *Alternating Current Circuit Theory.* Univ. of N.S.W. Press.

For all students taking First Year Physics:
Russell, G. J., Dunn, I. & Higinbotham, J. *Laboratory Notes for Physics I.* The Univ. of N.S.W.

1.212 Physics IIT

Half Unit A (Geometrical Optics)

TEXTBOOK
Fincham, W. *Optics.* Hatton.

Half Unit B (Electronics)

TEXTBOOK
Brophy, J. J. *Basic Electronics for Scientists.* McGraw-Hill. Paperback.

Half Unit C (Introduction to Physics of Solids)

TEXTBOOK
Wert, C. A. & Thomson, R. M. *Physics of Solids.* Int. Student Ed. McGraw-Hill, 1964.

Half Unit D (Biophysics)

TEXTBOOKS
To be announced later.

1.112A Electricity and Magnetism

TEXTBOOK
Whitmer, R. M. *Electromagnetics.* 2nd ed. Prentice-Hall, 1962.

1.112B Modern Physics

TEXTBOOK
Beiser, A. *Perspectives of Modern Physics.* Rev. ed. McGraw-Hill, 1969.

1.112C Waves in Continuous Media and Thermodynamics

TEXTBOOKS

Crawford, P. S. *Waves.* McGraw-Hill, 1968.

Sears, F. W. *Thermodynamics, the Kinetic Theory of Gases and Statistical Mechanics.* Addison-Wesley.

1.122A Electromagnetism

TEXTBOOK

Corson, D. & Lorrain, P. *Introduction to Electromagnetic Fields and Waves.* Freeman, 1962.

1.122B Quantum Physics

TEXTBOOK

Eisberg, R. M. *Fundamentals of Modern Physics.* Wiley, 1961.

1.122C Thermodynamics and Mechanics

TEXTBOOKS

Pippard, A. B. *Classical Thermodynamics.* C.U.P., 1964.

Symon, K. R. *Mechanics.* 2nd ed. Addison-Wesley, 1965.

1.113A Wave Mechanics and Spectroscopy

TEXTBOOK

Beiser, A. *Perspectives of Modern Physics.* Rev. ed. McGraw-Hill, 1969.

1.113B Electromagnetic Fields and Physical Optics

TEXTBOOK

Lipson, H. & S. S. *Optical Physics.* C.U.P., 1969.

1.113C Statistical Mechanics and Solid State

TEXTBOOKS

Blakemore, J. S. *Solid State Physics.* Saunders, 1969.

Jackson, E. A. *Equilibrium Statistical Mechanics.* Prentice-Hall, 1968.

1.113D Astrophysics and Nuclear Physics

TEXTBOOK

Brandt, J. C. *The Sun and Stars.* McGraw-Hill.

1.123A Quantum Mechanics

TEXTBOOK

Schiff, L. I. *Quantum Mechanics.* 2nd ed. McGraw-Hill.

1.123B Electromagnetic Theory and Statistical Mechanics

TEXTBOOKS

Corson, D. & Lorrain, P. *Introduction to Electromagnetic Fields and Waves.* Freeman, 1962.

Reif, F. *Fundamentals of Statistical and Thermal Physics.* McGraw-Hill.

1.123C Solid State and Nuclear Physics

TEXTBOOKS

Burcham, W. E. *Nuclear Physics, an Introduction.* Longmans, 1963.
Kittel, C. *Introduction to Solid State Physics.* 3rd ed. Wiley, 1967.

1.123D Atomic Physics and Spectroscopy

TEXTBOOKS

McDaniel, E. W. *Collision Processes in Ionised Gases.* Wiley, 1964.
White, H. W. *Introduction to Atomic Spectra.* McGraw-Hill, 1934.

1.143A Biophysics

TEXTBOOK

Ackerman, E. *Biophysical Science.* Prentice-Hall, 1962.

1.143B Solid State Devices and Electronics

TEXTBOOK

Van der Ziel, A. *Introduction to Electronic Circuits.* Allyn & Bacon, 1969.

1.143C Magnetism

TEXTBOOK

None specified.

1.143E Electrical and Optical Properties of Solids

TEXTBOOK

Adler, R. B., Longini, R. L. & Smith, A. C. *Introduction to Semi Conductor Physics.* Wiley, 1964.

1.153A Hydrodynamics and Magneto-hydrodynamics

TEXTBOOKS

Landau, L. D. & Lifshitz, E. M. *Fluid Mechanics.* Pergamon, 1959.
Schmidt, G. *Physics of High Temperature Plasmas.* Academic, 1966.

1.153B Relativity and Electromagnetism

TEXTBOOK

None specified.

SCHOOL OF PHYSIOLOGY AND PHARMACOLOGY

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.

73.011A Principles of Physiology

An introductory course in physiology. It considers in some detail the basic problems of homeostasis encountered in man and animals. Function is considered at cellular and systemic levels, and examples are drawn from mammalian and invertebrate species.

TEXTBOOKS

Ganong, W. F. *Review of Medical Physiology*. 4th ed. Lange Medical Publications, Los Altos, 1969.

Guyton, A. C. *Function of the Human Body*. 3rd ed. W. B. Saunders Company, Philadelphia and London, 1969.

Katz, B. *Nerve, Muscle and Synapse*. McGraw-Hill, N.Y., Toronto, London, 1966.

PRE-REQUISITES

17.001 General and Human Biology.

10.001 Mathematics I *or* 10.011 Higher Mathematics I *or* 10.021 Mathematics IT.

2.001 Chemistry I *or* 2.011 Higher Chemistry I.

This is a two-unit course that will continue for 6 hours each week throughout the year.

73.012 Physiology II

An advanced course in the principles of physiology, centred on four major areas: circulation, respiration, control of body fluids and neurophysiology.

TEXTBOOKS
To be advised.

PRE-REQUISITES
41.101A Chemistry of Biologically Important Molecules.
41.101B Metabolism.
41.101C Control Mechanisms.

CO-REQUISITE
43.101A/45.101A Genetics and Biometry.

A student who has not passed the pre-requisite units of Biochemistry may still proceed to Physiology II by arrangement with the Head of School.

This is a four-unit course that will continue for 12 hours per week throughout the year, and will consist of lectures, tutorials, seminars and laboratory work. On some occasions students may be required to attend at other times for the maintenance and treatment of experimental animals.

SCHOOL OF ZOOLOGY

The School provides undergraduate courses in Zoology and Entomology taught as part of the Unit pattern which was introduced for second year classes in 1969 and third year classes in 1970. The School offers seven units of Zoology and four units of Entomology and contributes to a unit of Biometry and Genetics offered jointly with the School of Botany. All courses leading to a Science degree in Zoology are dependent on an adequate background in Biochemistry and in Genetics and Biometry. The units offered place an emphasis on experimental Animal Physiology, experimental and applied Entomology and an ecological approach to Marine Science.

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.

43.101A/45.101A Genetics and Biometry

For details of this course, which is offered jointly by the Schools of Zoology and Botany, see under School of Botany.

45.101B Invertebrate Zoology

A comparative study of the major invertebrate phyla with emphasis on morphology, systematics and phylogeny. Practical work to illustrate the lecture course.

Obligatory field camp.

TEXTBOOK
Barnes, R. D. *Invertebrate Zoology*. 2nd ed. Saunders, 1968.

PRE-REQUISITES
1.001 Physics I *or* 1.011 Higher Physics I *or* 1.041 Physics IC.
2.001 Chemistry I *or* 2.011 Higher Chemistry I.
10.001 Mathematics I *or* 10.011 Higher Mathematics I *or* 10.021 Mathematics IT.
17.001 General and Human Biology.

This unit is offered in Session 2, and consists of 2 hours' lecture and 4 hours' laboratory time per week.

45.101C 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. Obligatory field camp.

TEXTBOOKS
Weichert, C. K. *Anatomy of the Chordates*. 3rd ed. McGraw-Hill, 1969.
Young, J. Z. *The Life of the Vertebrates*. Clarendon, 1958.

PRE-REQUISITES
As for 45.101B above.

This unit is offered in Session 2, and consists of 2 hours' lecture and 4 hours' laboratory time per week.

45.101D Field Ecology

A lecture series on the basic principles of ecology followed by an examination and evaluation of the field methods used to measure the environment and the distribution and abundance of organisms.

TEXTBOOK
Southwood, T. R. E. *Ecological Methods*. Methuen, 1966.

PRE-REQUISITES
43/45.101A Genetics and Biometry.

CO-REQUISITES
45.101B Invertebrate Zoology.
or
45.101C Vertebrate Zoology.

This unit is offered as a lecture series (two per week) in Session 2 plus a two week camp in early February 1972 at the University's Smiths Lake Field Station.

45.102A Marine Ecology

A study of the metabolic, regulatory and reproductive activities of marine organisms with particular reference to the physical, chemical and biological environment in which they occur. Both field and laboratory practical work are included.

TEXTBOOK
Moore, H. B. *Marine Ecology*. Wiley, 1958.

PRE-REQUISITES
As for 45.101B above.

This unit is offered in Session 1, and consists of 2 hours' lecture and 4 hours' laboratory time per week.

45.102B Animal Behaviour

An introduction to the biological study of behaviour. The observable phenomena of behaviour are studied relative to the immediate physical-physiological causation, to the evolutionary and ontogenetic histories and to functional and survival values. Both field and laboratory work are included.

TEXTBOOKS
Carthy, J. D. *The Behaviour of Arthropods*. Oliver & Boyd, 1965.
Manning, A. *An Introduction to Animal Behaviour*. Arnold, 1967.

PRE-REQUISITES
1.001 Physics I *or* 1.011 Higher Physics I *or* 1.041 Physics IC.
2.001 Chemistry I *or* 2.011 Higher Chemistry I.
10.001 Mathematics I *or* 10.011 Higher Mathematics I *or* 10.021 Mathematics IT.
17.001 General and Human Biology.

This unit is offered in Session 2, and consists of 2 hours' lecture and 4 hours' laboratory time per week.

45.102C Comparative and Environmental Physiology

A study of the physiology of the various animal groups with particular emphasis on the adaptation of the animal to its environment. Subjects in this examination include the following. Osmotic and ionic regulation. Respiration and the cardio-vascular system. Temperature regulation and hibernation. Nerve and muscle physiology.

TEXTBOOK
Gordon, M. S. *Animal Function: Principles and Adaption*. Macmillan, 1968.

PRE-REQUISITES
41.101A Chemistry of Biologically Important Molecules.
41.101B Metabolism.
45.101C Vertebrates.

This unit is offered in Session 1, and consists of 2 hours' lecture and 4 hours' laboratory time per week.

45.102D Comparative Reproductive Physiology

A survey of reproductive mechanisms, reproductive histology, reproductive endocrinology, and embryology, with particular reference to the comparative aspects in vertebrate species. A detailed treatment of marsupial and monotreme reproduction.

TEXTBOOKS
Frye, B. E. *Hormonal Control of Vertebrates.* Macmillan, 1967.
Gilchrist, F. G. *A Survey of Embryology.* McGraw-Hill, 1968.
Nalbandov, A. V. *Reproductive Physiology.* Freeman, 1964.

PRE-REQUISITES
As for 45.102C above.

This unit is offered in Session 2, and consists of 2 hours' lecture and 4 hours' laboratory time per week.

45.201A Insect Structure and Classification

A comparative study of the internal anatomy and external morphology of insects. Classification and bionomics of major groups and families. A collection of insects is to be made. Practical work to include dissections, a study of mouthparts, wing venations, segmentation, etc. Field excursions as arranged.

TEXTBOOK
C.S.I.R.O. *The Insects of Australia.* M.U.P., 1969.

PRE-REQUISITES
45.101B Invertebrates.
43.101A/45.101A Genetics and Biometry.

This unit is offered in Session 1, and consists of 2 hours' lecture and 4 hours' laboratory time per week.

45.201B Insect Physiology

A study of the functions of the various organ systems and of the whole insect. Various aspects of reproduction, growth and metabolism. Experimental work to illustrate the lecture course.

TEXTBOOK
Chapman, P. F. *The Insects, Structure and Function.* E.U.P., 1969.

PRE-REQUISITES
45.202A Insect Structure and Classification.

This unit is offered in Session 1, and consists of 2 hours' lecture and 4 hours' laboratory time per week.

45.201C Applied Entomology

Fundamentals of insect control. Pest species and types of damage caused. Control by insecticides, physical and biological means. Insect toxicology. Insecticide resistance. Practical work to illustrate the above and also various aspects of bioassay in Entomology. Field excursions as arranged.

TEXTBOOK
Beirne, P. *Pest Management*. Leonard Hill, 1967.

PRE-REQUISITES
45.202B Insect Physiology.

This unit is offered in Session 2, and consists of 2 hours' lecture and 4 hours' laboratory time per week.

45.201D Project

Detailed studies of selected aspects of insect physiology; ecology and toxicology. Treatment of topics will be in depth rather than breadth. Practical work will illustrate the lectures and will place emphasis on design and planning of experiments.

PRE-REQUISITES
45.202B Insect Physiology.

This unit is offered in Session 2, and consists of 6 hours' project work 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					