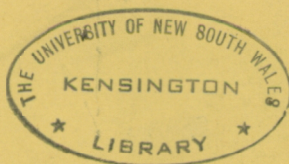


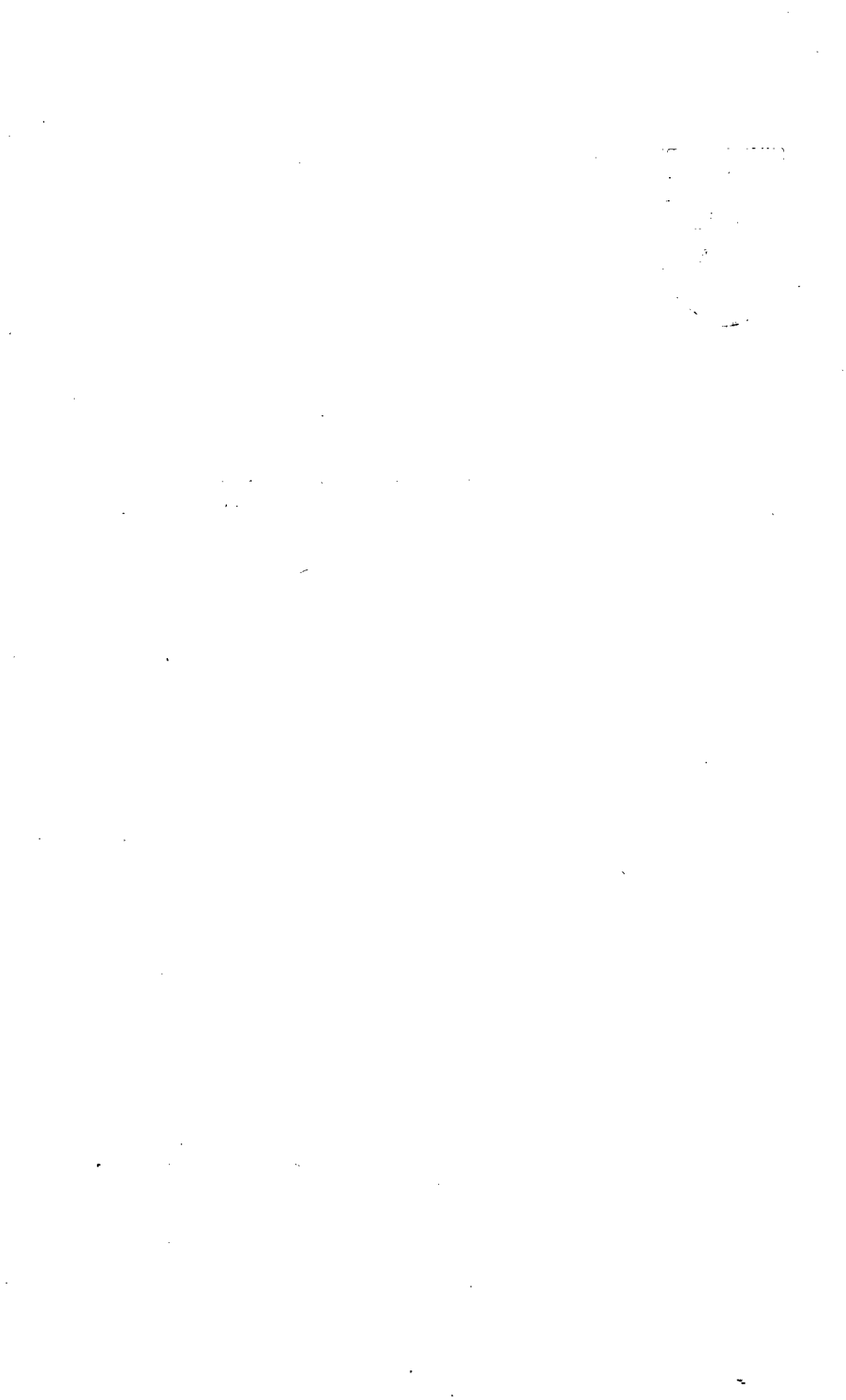
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FACULTY OF SCIENCE—
HANDBOOK 1961



THE UNIVERSITY OF
NEW SOUTH WALES





***FACULTY OF SCIENCE—
HANDBOOK 1961***

**THE UNIVERSITY OF
NEW SOUTH WALES**

Foreword

In renewing, for this 1961 edition of the Faculty of Science Handbook, the Dean's welcome to new students, I would like to express the hope that they will enjoy and profit by their studies here. As a message to them I feel that I cannot improve upon the following "Advice on Study" given by a senior member of Faculty.

Advice on Study

Intelligence *and* diligence are required to become a scientist—neither alone will suffice. Diligence is the principal agent whereby the intellect passes from a state of ignorance or of confused knowledge to that of an actual scientific understanding.

In the progress of scientific study it is fitting to approach the more difficult things by way of those which are easier. Do not dissipate effort on enquiry into advanced matters until the fundamentals have been firmly established.

Take all means to *understand* rather than simply to *memorise*, or, even worse, to acquire only a vague jargon. In this connection do not bow to the authority of a lecturer or a text-book author, but rather rely on the evidence for what is proposed.

Do not *passively* endure the lectures and practical classes, but rather put an *active* effort of understanding into them. Study continuously throughout the academic year for reasonable numbers of hours, and not for unreasonably long hours in one part of the year alone.

Proper recreation is essential and should be regular, to avoid on the one hand the mental dissipation which stems from excess of outside interests and on the other the mental stagnation which results from overstudy.

If progress is halting and the mind confused in spite of honest efforts, then seek specialised advice on how best to implement these general considerations, e.g. from your lecturer, or from the Student Counselling Service.

The passing of examinations is not the aim of scientific study, but rather the aim is to acquire scientific understanding of the subject. To acquire this understanding is to make the passing of examinations inevitable.

C. J. MILNER

Acting Dean

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Faculty of Science

SCHOOLS AND ADMINISTRATIVE OFFICERS, 1961

Dean:

Professor J. F. CLARK.

Educational Officer for Science Degree Courses:

Mr. C. M. GRODEN (School of Mathematics).

Educational Officer for Applied Chemistry Course:

Mr. W. J. DUNSTAN (School of Chemistry).

Educational Officer for Applied Psychology Course:

Mr. J. C. MURRAY (School of Applied Psychology).

Educational Officer for Applied Biology Course:

Mr. R. BARBOUR (School of Biological Sciences).

School of Biological Sciences:

(Located at Ultimo)

Head of School: Professor B. J. RALPH.

Educational Officers: Mr. R. BARBOUR, Mr. A. WOOD.

School of Chemistry:

(Departments of Analytical Chemistry and Nuclear and Radiation Chemistry located at Kensington. The School Administration and all other departments are located at Ultimo)

Head of School: Professor D. P. MELLOR.

Professor of Organic Chemistry: Professor S. J. ANGYAL.

Associate Professor of Chemistry: Dr. G. W. K. CAVILL.

Associate Professor of Physical Chemistry: Dr. R. C. L. BOSWORTH.

Associate Professor of Nuclear and Radiation Chemistry: Dr. J. H. GREEN.

Educational Officers: Mr. W. J. DUNSTAN, Mr. E. C. MARTIN.

School of Mathematics:

(Located at Kensington)

Head of School: Professor G. BOSSON.

Professor of Applied Mathematics: Professor J. M. BLATT.

Associate Professor of Mathematical Statistics: J. B. DOUGLAS.

Educational Officers: Mr. S. SENIOR, Mr. C. KIRKPATRICK.

School of Physics:

(Located at Kensington)

Head of School: Professor C. J. MILNER.

Associate Professor: Dr. J. F. McCONNELL.

Associate Professor: Dr. J. J. O'DWYER.

Educational Officers: Dr. R. E. LISHMUND; for courses majoring in Physics, Associate Professor J. J. O'DWYER; for servicing courses, Associate Professor J. F. McCONNELL; for Optometry courses, Associate Professor J. LEDERER.

School of Applied Psychology:

(Located at Kensington)

Head of School: Professor J. F. CLARK.

Educational Officer: Mr. J. C. MURRAY.

CALENDAR OF DATES—1961

First Term March 6th to May 13th

Second Term May 29th to August 5th

Third Term August 28th to November 4th

February—

Monday 27 Enrolment Week commences.

March—

Monday 6 First Term Lectures commence.

Thursday 30 Last day for Acceptance of Enrolments.

Friday 31 to
Monday 3rd April Easter Holidays.

April—

Friday 14 Conferring of Degrees—Newcastle University College.

Wednesday 19 Conferring of Degrees—First Ceremony.

Tuesday 25 Anzac Day—Public Holiday.

May—

Wednesday 3 Conferring of Degrees—Second Ceremony.

Saturday 13 First Term ends.

Monday 15 to

Saturday 27 Vacation (2 weeks).

Monday 29 Second Term commences.

August—

Saturday 5 Second Term ends.

Last day for acceptance of applications for examinations—3-term courses.

Monday 7 to

Saturday 26 Vacation (3 weeks).

Monday 28 Third Term commences.

October—

Monday 2 Six-Hour Day—Public Holiday.

November—

Saturday 4 Lectures cease.

Saturday 11 Annual Examinations begin—3-term courses.

December—

Saturday 2 Annual Examinations end—3-term courses.

1962

January—

Tuesday 30 to

Saturday 19th February Deferred Examinations (all courses).

March—

Monday 5 Enrolment Week commences.

Monday 12 First Term begins.

Introduction

One of the minor difficulties of student life is to find information about the courses he is taking, the fees he is required to pay and the people to whom he can go for guidance.

Much of this information can be found in the University Calendar which should be consulted as the authority on many subjects. However, its pages contain much information which is not relevant to the more simple inquiries, and in some cases the By-Laws and Regulations require a certain amount of practical knowledge in interpretation.

This handbook is an attempt to bridge the gap between the Calendar and the student. In it are the courses offered by the Faculty of Science, and lists of the senior members of the academic staff of the various schools within the Faculty are given. The Guidance Office is in most cases the first point of contact between the student and the University. Its functions and the help it can give are outlined below.

The educational pre-requisites for entrance to the various courses, and the fees which are payable, are to be found in this handbook. Lists of text-books, scholarships and prizes are included under the headings of the schools.

Finally, the names of the people to consult on educational matters within the schools are given.

It should be noted that the University Calendar, published annually, has a full list of By-Laws and Regulations and the handbook is a general guide rather than a final authority.

W. J. DUNSTAN

E. C. MARTIN

For the Science Handbook Committee

Requirements for Admission

Candidates may qualify for entry to undergraduate courses by complying with the matriculation requirements set out hereunder at the New South Wales Leaving Certificate Examination, or the University of Sydney Matriculation Examination, or the Qualifying or Qualifying (Deferred) Examination of the Department of Technical Education.

The New South Wales Leaving Certificate Examination is usually held in November and entries must be lodged with the Department of Education during August.

The Matriculation Examination is held in February, and applications must be lodged at the University of Sydney during the first ten days of January except by candidates who have taken the Leaving Certificate Examination in the previous November. The closing date for such candidates will be announced when the Leaving Certificate results are published.

The Qualifying Examination is conducted by the Department of Technical Education in November-December for students attending Qualifying and Matriculation courses conducted by the Department of Technical Education. The Qualifying (Deferred), an open examination, is held in January; entries must be lodged at the Technical College, Broadway, or other participating Technical Colleges throughout the State before the middle of January.

The following matriculation requirements operate from 1st January 1961 but candidates will be permitted to qualify for entry under the requirements current in 1960 until March 1964; these requirements are set out below the new requirements.

MATRICULATION REQUIREMENTS

(To operate from 1st January 1961)

1. (i) A candidate for any first degree of the University must satisfy the conditions for admission set out hereunder before entering upon the prescribed course for a degree. Compliance with these conditions does not in itself entitle a student to enter upon a course.
- (ii) A candidate who has satisfactorily met the conditions for admission and has been accepted by the University shall be classed as a "matriculated student" of the University after enrolment.
- (iii) A person who has satisfactorily met the conditions for admission may on the payment of the prescribed matriculation fee be provided with a statement to that effect.

2. (i) For the purpose of matriculation approved subjects* are grouped as follows:—

- A. English,
- B. Latin, Greek, French, German, Italian, Hebrew, Chinese, Japanese, Dutch, Russian, Geography, Ancient History, Modern History, Economics,
- C. Mathematics I, Mathematics II, General Mathematics,†
- D. Agriculture, Applied Mathematics, Biology, Botany, Chemistry, Physics, Geology, Physics and Chemistry, Physiology, Zoology.
- E. Accountancy, Art, Descriptive Geometry and Drawing, Music, Theory and Practice of Music.

(ii) In order to satisfy the conditions for admission to undergraduate courses leading to a degree candidates must pass the New South Wales Leaving Certificate Examination conducted by the Department of Education, or the University of Sydney Matriculation Examination, or the Qualifying or Qualifying (Deferred) Examinations of the Department of Technical Education in at least five approved subjects at the one examination; provided that:—

- I. either (a) the five subjects include English and at least one subject from each of Groups B and C, but do not include more than one subject from Group E, except that candidates may qualify for admission to the Faculty of Arts only, by passing in one subject from Group D in lieu of the subject from Group C,
- or (b) the five subjects include English, and at least one subject from either Group B or Group C, but do not include more than one subject from Group E, and provided further that the five passes include either one first class Honours and two A's or two Honours of which one is first class,

* It should be noted that certain subjects taken for the Leaving Certificate are not approved subjects for admission to the University of New South Wales.

† As from 1st July 1962, consequent upon the introduction of Mathematics III and the adoption of the revised syllabus for General Mathematics, Mathematics III will be placed in Group C and General Mathematics in Group D.

and further provided that:—

- II. (a) neither Physics nor Chemistry is offered with the combined subject Physics and Chemistry;
- (b) neither Botany nor Zoology is offered with Biology;
- (c) neither Botany nor Zoology nor Biology is offered with Physiology;
- * (d) neither Mathematics I nor Mathematics II is offered with General Mathematics;
- (e) Mathematics I or Mathematics II may be counted as an approved subject only if the candidate presented himself for examination in both Mathematics I and Mathematics II;
- (f) Theory and Practice of Music is accepted only in cases where the pass was obtained at an examination in 1946 or subsequent years;
- (g) Ancient History is accepted only in cases where the pass was obtained at an examination held in 1945 or subsequent years; and further both Modern History and Ancient History may be offered as qualifying subjects at the examinations held at the end of 1951 and subsequent years;
- (h) Agriculture is accepted only in cases where the pass was obtained at an examination held in 1945 or subsequent years;
- (i) Economics is accepted only in cases where the pass was obtained at an examination held in 1947 or subsequent years;
- (j) Descriptive Geometry and Drawing is

* As from 1st July 1962 sub-paragraph (d) will read—

“neither Mathematics I nor Mathematics II nor Mathematics III is offered with General Mathematics,”

a new sub-paragraph will be inserted—

“(e) neither Mathematics I nor Mathematics II is offered with Mathematics III,”

and the remaining sub-paragraphs consecutively re-lettered.

accepted only in cases where the pass was obtained at an examination held in 1954 or subsequent years.

- (iii) Candidates who have satisfactorily met the matriculation requirements of the University of Sydney, but who have not obtained the requisite pass in Mathematics, where prescribed for entrance to the University of New South Wales, will be permitted to complete their qualifications to enter the University of New South Wales by passing only in a Mathematics subject from Group C at a subsequent Leaving Certificate, Matriculation, Qualifying or Qualifying (Deferred) Examination.

3. Notwithstanding the provisions of section (2) above, candidates may be accepted as "matriculated students" of the University under the following conditions subject to the approval of the Professorial Board:—

- (i) Any person who holds a diploma from the New South Wales Department of Technical Education, or any other Technical College which may from time to time be recognised by the University, may be admitted to the University as a "matriculated student" with such status as the Board may determine, provided that, in the opinion of the Board, the applicant's qualifications are sufficient for matriculation to the Faculty nominated.
- (ii) The Board may admit as a "matriculated student" in any Faculty with such status as the Board may determine in the circumstances—
 - (a) A graduate of any approved University.
 - (b) An applicant who presents a certificate from a University showing that he has a satisfactory record and is qualified for entrance to that University, provided that, in the opinion of the Board, there is an acceptable correspondence between the qualifying conditions relied upon by the applicant and conditions laid down for matriculation to the nominated Faculty of the University of New South Wales.
- (iii) (a) Any person who has completed the first year of the course at the Royal Military College of Australia and submits a certificate from the Commandant to that effect may be admitted as a "matriculated student" of the University.
- (b) Any person who has completed a full course of at least three years' prescribed study at the Royal

Military College of Australia and produces a certificate from the Commandant to that effect may be admitted as a "matriculated student" of the University with such status as the Board may determine.

- (iv) Any person who has completed satisfactorily the passing out examination of the Royal Australian Naval College and submits a certificate from the Commanding Officer may be admitted as a "matriculated student" of the University.
 - (v) (a) Any person who has completed the first year of the course at the Royal Australian Air Force College and submits a certificate from the Commandant to that effect may be admitted as a "matriculated student" of the University.
 - (b) Any person who has completed two years of the course at the Royal Australian Air Force College and submits a certificate from the Commandant to that effect may be admitted as a "matriculated student" of the University with such status as the Board may determine.
4. (i) The Professorial Board may in special cases including cases concerning persons of other than Australian education, declare any person qualified to enter a faculty as a "provisionally matriculated student", although he has not complied with the requirements set out above, and in so doing may prescribe the completion of certain requirements before confirming the person's standing as a "matriculated student". Students who satisfactorily complete these requirements will be permitted to count the courses so passed as qualifying for degree purposes.
- (ii) Persons over the age of twenty-five years may be admitted to provisional status provided that—
- (a) they have a meritorious pass at the Leaving Certificate Examination or an equivalent examination and have passed in at least five subjects at such examination, or
 - (b) they have satisfactorily completed an approved course of systematic study extending over at least three years after passing the Intermediate Certificate Examination, or
 - (c) they satisfy the Professorial Board that they have reached a standard of education sufficient to enable them profitably to pursue the first year of the proposed course.

- (iii) Any applicant for provisional status may be required to take such examination as the Professorial Board may prescribe before such status is granted.
5. The Professorial Board may at its discretion permit a person, who does not satisfy the requirements for admission, to attend lectures in a subject or subjects at the University, on payment of the prescribed fees provided that such person shall not necessarily have the privileges of "matriculated students" and shall not be eligible to proceed to a degree.

ADMISSION REQUIREMENTS CURRENT IN 1960

Compliance with these requirements will qualify for entry to the University until March 1964.

- I. Applicants for entry to undergraduate courses leading to a degree may satisfy entrance requirements by passing the New South Wales Leaving Certificate, or equivalent examination, in at least five subjects,* of which one must be English and one other must be Mathematics I, or Mathematics II, or General Mathematics,† three other subjects being chosen from the following groups, at least one of the three being from Group A:—
- Group A: Latin, French, Greek, German, Italian, Hebrew, Chinese, Japanese, Russian, Dutch, Geology, Geography, Agriculture, Economics, Modern History, Ancient History, Combined Physics and Chemistry, Physics, Chemistry, Physiology, Biology, Botany or Zoology.
- ‡ Group B: Applied Mathematics, Music, Theory and Practice of Music, General Mathematics, Mathematics I, Mathematics II, or Descriptive Geometry and Drawing.
- II. Candidates who have presented themselves for the Leaving Certificate or equivalent examination in five or six subjects selected in accordance with the requirements prescribed in I and who have passed in English and a Mathematics and two other of the subjects may be granted admission provided that they have been awarded A passes or passes with Honours in at least three of these four subjects.

The other provisions set out in the new requirements above also apply.

* It should be noted that certain subjects taken for the Leaving Certificate are not approved subjects for admission to the University of New South Wales.

† As from 1st July 1962, consequent upon the introduction of Mathematics III and the adoption of the revised syllabus for General Mathematics, Mathematics III will replace General Mathematics.

‡ As from 1st July 1962, Mathematics III will be included in Group B.

FEES FOR UNDERGRADUATE COURSES

Course Fees

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

- (i) Full-time Course Fee (more than 15 hours' attendance per week)—£40 per term.
- (ii) Part-time Course Fee—over 4 hours and up to 15 hours' attendance per week—£20 per term.
- (iii) Part-time Course Fee (4 hours or less per week attendance)—£10 per term.
- (iv) Thesis Fee—Students who have completed the final examinations but have a thesis still outstanding are required to pay £10 per annum (no term payment).

Late Fees

1st Term

A late fee of £1 is payable in respect of first term enrolment where a student (a) fails to visit the enrolment centre during Enrolment Week for authorisation of his 1961 programme or (b) fails to pay fees by the end of the first week of term. This latter fee is increased to £2 where fees are paid in the fourth week of term. The Cashier will not accept fees (i.e. enrolment cannot be completed) after 31st March without the approval of the Registrar.

These two late fees are not cumulative.

2nd and 3rd Terms

A late fee of £1 will be charged where fees are paid after the end of the 1st week of 2nd and 3rd terms. This fee is increased to £2 where fees are paid after the end of the third week of 2nd and 3rd terms.

Other Fees

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

Matriculation Fee—£3—payable at the beginning of first year.

Library Fee—Annual fee—£5.

Graduation Fee—£3—payable at the completion of the course.

University of New South Wales Students' Union—Annual subscription—£2.

University of New South Wales Sports Association—Annual subscription—£1.

University Union—£4 (1961). In subsequent years the subscription will be £6 per annum.

Deferred Examination—£2 for each subject.

ENROLMENT PROCEDURE FOR UNDERGRADUATE COURSES

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

First Enrolments—Students seeking to enrol in 1961 with the University for the first time should complete the following procedure:

1. Make preliminary application in January to the Guidance Office, 25 Broadway (not to the University at Kensington),* as soon as the results of the Leaving Certificate or Qualifying Examination of the Department of Technical Education are published.
2. Attend at the University during Enrolment Week (the week preceding the commencement of first term) to keep the appointment made by the Guidance Office with the appropriate course enrolling officer in order to complete course details and receive a timetable of classes.
3. Complete enrolment by paying fees to the Cashier, subsequent to the completion of enrolment details with the enrolling officer, but not later than the end of the 1st week of term.

Applicants for enrolment with advanced standing or applicants relying on overseas examinations for matriculation should lodge an application with the Guidance Office as soon as possible.

Later Year Enrolments—All students enrolling other than for the first time should enrol through the appropriate School. This enrolment must be effected during Enrolment Week at the commencement of the academic year in accordance with the special arrangements made by the individual Schools.

Conversion Course Enrolments—Enrolment in conversion courses must commence with an application to the Registrar for admission, and the applicant will be notified of the subsequent procedure.

Students who have completed the final examinations but have

* In 1962 applications for admission will be made direct to the University at Kensington.

a thesis still outstanding are required to enrol for the period necessary to complete the thesis and to pay the requisite fees.

While course details must be completed during Enrolment Week, fees may be paid without penalty by students in any of the above categories up to the end of the first week of term. For details of fee requirements, including late fee provisions, see under Fees.

No enrolments will be accepted after the 31st March without the express approval of the Registrar which will be given in exceptional circumstances only.

Student Registration Card

When enrolment forms have been submitted to the University Cashier he will return to the student a Registration Card. Students are required to carry this card with them as evidence that they are entitled to the rights and privileges afforded by the University.

RESTRICTION UPON STUDENTS RE-ENROLLING IN UNIVERSITY COURSES

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

- (i) As from 1st January 1962 a student shall show cause why he should be allowed to repeat a subject in which he has failed more than once. (Failure in a deferred examination as well as in the annual examination counts, for the purpose of this regulation, as one failure);
- (ii) Notwithstanding the provisions of Clause (i), a student shall be required to show cause why he should be allowed to continue a course which he will not be able to complete in the time set down in the following schedule:

<i>Number of years in course</i>	<i>Total time allowed from first enrolment to completion (years)</i>
3	5
4	6
5	8
6	9
7	11

- (iii) 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;

- (iv) A student who has a record of repeated failures in a course at another University shall be required to show cause why he should be admitted to this University.
- (v) Any student excluded under any of the Clauses (i)-(iii) may apply for re-admission after two academic years and such application shall be considered in the light of any evidence submitted by him;
- (vi) A student wishing "to show cause" under these provisions shall do so in writing to the Registrar. Any such application shall be considered by the Professorial Board, which shall determine whether the cause shown is adequate to justify his being permitted to continue his course or re-enrol as the case may be.

SCHOLARSHIPS AND CADETSHIPS

Students undertaking courses in the Faculty of Science are eligible to apply for the following scholarships or cadetships:

University Scholarships

The University offers the following Scholarships:—

- (1) For students who have completed Trade Courses (Department of Technical Education).

Ten scholarships tenable in Degree or Diploma Courses may be awarded annually to students who have completed a Trade Course and have qualified for admission to a Degree or Diploma Course within three years of the completion of the Trade Course. The scholarships shall be awarded on the results of the examination qualifying for entrance.

- (2) For candidates of the Qualifying Examination (Department of Technical Education).

Ten scholarships tenable in Degree or Diploma Courses may be awarded annually to students on the results of the Qualifying Examination (Department of Technical Education).

- (3) For candidates at the Leaving Certificate Examination.

Fifteen scholarships tenable in Degree or Diploma Courses may be awarded annually on the results of the Leaving Certificate Examination.

The scholarships shall be awarded under the following conditions:—

- (a) A scholarship holder shall be eligible for enrolment in the course selected and will be exempt from payment of University course fees during the currency of the scholarship.
- (b) A student may hold only one scholarship at a time.
- (c) The University shall have the power to withhold the award of any scholarship if the applicants are of insufficient merit.
- (d) Any scholarship may be withdrawn if the progress or conduct of the holder is unsatisfactory.
- (e) The holder of a scholarship in any course of part-time instruction must be actively engaged in the relevant trade or profession for which the course has been established.
- (f) A scholarship that has been forfeited or withdrawn may be offered to another candidate.
- (g) Only results obtained in the year in which the scholarship competitions are conducted may be considered.
- (h) Scholarships available on the Leaving Certificate examination will be awarded in order of merit as shown by the highest aggregate marks in six papers, including those specified for the particular scholarships.
- (i) Scholarships available on the Qualifying Examination (Department of Technical Education) will be open only to candidates at the examination who have been bona fide part-time students during the year in which they have taken the examination and shall be awarded in order of merit as shown by the highest aggregate marks in five papers, which shall include those prescribed for enrolment in the course in which the student proposes to enrol.

Applications 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.

Commonwealth Scholarships

Open Entrance Scholarships are awarded at matriculation to persons under 25 years of age on 1st January of the year in which

the course is to be commenced. In addition a limited number of scholarships are awarded to students proceeding to second or later years of their course, who have not failed in their first year or the year immediately preceding the award of the scholarship. Mature Age Scholarships are also awarded either in the first or later years of a course. Applicants must be over the age of 25 on the 1st January of the year in which a scholarship is awarded, and must be, or have been, under the age of 30 on the 1st January of the year in which the course is or was commenced.

The award of a Commonwealth Scholarship covers the payment of all compulsory fees, i.e., course fees, matriculation fees, Students' Union and Sports Association fees and graduation fee, library fee and University Union fee.

In addition holders of Commonwealth Scholarships who undertake their courses on a full-time basis may apply for a living allowance which is subject to a means test. The maximum living allowances are £221 p.a. for a student living with his parents and £338 p.a. for a student living away from his parents.

The closing date for applications for Commonwealth Scholarships is 30th November of the year immediately preceding the year for which the Scholarship is desired. Applications for the renewal of these scholarships must be lodged not later than 30th October. Full particulars and application forms may be obtained from the Officer-in-Charge, University Branch Office, Department of Education, University Grounds, University of Sydney (telephone MW 2911).

The John Heine Memorial Scholarship

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

The scholarship has a total value of £250 which is paid at the following rates:—

(i) Final two years of the Applied Chemistry Degree Course:

1st year	....	....	....	....	£100
2nd year	....	....	....	....	£150

(ii) Applied Chemistry Conversion Course:

1 full-time year	....	....	....	....	£250
2 part-time years	....	....	....	....
1st year	....	....	....	....	£100
2nd year	....	....	....	....	£150

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

State Bursaries and Exhibitions

A number of exhibitions and bursaries are awarded by the New South Wales Government on the results of the Leaving Certificate Examination and the Qualifying Examination of the Department of Technical Education.

The award of an exhibition exempts the student from payment of fees. Bursaries are awarded subject to the applicant holding an exhibition and satisfying a means test. They are tenable for the duration of one First Degree Course, and provide a living allowance of £65 per annum (£104 per annum if the student is living away from home), and a book allowance of up to £10 per annum. The permissible income of the applicant's family is £1260 if there are three or fewer dependants, with an increase in the permissible family income of £140 for each additional dependant. Bursary holders are allowed to engage in employment only when it is associated with the course, and the income from such employment must not exceed £300 per annum. Further information can be obtained from the Bursary Endowment Board, C/- Department of Education, Bridge Street, Sydney.

Traineeships and Cadetships

Traineeships and cadetships are offered by the N.S.W. Public Service Board and by the Commonwealth Public 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, 119 Phillip Street, Sydney (Telephone BW 5701).

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 Guidance Office, 25 Broadway, or the Student Counsellor at Kensington, for further details concerning scholarships and cadetships and for information concerning companies sponsoring students.

THE GUIDANCE OFFICE

All students enrolling at the University for the first time whether in first year or with advanced standing must make application for enrolment through the University's Guidance Office, situated at 25 Broadway. Students wishing to enrol in the first year of a course should make their application as soon as the results of their Qualifying Examination are known, in any case not later than 31st January.

Applicants for enrolment with advanced standing (i.e., credit for study at University level already completed) should lodge an application with the Guidance Office not later than 31st December.

Students who wish to transfer from a full-time to a part-time course or vice versa, or who wish to suspend their studies for a period, should also make their application to the Guidance Office.

In addition to its duties in connection with enrolments the Guidance Office also provides a counselling service for all students and prospective students at the University. Information is also provided relating to the vocational opportunities available to graduates in the different courses conducted at the University. All enquiries relating to scholarships should also be made at the Guidance Office.

A special pamphlet setting out the detailed arrangements for the enrolment of students is available without charge from the Guidance Office.

In more detail the activities of the Guidance Office include the following:—

1. Student Counselling

The aim of the counselling service, stated briefly, is to enable the individual to take the fullest advantage of the educational and vocational opportunities available to him.

A prospective student who has not made a definite choice of career may thus consult a Guidance Officer who will discuss with

him his previous educational attainments, assessed abilities and interests in relation to the demands of the many University courses offering, and introduce him to other sources of information and advice.

Each student entering the University is invited to interview a Guidance Officer to discuss his plans, to put any questions of a general kind about the University or his course, and to review his methods of study. Throughout this course, moreover, the service is freely available if he feels the need of help in adjusting himself to University life; if, for example, his study habits do not meet the demands of University work, if his reading skills are similarly inadequate or if he has a distracting personal problem. Such difficulties though not concerned directly with the subjects being studied can nevertheless have a profound effect upon the student's progress in his course. An appointment may be made personally or by telephone.

2. Educational and Occupational Information Service

Correct and complete information is essential for a proper choice of a vocation or course of training. Closely associated with its counselling activities therefore the Guidance Office provides information for public and students in the following and related matters:—

- (a) Courses of training offered, e.g., types, duration, entrance and occupational requirements, fees and special conditions applicable.
- (b) Information concerning financial assistance for students, e.g., scholarships, bursaries, exhibitions.
- (c) Occupations, e.g., methods of entry, methods of training, prospects, personal qualifications needed and descriptions of the work. Booklets are available covering many occupations and where necessary arrangements can be made for reference to experts in a particular field for detailed advice.

3. Applications for Variations in Courses

Applications for permission to vary, or to secure special admission to courses laid down in the University Calendar, or to defer or resume courses of study, should be made, in the first instance, at the Guidance Office. Where applicable, documentary evidence should be tendered on lodging the application for such a variation. Copies should accompany originals, as this will allow the immediate return of original documents.

4. Service to Students from Overseas

(a) Initial Application for Enrolment—

Students from overseas already resident in New South Wales should enquire initially and in person at the Guidance Office regarding enrolment procedure.

Intending students who have not yet arrived in New South Wales are advised to address their enquiries to the Guidance Officer, University of New South Wales, Broadway, Sydney, clearly stating details of their educational standing, and forwarding certified or photostatic copies of the examination certificates on which they are depending to qualify for matriculation.

(b) Documentary Evidence—

It is desirable that students from overseas seeking admission to, or advanced standing within, a course should bring with them to the Guidance Office documentary evidence of all relevant subjects studied in other countries. This evidence might include diplomas, statements of examinations passed, course syllabuses and samples of examination papers. Original certificates should be produced. If these are in a language other than English, it may be necessary subsequently to secure translations from accredited authorities such as the appropriate consular representative, or the New South Wales Government Interpreter and Translator, Central Court of Petty Sessions, Liverpool Street, Sydney.

(c) English Language Test—

A special examination in the English language is generally required of overseas applicants. In certain cases they may be required to undertake a special English Course before, or concurrently with, the main course. Each person will be advised by the Guidance Officer concerning the requirements in his own particular case, and the student should keep in close touch with the Guidance Office until the English language requirement has been satisfied.

(d) Landing Permits—

The Guidance Office (or the University) is unable to assist in the procurement of "landing permits" for overseas students, who are advised to contact the Australian Commonwealth Government representative in their own country for further advice in this matter.

Location and Hours of Guidance Office

At Sydney the Guidance Office is located at 25 Broadway

(ground floor), and is open from 9 a.m. to 9 p.m. daily. Telephone enquiries should be made to 2-0922. A student counselling service is also provided at Kensington—Telephone 33-0351, Extension 462.

THE UNIVERSITY UNION

Warden: A. T. Cuningham, B.Ec. (Syd.)

The University Union is located on the Kensington campus in the large circular building adjacent to Anzac Parade. Membership of the Union is compulsory for all registered students of the University.

The full range of facilities which will be available when the Union is completed include a cafeteria service and other dining facilities, a large shopping centre, cloak room, banking and hairdressing facilities, showers, common rooms, games rooms, reading rooms, etc.

The constitutional objects of the Union are "to create opportunities to encourage the development of social and intellectual intercourse between members of the Union; to provide premises and other amenities which shall be the common meeting ground and social centre for members of the Union; to secure the co-operation of members of the Union in furthering the interests of the University; to generally organise and direct such activities as may be deemed appropriate for giving expression to the interests of members of the Union or for carrying out any of the objects aforesaid".

Courses

The courses available within the Faculty of Science are of two types. The first is the Science course which allows a student to select sequences from a variety of the sciences. The regulations governing this course and the list of subjects available appear on page 29ff. The course is of three years' duration for a pass degree with an additional year for Honours. The course may also be taken on a part-time basis normally requiring a minimum of seven years' study.

The second type of course offered by the Faculty consists of the more specialised courses in Applied Chemistry, Optometry and Applied Psychology. The Applied Chemistry and Applied Psychology courses lead to the degree of Bachelor of Science and the Optometry course to the degree of Bachelor of Optometry. The Optometry course is a four-year full-time course and the Applied Psychology course is a five-year part-time course. The Applied Chemistry course may be completed in three years of full-time study or six years of part-time study; additional time is required for Honours.

In previous years the Faculty has offered courses in Applied Biology and Applied Physics. These courses have been withdrawn and in 1961 and thereafter students wishing to specialise in Physics or in the Biological Sciences may do so within the framework of the Science course.

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

COMMON FIRST YEAR

Commencing in 1961 all students entering the first year of courses in the Faculties of Applied Science, Engineering, Medicine and Science (except the Applied Psychology course) will take a programme of study extending over three terms containing a substantial common element, namely, 1.001 Physics I, 2.001 Chemistry I, and 10.001 Mathematics I plus a fourth subject appropriate to the course to be followed. The fourth subject may be chosen from: 5.001 Engineering I, 7.511 Geology I, 12.011 Psychology I, or 17.001 General Biology. Part-time students complete these four subjects over two years. The introduction of the common first year will enable students to transfer to different, though related, courses, both within the same faculty and between faculties, much more readily than has been the case in the past.

The fourth subject of the common first year should be selected

with due care. The selection of Engineering I will enable a student to proceed in the Applied Chemistry or the Science courses within the Faculty of Science, or to transfer to any of the courses in the Faculty of Engineering or most courses in the Faculty of Applied Science. He would not be eligible to proceed in the Optometry course or the Medical course without loss of time. The selection of General Biology will enable a student to proceed in the Applied Chemistry, the Optometry or the Science course within the Faculty of Science, and the Medical course and some courses in the Faculty of Applied Science. He would not be eligible to proceed in the Engineering courses or in some of the Applied Science courses without loss of time.

Rules Relating to Common First Year Subjects in the Faculties of Applied Science, Medicine, Science, and Engineering

1. Each student intending to follow any course leading to the degree of Bachelor in any of the Faculties of Science, Applied Science, Medicine or Engineering must have satisfied the examiners in the subjects of 1.001 Physics I, 2.001 Chemistry I, 10.001 Mathematics I, and in a fourth subject (elective) chosen from 5.001 Engineering I, 7.511 Geology I, 12.011 Psychology I or 17.001 General Biology, before progressing further in his course, except that progression may be permitted with outstanding subjects if Faculty regulations permit.
2. Notwithstanding Faculty regulations to the contrary, full-time students will be required to complete the four subjects of Rule 1 in not more than two years' study and part-time students in not more than four years' study. The re-enrolment of students who have not complied with this rule shall be subject to the General Regulations governing re-enrolment.
3. At enrolment, each student to whom Rule 1 applies will be required to nominate and apply for admission to the course which he desires to follow. Although application for transfer from one course to another within these Faculties may be made at any time, students are advised that such transfers are most readily effected prior to re-enrolment in the second year of full-time courses and the third stage of part-time courses. All such transfers will be subject to the regulations of relevant Faculties and the concurrence of the Professorial Board.

**TRANSFERS AND CLAIMS FOR ADVANCED
STANDING**

Students wishing to transfer from one course to another must apply to the Registrar in writing for permission to do so. It may

expedite matters if they first consult the Education Officer in the School within which they are mainly studying or Mr. C. M. Groden, School of Mathematics, if they are enrolled in the Science course.

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 Vocational Guidance Office.

HONOURS COURSES

In general, Honours degrees are awarded after one year of extra study for full-time students. The requirements of the School in which the student is to take Honours are broadly that (i) he apply in writing to the Head of the School in which he anticipates working, during the final year of his pass courses; and (ii) that he have a better than average record in his studies.

He will be required to complete in a satisfactory manner such courses as the Head of the School prescribes and engage in a programme of original research under the supervision of a staff member.

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

CONVERSION COURSES

A student who holds the Associateship of the Sydney Technical College may obtain a Bachelor's Degree by undertaking a course of study (conversion course) designed to bring him up to date in his subject. It will include generally Humanities and Mathematics as well as other related subjects.

Intending students for Conversion Courses should apply during the year prior to that in which they wish to take up their studies. Application should be made in writing to the Registrar accompanied by details of his previous courses and documentary evidence of any relevant studies taken at other institutions.

POST-GRADUATE COURSES

On completion of a first degree course (B.Sc.) the student may wish to proceed to a higher degree, usually a Master of Science degree. This usually entails two to 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.

Humanities and Social Science Courses

All undergraduates in faculties other than Arts are required to complete a number of courses in the Humanities and Social Sciences. The Faculty of Arts is responsible for providing the courses and supervising the teaching.

As a new pattern for Science students is being introduced in 1961, all students enrolled prior to 1961 will complete a special programme already approved by the Faculties of Arts and Science. (Details on request.)

Students who begin their Science course in 1961 will follow the following programme:—

First Year: No Humanities or Social Sciences.

Second Year: English Language & Literature (60 hours).

Third Year: History or Philosophy (30 hours) and a Social Science Elective (30 hours).

Part-time students will take the same programme in smaller units:—

Third Year: English Language (30 hours).

Fourth Year: English Literature (30 hours).

Fifth Year: History or Philosophy (30 hours).

Sixth Year: Social Science Elective (30 hours).

The English Course

The English Language component will cover such subjects as the History of the English Language, Contemporary Problems of Usage, and The Principles of Literary Criticism. The Literature component will involve the critical reading of selected texts.

The History Course

This is a general survey of the development of human society from the time of the Renaissance to the present day. The lectures will describe those developments and personalities which have given to western civilisation its specific character and whose influence upon the outlook and conditions of western society remains significant at the present time.

The Philosophy Course

A fairly detailed study of Hoppers; *An Introduction to Philosophical Analysis*. The topics taken up will include such matters as the distinctions between empirical and rational knowledge, and

the logical status of some important concepts such as those of causation and free will.

The Social Science Elective

One course may be chosen from the following group:—

- Psychology
- Sociology
- Political Science
- Economics.

The Psychology Course

The aim of this course is to present a general introduction to the study of psychology as a science and to provide some understanding of human behaviour. The emphasis will be on the social and clinical aspects of the subject. Some of the more important issues revolving about the problem of personality will be selected for discussion.

The Sociology Course

The course in Sociology consists of a study of the nature of human society. The sociologist is directly concerned with the elements involved in the structure of society and its dynamic nature, and the underlying social interaction between people. During the course it will be shown that objective and scientific methods can be applied to the problems of human behaviour and human relations.

The Political Science Course

This course will introduce students to the study of political institutions. (The examples of political institutions will be drawn chiefly from Australian experience.)

The Economics Course

This course is an introductory examination of the working of a modern economic system, with particular reference to "Current Economic Problems".

The Science Course

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

Subjects are available for study during day or evening attendance. For the convenience of students who attend principally during the evening and for fifteen hours or less per week (part-time students) some subjects are made available in smaller units or "part subjects".

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

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

Any arrangement of subjects to be studied under these regulations must be approved by the Dean of the Faculty and the advice of his representative must be sought. A student who intends to seek admission to an Honours Course should consult the Head of the appropriate School on completion of the first year subjects. This is particularly important for those seeking Honours in Mathematics or Theory of Statistics since special studies will normally be prescribed to accompany their second year programmes. The normal requirements for admission to Honours studies in Schools of the Faculty may be found under the description of the courses offered by these Schools as set out below.

REGULATIONS GOVERNING THE SCIENCE COURSE

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

	<i>Term 1</i>	<i>Term 2</i>	<i>Term 3</i>
	lec. lab./tut.	lec. lab./tut.	lec. lab./tut.
(A) HUMANITIES—			
English	2 — 0	2 — 0	2 — 0
History or Philosophy	1 — 0	1 — 0	1 — 0
Psychology or Economics or			
Government or Sociology	1 — 0	1 — 0	1 — 0

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

	<i>Term 1</i> lec. lab./tut.	<i>Term 2</i> lec. lab./tut.	<i>Term 3</i> lec. lab./tut.
<i>Additional for an Honours Degree</i>			
Advanced Elective (Humanities or Social Science)	2 — 0	2 — 0	2 — 0

(B) SCIENCE SUBJECTS

Group I

2.001	Chemistry I	3 — 3	3 — 3	3 — 3
10.001	Mathematics I	4 — 2	4 — 2	4 — 2
1.001	Physics I	3 — 3	3 — 3	3 — 3
7.511	Geology I	2 — 4	2 — 4	2 — 4
12.011	Psychology I	3 — 2	3 — 2	3 — 2
17.001	General Biology	2 — 4	2 — 4	2 — 4
5.001	Engineering I	3 — 3	3 — 3	2 — 4

Group II

2.002	Chemistry II	4 — 5	4 — 5	4 — 5
10.111	Pure Mathematics II	3 — 2	3 — 2	3 — 2
10.211	Applied Mathematics II	3 — 4	3 — 4	3 — 4
10.121	Pure Mathematics II (Higher)	6 — 0	6 — 0	6 — 0
10.221	Applied Mathematics II (Higher)	4 — 3	4 — 3	4 — 3
1.112	Physics II	4 — 4	4 — 4	4 — 4
7.512	Geology II	4 — 5	4 — 5	4 — 5
12.012	Psychology II	5 — 3	5 — 3	5 — 3
10.311	Theory of Statistics I	4 — 3	4 — 3	4 — 3
10.321	Theory of Statistics I (Higher)	5 — 3	5 — 3	5 — 3
2.042	Chemistry IIA	3 — 6	3 — 6	3 — 6
17.101	Biochemistry I	3 — 6	3 — 6	3 — 6
17.301	Botany I	3 — 6	3 — 6	3 — 6
17.401	Zoology I	3 — 6	3 — 6	3 — 6

Group III

Part (a)

2.003	Chemistry III	4 — 10	4 — 10	4 — 10
10.112	Pure Mathematics III	4 — 1	4 — 1	4 — 1
10.122	Pure Mathematics III (Higher)	6 — 1	6 — 1	6 — 1
10.212	Applied Mathematics III	3 — 4	3 — 4	3 — 4
10.222	Applied Mathematics III (Higher)	5 — 3	5 — 3	5 — 3
1.113	Physics III	4 — 8	4 — 8	4 — 8
1.133	Mathematical Physics	5 — 1	5 — 1	5 — 1
7.513	Geology III	7 — 6	7 — 7	6 — 6
12.013	Psychology III	5 — 6	5 — 6	5 — 6
17.102	Biochemistry II	3 — 10	3 — 10	3 — 10
17.302	Botany II	3 — 10	3 — 10	3 — 10
17.402	Zoology II	4 — 9	4 — 9	4 — 9
17.201	Microbiology I	4 — 8	4 — 8	4 — 8
17.501	Entomology I†	4 — 9	4 — 9	4 — 9

Part (b)

10.312	Theory of Statistics II	4 — 4	4 — 4	4 — 4
10.322	Theory of Statistics II (Higher)	5 — 4	5 — 4	5 — 4
2.053	Chemistry III (Supplementary)	3 — 7	2 — 8	2 — 8
1.120	Physics III (Applied)	4 — 4	4 — 4	4 — 4
7.521	Geology III (Supplementary)	4 — 8	4 — 8	4 — 8

† Not available in 1961.

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

- (i) the Humanities subjects listed under section 1(a),
- (ii) nine Science subjects selected from the list in section 1(B).

(b) The proposed course must be approved by the Dean of the Faculty of Science or his representative during enrolment, and for full-time students must include the study of Physics I, Mathematics I, Chemistry I and one other subject from Group I in the first year. In special circumstances, the Dean may grant the student permission to defer enrolment in Chemistry I or Mathematics I or Physics I until the second year of the course. Where any alteration in the course approved at enrolment is desired, the student must obtain the approval of the Dean or his representative for the new course.

(c) The nine Science subjects must include:

- (i) Mathematics I, Physics I, and Chemistry I.
- (ii) Either one or two other subjects from Group I.
- (iii) At least one subject from Group III Part (a).

(d) The following combinations of subjects may *not* be included in the course selected:

- (i) both Chemistry II and Chemistry IIA;
- (ii) both Pure Mathematics II and Pure Mathematics II (Higher);
- (iii) both Applied Mathematics II and Applied Mathematics II (Higher);
- (iv) both Pure Mathematics III and Pure Mathematics III (Higher);
- (v) both Applied Mathematics III and Applied Mathematics III (Higher);
- (vi) both Theory of Statistics I and Theory of Statistics I (Higher);
- (vii) both Theory of Statistics II and Theory of Statistics II (Higher);
- (viii) both Chemistry IIA and Biochemistry I.

(e) Full-time students are required to complete Mathematics I, Chemistry I, Physics I and one other Group I subject in the first two years of attendance or else show cause to the satisfaction of the Professorial Board why they should be allowed to re-enrol. The remaining subjects of the course may be completed in any

order consistent with the requirements concerning pre-requisite and co-requisite subjects as set out in Section 4.

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

First Year

Chemistry I, Mathematics I, Physics I, and one other subject from Group I.

Second Year

(a) English

(b) Three subjects from Group II,

OR two subjects from Group II and one from Group I.

Third Year

(a) Philosophy or History; Social Science Elective

(b) Two subjects from Group III Part (a)

OR one subject from Group III Part (a) and one from Group III Part (b)

OR one subject from Group III Part (a) and one from Group II.

4. *Pre-requisites and Co-requisites*

(a) Before enrolling for any subject listed in Group II, the student shall have attended the classes and satisfied the examiners in the corresponding subject in Group I, and before enrolling for any subject listed in Group III, the student shall have attended classes and satisfied the examiners in the corresponding subject listed in Group II.

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

Group II—	<i>Subject</i>	<i>Pre-requisite</i>
	Chemistry IIA	Chemistry I and General Biology.
	Physics II	Mathematics I.
	Botany I	General Biology.
	Zoology I	General Biology.
	Biochemistry I	General Biology and Chemistry I.
	Pure Mathematics II	} Mathematics I.
	—Either level	
	Applied Mathematics II	
	—Either level	
	Theory of Statistics I	}
	—Either level	
<i>Group III—</i>		
	Physics III	Either Pure Mathematics II or Applied Mathematics II.

<i>Subject</i>	<i>Pre-requisite</i>
Botany II	Chemistry IIA or Biochemistry I or Chemistry II.
Zoology II	Chemistry IIA or Biochemistry I or Chemistry II.
Microbiology I	Either Chemistry IIA; or Biochemistry I; or Chemistry II and General Biology.
Biochemistry II	Chemistry II.
Theory of Statistics II—Either level	Pure Mathematics II—Either level.
Pure Mathematics III (Higher)	Pure Mathematics II (Higher) and one other Group II subject of the School of Mathematics.
Physics III (Applied)	Physics II.
Mathematical Physics	Pure Mathematics II and Physics II.
Entomology I	Zoology I and one of Chemistry IIA, Chemistry II, or Biochemistry I.

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

<i>Subject</i>	<i>Co-requisites</i>
<i>Group III—</i>	
Chemistry III (Supplementary)	Chemistry III.
Theory of Statistics II	Pure Mathematics III or Pure Mathematics III (Higher).
Geology III (Supplementary)	Geology III.

Part-time Study

5. For the benefit of part-time students some subjects from Group II and Group III are provided in sections so that the requirements for the Pass Degree may be satisfied by part-time study of normally 12 hours per week with a maximum of 15 hours per week.

The following table shows the time allocation (hours per week) for the various subjects:—

(A) HUMANITIES—as listed in Section 1(A).

(B) SCIENCE SUBJECTS

Group I as listed in Section I(B).

Group II—

	<i>Hours per week for 30 weeks</i>	
	<i>lec. lab./tut.</i>	<i>lec. lab./tut.</i>
Chemistry II	Part I* 2 — 2½	Part II 2 — 2½
Pure Mathematics II	Part I 1½ — 1	Part II 1½ — 1
Applied Mathematics II	Part I 2½ — 1	Part II 2½ — 1
Physics II	Part I 2 — 2	Part II 2 — 2
Geology II	Part I 2 — 3	Part II 2 — 2
Psychology II	Part I 2 — 2	Part II 3 — 1
Theory of Statistics I	Part I 2 — 1	Part II 2 — 2
Chemistry IIA	Part I 2 — 4	Part II 1 — 2
Biochemistry I	3 — 6	
Botany I	Part I 1 — 2	Part II 2 — 4
Zoology I	Part I 1 — 2	Part II 2 — 4

* Not available in 1961; students entering Chemistry II will study the full subject with the time allocation shown in Section 1(B).

Group III—

Part (a)

Hours per week for 30 weeks

lec. lab./tut.

lec. lab./tut.

Chemistry III	.....
Pure Mathematics III	.....
Applied Mathematics III	.....
Physics III	.....
Geology III	.....
Psychology III	.....
Biochemistry II	.....
Botany II	.....
Zoology II	.....
Microbiology I	.....

Part I	2 — 5	Part II	2 — 5
Part I	2 — 1/2	Part II	2 — 1/2
Part I	2½ — 1	Part II	2½ — 1
Part I	2 — 4	Part II	2 — 4
Part I & Part II	4 — 4	Part III	3 — 3
Part I	2 — 3	Part II	3 — 3
Part I	1 — 5	Part II	2 — 5
Part I	1 — 5	Part II	2 — 5
Part I	2 — 4	Part II	2 — 5
Part I	2 — 4	Part II	2 — 4

Part (b)

Theory of Statistics II	.....
Chemistry III (Supplementary)	.....
Physics III (Applied)	.....
Mathematical Physics	.....
Geology III (Supplementary)	.....

Part I	2 — 2	Part II	1½ — 1
Part I	2 — 3	Part II	2 — 3
Part I	2 — 3	Part II	2 — 3
Part I	2½ — 1/2	Part II	2½ — 1/2
Part I	2 — 4	Part II	2 — 4

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

Honours Course

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

- (i) Biochemistry
- (ii) Botany
- (iii) Chemistry
- (iv) Geology
- (v) Mathematics
- (vi) Microbiology
- (vii) Entomology
- (viii) Physics
- (ix) Psychology
- (x) Theory of Statistics
- (xi) Zoology.

(b) A student desiring admission to the Honours course must apply to the Head of the appropriate School on completion of the pass degree requirements.

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

STUDENTS ENROLLED IN 1960

A student enrolled in 1960 who completed a subject or part subject in 1960 is to note that the above Regulations apply to his course of studies leading to the B.Sc. with the following modifications:

1. The Humanities requirements to be fulfilled will be notified by the Dean's representative.
2. Eight science subjects shall be required which must include two of Chemistry I, Mathematics I and Physics I.
3. The normal pattern of study is:
Three subjects chosen from Group I
Three subjects chosen from Group II
Two subjects chosen from Group III
provided that: a Group I subject may be substituted for a Group II subject; or a Group II subject may be substituted for a Group III subject, providing that the remaining Group III subject is from Part A.
4. Engineering I is not to be counted as a subject from Group I.

GENERAL REQUIREMENTS FOR ENTRY TO HONOURS COURSES FOR SCIENCE DEGREE STUDENTS

School of Applied Psychology

A student wishing to proceed to Honours in Psychology must have completed three full-time or five part-time years of psychology in his pass degree course, and have obtained at least Credit standard in Psychology 2 and Psychology 3, in order to be admitted to Honours study.

School of Biological Sciences

Students may read for Honours in the School of Biological Sciences in the subjects of Botany, Zoology, Entomology, Biochemistry and Microbiology. Students wishing to do so must apply to the Head of the School not later than 31st December of the year in which the third year of the full-time course is completed. A student who is admitted to Honours study should have achieved a generally high standard throughout the course and must have majored in the particular discipline in which the study is to be carried out.

It is desirable, but not imperative, for a student to decide as early as possible that he wants to do Honours and should consult appropriate members of staff for advice on the best course structure for his particular interests.

Honours courses will include research work, lectures and seminars, advanced reading and such additional work as may be prescribed by the Head of the School.

School of Chemistry

Students desiring to take Honours must apply to the Head of the School not later than 31st December of the year in which the third year of the full-time (sixth 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. It is not essential for admission to the Chemistry Honours course that a student should have taken both Chemistry III and Chemistry III Supplementary in the final year.

The major part of the work for Honours will consist of a research project which may be undertaken in any one of the six departments by arrangement with the Head of the School. Honours will, however, not be awarded in any particular branch of the subject but in the subject as a whole. Attendance will be required at such lectures and seminars as the Head of the School directs.

School of Mathematics

There are three different fourth year Honours courses in the School of Mathematics, namely, Pure Mathematics, Applied Mathematics and the Theory of Statistics.

1. Permission to enter the fourth year course in Pure Mathematics is granted by the Head of the School. Such permission will not usually be granted unless the applicant has passed in Pure Mathematics III (Higher). This work should be supplemented by some extra work in Applied Mathematics or in the Theory of Statistics.
2. Permission to enter the fourth year course in Applied Mathematics is granted by the Head of the School after consultation with the Professor of Applied Mathematics. Such permission will not usually be granted unless the applicant has passed in Applied Mathematics III (Higher) and in Pure Mathematics III or Pure Mathematics III (Higher).

3. Permission to enter the fourth year course in the Theory of Statistics is granted by the Head of the School after consultation with the Associate Professor of Mathematical Statistics. Such permission will not usually be granted unless the applicant has passed in Theory of Statistics II (Higher) and Pure Mathematics III (Higher).

School of Physics

Students wishing to read for Honours in Physics must complete the major sequence, Physics I, Physics II and Physics III, and for acceptance into the Honours course will be expected to have attained a majority of graded passes ("Credit" or "Distinction") in these subjects. Adequate supporting performance in mathematical subjects will also be expected. In preparation for the Honours year, students would be expected to take the subjects Physics III and Mathematical Physics in their third year.

Intending candidates for Honours should apply to the Head of the School not later than 31st December in the year in which the third year is completed.

Department of Geology

Students in the Faculty of Science who have completed the two third year Geology subjects, in the case of full-time students; or the course requirements up to the end of the sixth year and whose programme includes the two third year geology subjects, in the case of part-time students, may apply to the Head of the School of Mining Engineering and Applied Geology to read for an Honours Degree in Geology. Students who have taken only one third year geology subject may also be admitted but will be required to take the equivalent of Geology III Supplementary as part of their Honours work, i.e. in lieu of (1) and (3) below. This should be regarded as a special provision for students whose two third year subjects are either Geology III and Physics III or Geology III and Chemistry III and who wish to specialise in either geophysics or geochemistry. Thesis work for such students would be restricted to a laboratory project.

The Honours course will consist of:—

- (1) An advanced laboratory assignment on one of the subjects taken in the third year of the course and a dissertation thereon.
- (2) A field assignment together with a graduation thesis on the results of the field work.
- (3) Such other work, including advanced lectures and seminars, as may be from time to time required.

Full-time students will cover the 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 the advanced laboratory assignment will be done in the eighth year along with the further work necessary to complete their graduation (field) thesis work.

It may be stated in addition, that 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 as to indicate their ability to undertake geological studies at a more advanced level.

School of Applied Psychology

It has become a platitude that modern civilisation can command the technical power to produce all that is needed to destroy hunger, want, and fear, but it has failed to develop the social organisation and skills needed to use this power satisfyingly and effectively. There is a lag in knowledge of how to create and control a social structure which can maintain stability and its highest values whilst adapting its form to the ceaseless advance of material invention. To make an industrial society work, we must understand its human as well as technical aspects. Applied Psychology is one of the technologies concerned with such a study of human behaviour. It seeks principles to explain, understand and predict human action. It deals with practical situations but it is based on, and makes its own contributions to, a solid theoretical framework which it shares with academic psychology. It is thus both a technology and a social science.

There are increasing demands for professional psychologists in the fields of industrial psychology, personnel management, "human" engineering (the design of machines and processes allowing for the qualities of the human operator), educational and vocational guidance, clinical psychology, child development, selection and placement in the Armed Services, and teaching and research.

The School provides a five year course in Applied Psychology leading to the degree of Bachelor of Science with electives in counselling and industrial psychology.

In addition, Psychology may be taken as a major sequence in the Science Course.

APPLIED PSYCHOLOGY COURSE

The first two years of the course leading to the Degree of Bachelor of Science are aimed at giving the student a firm background of psychological theory, such other sciences as he will need in further studies (i.e. Mathematics, Biology and Physics) and a leavening of arts subjects such as English, History and Philosophy. In the third and fourth years, the subjects are basic to the courses included in the fifth year in which the student specialises in either Industrial Psychology or counselling.

The elective in Industrial psychology is intended to meet the demand for students who will engage in personnel work in industry. It involves a study of the individual worker and

the organisations in which he works. It is concerned with the study of job success and failure, job satisfaction and dissatisfaction, industrial motivation, employer-employee relations, acquisition of job skill, conditions affecting job efficiency and the like. These will be the subject of both theory and practical work.

The elective in counselling provides training for people engaged in counselling activities, employed in business and industry, guidance bureaux, colleges and universities. The main emphasis is on counselling principles and techniques. Lectures are also given in individual assessment, occupational information, professional relations, and the counsellor and society. Again, practical work requirements must be fulfilled.

Lectures will be held in the evenings for 9-12 hours per week.

FIRST YEAR

(30 weeks part-time course)

		<i>Hours per week for 3 terms</i>	
		Lec.	Lab./Tut.
12.011	Psychology I	3	— 2
12.301	Mathematics for Psychology*	3	— 0
	English	2	— 0
		8	— 2

SECOND YEAR

(30 weeks part-time course)

		<i>Hours per week for 3 terms</i>	
		Lec.	Lab./Tut.
12.012/1	Psychology:		
	Part A—Psychological Testing	0	— 2
	Part B—Developmental Psychology	2	— 0
17.001	General Biology (by special arrangement Physics I or additional Mathematics* may be substituted)	2	— 4
	History	2	— 0
		6	— 6

THIRD YEAR

(30 weeks part-time course)

		<i>Hours per week for 3 terms</i>	
		Lec.	Lab./Tut.
12.043	Psychology:		
	Part A—General Psychological Theory	2	— 1
	Part B—Psychological Assessment	0	— 2
	Part C—Personality	2	— 0
15.11	Descriptive Economics	2	— 0
G33	Philosophy	2	— 0
		8	— 3

* These two requirements (12.301 Mathematics for Psychology and Additional Mathematics) may be satisfied by the completion of Mathematics I or Mathematics I, Parts I and II.

FOURTH YEAR
(30 weeks part-time course)

		<i>Hours per week for 3 terms</i>	
		Lec.	Lab./Tut.
12.322	Psychological Assessment	1	— 2
12.511	Social Psychology	2	— 1
12.721	Principles of Counselling	1	— 2
		<hr/>	<hr/>
		4	— 5

FIFTH YEAR
(30 weeks part-time course)

For Industrial Course Elective

		<i>Hours per week for 3 terms</i>	
		Lec.	Lab./Tut.
12.401	Research Seminar	1	— 0
12.512	Social Psychology	2	— 2
12.621	Industrial Psychology and Personnel Techniques	1	— 3
		<hr/>	<hr/>
		4	— 5

For Counselling Course Elective

		<i>Hours per week for 3 terms</i>	
		Lec.	Lab./Tut.
12.331	Psychometrics	1	— 1
12.401	Research Seminar	1	— 0
12.611	Counselling Procedures	0	— 4
12.731	Abnormal and Clinical Psychology	2	— 0
		<hr/>	<hr/>
		4	— 5

SIXTH YEAR (HONOURS)
(30 weeks part-time course)

Industrial or Counselling

		<i>Hours per week for 3 terms</i>	
		Lec.	Lab./Tut.
12.046	Psychology:		
	Part A—Current Issues in Applied Psychology	3	— 0
	Part B—History of Psychology	1	— 0
	Part C—Research Seminar	1	— 0
		<hr/>	<hr/>
		5	— 0

Prizes in Psychology

The *British Psychological Society Australian Branch Prize* in Psychology is awarded annually to a third or later year student. Prize value is £5.

PSYCHOLOGY TEXT-BOOKS

1ST YEAR

12.011 Psychology I

- Munn, N. L.: *Psychology* (Houghton Mifflin), 1956.
Drever, J.: *A Dictionary of Psychology* (Penguin), 1952.

2ND YEAR

12.012/1 Psychology

- Part A—Psychological Testing*
Anastasi, A.: *Psychological Testing* (Macmillan), 1954.
Part B—Developmental Psychology
Pressey, L. L., and Kuklen, R. G.: *Psychological Development Through the Life Span* (Harper), 1957. New York.

3RD YEAR

12.043 Psychology

- Part A—General Psychological Theory*
Osgood, C. E.: *Method and Theory in Experimental Psychology* (Oxford Uni. Press), 1953. New York.
Part B—Psychological Assessment
Thorndike, R. L.: *Personnel Selection* (Wiley), 1949.
Part C—Personality
Hall and Lindzey: *Theories of Personality* (Wiley), 1957.

4TH YEAR

12.511 Social Psychology

- Asch, S. E.: *Social Psychology* (Prentice-Hall), 1952.

12.721 Principles of Counselling

- Rogers, C.: *Client Centred Therapy* (Houghton Mifflin), 1951.
Standal, S. W., and Corsini, R. J.: *Critical Incidents in Psych-Therapy* (Prentice-Hall), 1959.

5TH YEAR

12.512 Social Psychology

- Gardner and Lindzey: *Handbook of Social Psychology*, Vols. I and II.

12.731 Abnormal and Clinical Psychology

- Hutt, M. L., and Gibby, R. G.: *Patterns of Abnormal Behaviour* (Boston Allyn & Bacon), 1958.

NOTE: Text-books for courses not listed above, and reference books for all courses will be listed during the lecture course.

Psychology as a Social Science Elective

12.191 Psychology—1st Elective

- Knight, R., and Knight, M.: *An Introduction to Modern Psychology*.
or
Munn, N. L.: *Psychology*.
or
Lindgren, H. C., and Byrne, D.: *Psychology*.

12.591 Psychology—Advanced Elective

- Brown, J. A. C.: *The Social Psychology of Industry*.
Hartley, E. L., and Hartley, R. E.: *Fundamentals of Social Psychology*.

12.111 Psychology—Conversion

- Morgan, C. T.: *Introductory Psychology*.
or
Munn, N. L.: *Psychology*.
or
Krech, D., and Crutchfield, R. S.: *Elements of Psychology*.

School of Biological Sciences

The impact of the biological sciences on the community is extremely widespread, ranging from agriculture and public health to food processing and the preservation of structural materials. Wherever the care and culture of living organisms or the manipulation and processing of material of biological origin is involved, there is likely to be a need for graduates trained in one or more of the biological sciences. The teaching and research activities of the school include the primary biological sciences, botany, zoology and microbiology, which respectively embrace the study of plants, animals and micro-organisms, and certain of the important sub-divisions of these sciences, such as bacteriology and entomology. The two related sciences, physiology and biochemistry, interpenetrate the primary biological sciences and the latter in particular provides the principal link between these fields of study and the physical sciences. Physiology is concerned with the study of function while biochemistry has as its primary objectives the chemical aspects of structure and the explanation of biological events in physico-chemical terms. Biochemistry is intimately concerned with all the biological sciences and thus forms an essential element in any course where a biological subject is taken as a major.

There are a number of fields in which graduates who have majored in one or more of the biological sciences may make a career. These fields include education, public health, fermentation and food industries and agriculture, as well as a wide range of research activities.

The subjects, Botany, Zoology, Entomology, Biochemistry and Microbiology can be taken to Honours level in the Science Degree Course. The choice of subjects will be governed to a large extent by the field which the graduate wishes to enter. For example a student who wants to become a teacher of Biology would be advised to major in both Botany and Zoology. Such a student would take General Biology as the optional subject in Group 1, Botany I and Zoology I and one of Chemistry IIA, Biochemistry I, or Chemistry II from Group II and Botany II and Zoology II as the Group III subjects. Students should consult members of the staff for advice concerning the best choice of subjects for their particular interests.

BIOLOGICAL SCIENCES TEXT-BOOKS

Biochemistry I

White, Handler, Smith and Stetten: *Principles of Biochemistry* (2nd Ed.).
or
West and Todd: *Text Book of Biochemistry* (2nd. Ed.).
Reference—Fruton and Simmonds: *General Biochemistry* (2nd Ed.).

Biochemistry II

Fruton and Simmonds: *General Biochemistry* (2nd Ed.).

General Biology

Murray: *Biology* (2nd Ed.).

Robbins, Weier and Stocking: *Botany. An Introduction to Plant Science.*

Buchsbaum: *Animals without Backbones.*

Besly and Meyer: *Field Work in Animal Biology.*

Botany I Part I

Eames and McDaniels: *An Introduction to Plant Anatomy.*

or

Esau: *The Anatomy of Seed Plants.*

Reference—McLuckie and McKee: *Australian and New Zealand Botany.*

Botany I Part II

Daubenmire: *Plants and Environment.*

Lyon, Buckman and Brady: *The Nature and Properties of Soils.*

Thomas, Ransom and Richardson: *Plant Physiology.*

Botany II

Thomas, Ransom and Richardson: *Plant Physiology.*

Sinnott, Dunn and Dobzhansky: *Principles of Genetics* (5th Ed.).

Walker: *Plant Pathology.*

Microbiology I

Stanier, Doudoroff and Adelberg: *General Microbiology.*

and one of

{ Gardner: *Bacteriology for Medical Students and Practitioners.*

or

{ Bigger: *Handbook of Bacteriology.*

or

{ Fairbrother: *A Textbook of Medical Bacteriology.*

and one of

{ Alexopoulos: *Introductory Mycology.*

or

{ Bessey: *Morphology and Taxonomy of Fungi.*

Reference—Oginsky and Umbreit: *An Introduction to Bacterial Physiology.*

Zoology I Part I

Borradaile, Eastham, Potts and Saunders: *The Invertebrata.*

Zoology I Part II

Yapp: *Introduction to Animal Physiology.*

Odum: *Fundamentals of Ecology.*

Ross: *A Textbook of Entomology.*

Zoology II

Young: *The Life of Vertebrates.*

Romer: *The Vertebrate Body.*

Huettner: *Fundamentals of Comparative Embryology of the Vertebrates.*

Sinnott, Dunn and Dobzhansky: *Principles of Genetics* (5th Ed.).

School of Chemistry

Chemistry enters into a great many phases of human activity. In primary industry it plays an essential role in the understanding of the chemistry of plants and animals and in the discovery and manufacture of fertilisers, weedicides and insecticides. Its applications in secondary industry are too numerous to classify with any degree of simplicity ranging as they do from the extraction of metals to the manufacture of drugs, dyes, plastics, glass, paints and synthetic fibres. The chemist may be concerned with matters of public health by way of the analysis of foods and drugs, with defence through a study of rocket fuels, explosives and in many other ways; with the law in relation to the patenting of chemical processes. In short, all things material fall within the purview of chemistry.

The needs of chemical industry for men competent to devise and develop new processes and to improve existing ones and for men competent to operate these can best be met by different types of training. The University offers several distinctly different courses in which the word chemistry appears—viz.: Applied Chemistry, Chemical Engineering and Industrial Chemistry. The latter two are in the Faculty of Applied Sciences and differ from the Applied Chemistry course in that they contain subjects in engineering principles basic to the design and construction of plant and equipment in lieu of some of the more advanced aspects of chemistry. For research and development chemistry, as well as general laboratory work in industry a training in fundamental science with a strong emphasis on chemistry is essential. It is this type of training that is provided by the Applied Chemistry Course where instruction is given in the underlying principles of inorganic, physical, organic, analytical and nuclear chemistry. In the final year of this Course, students are given the opportunity of concentrating on fields of chemistry in which they are particularly interested. Graduates of the School of Chemistry who have taken a degree in Applied Chemistry find employment not only in industry and in universities but also in the C.S.I.R.O., Defence Research, Customs, Agriculture and Public Health, and many other government laboratories.

The School also provides courses in chemistry which form part of the requirements of the Science course (see p. 29ff). No industrial training is required for this course. By taking a double major in chemistry in the third year of the Science course, it is possible to reach a high degree of specialisation in the subject and, at the same time, obtain a substantial background of supporting science subjects.

Both the Applied Chemistry and the Science courses provide a training in chemistry at a level which satisfies the requirements for professional chemists. The essential difference between the two main chemistry courses is this: the Applied Chemistry course is the more extensive of the two, embracing as it does each of the major disciplines in chemistry. Another distinctive feature is that it demonstrates how fundamental knowledge in the various branches of chemistry may be applied to industry.

On the other hand, the Science chemistry course which requires an equally high standard in the various fields of chemistry offers a student either of two possibilities. By taking a double major in chemistry in the third year, he may reach a high degree of specialisation in the subject but instead of being concerned with applications of chemistry to industry, he will in the second year of the course take other supporting science subjects. The other possibility is to combine chemistry with another third year science subject, such as mathematics, physics, biology, or geology. Chemistry combined with mathematics will provide a useful basis for the advanced study of X-ray crystallography; combined with geology, it will be of assistance to anyone who later wishes to specialise in geochemistry.

For the student who graduates in the science course with chemistry as the major subject, there is a wide choice of opportunities for employment similar to those listed above. In addition, the course is well suited to the needs of science teachers.

The highest degree of specialisation in chemistry at the undergraduate level may be gained by means of an honours degree, the work for which entails a research project. An honours degree may be taken in either Applied Chemistry or Chemistry (as part of the Science course). For the latter a double major in chemistry is desirable but by no means essential. Chemistry III combined with such Science subjects as Physics III, Mathematics III or Geology III also forms a good foundation for an honours degree in chemistry.

The first year of the Applied Chemistry course is identical with other courses in the Faculties of Applied Science, Engineering, Medicine, and Science in that the student must take Chemistry I, Physics I, Mathematics I and one other subject from Engineering I, Geology I, Psychology I, General Biology. (See pp. 24-5.)

Of these four, Engineering I would give the student the widest choice of courses in his second year, should he decide to change his subject. This applies both to full-time and part-time students.

APPLIED CHEMISTRY—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 (30 weeks day course)

		<i>Hours per week for 3 terms</i>	
		Lec.	Lab./Tut.
1.001	Physics I	3	— 3
2.001	Chemistry I	3	— 3
10.001	Mathematics I	4	— 2
<i>Plus one of</i>			
5.001	Engineering I	3	— 3
7.511	Geology I		
17.001	General Biology		
		13	— 11

SECOND YEAR (30 weeks day course)

		<i>Hours per week for 3 terms</i>	
		Lec.	Lab./Tut.
2.311	Physical Chemistry	2	— 3
2.341	Chemical Instrumentation*	2	— 1†
2.351	Chemical Calculations	1	— 0
2.411	Inorganic Chemistry	1	— 2
2.441	History of Chemistry	1	— 0‡
2.511	Analytical Chemistry	2	— 3§
2.611	Organic Chemistry	2	— 3
10.031	Mathematics	1	— 1
50.011	English	2	— 0
		14	— 13

* Alternative subject 1.212 Physics.

§ Only one hour lecture in Term 2.

‡ Term 2 only.

† Hours for Term 1 only

Hours for Terms 2 and 3: 1½ — 1½ 1 — 2

THIRD YEAR (30 weeks day course)

		<i>Hours per week for 3 terms</i>	
		Lec.	Lab./Tut.
2.322	Physical Chemistry	2	— 3
2.361	Applied Chemistry	1	— 0
2.422	Inorganic Chemistry	1	— 2
2.522	Analytical Chemistry	1	— 2
2.622	Organic Chemistry	2	— 5
22.131	Industrial Chemistry	2	— 0
51.011	History or	1	— 0
52.011	Philosophy		
	Social Science Elective	1	— 0

Plus one of

2.211	Applied Organic Chemistry	}	1	—	3
2.331	Applied Physical Chemistry					
2.433	Inorganic Chemistry III					
2.533	Analytical Chemistry III					
2.811	Nuclear and Radiation Chemistry					
						<hr/>
						12 — 15

FOURTH YEAR (HONOURS)

(30 weeks day course)

			<i>Hours per week for 3 terms</i>		
			Lec.		Lab./Tut.
2.014	Chemistry IV	.....	3	—	0
	Humanities (Advanced Elective)	.....	2	—	0
	Project	.....	0	—	20
			<hr/>		<hr/>
			5	—	20
			<hr/>		

A student desiring admission to the Honours Course should apply in writing to the Head of the School as soon as possible after the completion of the pass degree requirements.

The applicant must have passed the final year of the Applied Chemistry Course and have a good academic record.*

The applicant should set out his academic record in detail and indicate in which of the following branches of the subject he would prefer to undertake research:

- (1) Analytical
- (2) Applied Organic
- (3) Inorganic
- (4) Nuclear and Radiation
- (5) Organic
- (6) Physical Chemistry.

APPLIED CHEMISTRY—PART-TIME COURSE

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

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

* For admission to the Honours Chemistry Course in Science, the applicant must have passed Chemistry III.

FIRST AND SECOND YEARS

(30 weeks part-time course)

(30 weeks part-time course)										<i>Hours per week for 3 terms</i>		
										Lec.		Lab./Tut.
1.001	Physics I	....	....	....	....	....	....	....	....	3	—	3
2.001	Chemistry I	....	....	....	....	....	....	....	....	3	—	3
10.001	Mathematics I	....	....	....	....	....	....	....	....	4	—	2
<i>Plus one of</i>												
5.001	Engineering I	}	....	....	....	....	....	....	....	3	—	3
7.511	Geology I											
17.001	General Biology											
										13	—	11

THIRD YEAR

(30 weeks part-time course)

						<i>Hours per week for 3 terms</i>		
						Lec.	Lab./Tut.	
2.311	Physical Chemistry	....	....	....	....	2	—	3
2.441	History of Chemistry	....	....	....	....	1	—	0*
2.511	Analytical Chemistry	....	....	....	....	2	—	3†
10.031	Mathematics	....	....	....	....	1	—	1
50.011/1	English Language	....	....	....	....	1	—	0
						7	—	7

† Only 1 hour lecture in Term 2.

* Term 2 only.

FOURTH YEAR

(30 weeks part-time course)

						<i>Hours per week for 3 terms</i>		
						Lec.	Lab./Tut.	
2.341	Chemical Instrumentation*	....	....	....	....	2	—	1†
2.351	Chemical Calculations	....	....	....	....	1	—	0
2.422	Inorganic Chemistry	....	....	....	....	1	—	2
2.611	Organic Chemistry	....	....	....	....	2	—	3
50.011/2	English Literature	....	....	....	....	1	—	0
						7	—	6

* Alternative subject—Physics 1.212.

† Hours for Term 1 only.

Hours for Terms 2 and 3: 1½ — 1½ 1 — 2.

FIFTH YEAR

(30 weeks part-time course)

						<i>Hours per week for 3 terms</i>		
						Lec.		Lab./Tut.
2.322	Physical Chemistry	....	....	....	....	2	—	3
2.422	Inorganic Chemistry	....	....	....	....	1	—	2
2.522	Analytical Chemistry	....	....	....	....	1	—	2
22.131	Industrial Chemistry (Processes)	....	....	....	....	1½	—	½
51.011	History or	}	....	....	....	1	—	0
52.011	Philosophy							
						6½	—	7½

SIXTH YEAR
(30 weeks part-time course)

(30 weeks part-time course)							<i>Hours per week for 3 terms</i>			
							Lec.		Lab./Tut.	
2.361	Applied Chemistry	....	....	....	....	....	1	—	0
2.622	Organic Chemistry	....	....	....	....	....	2	—	5
	Social Science Elective	....	....	....	....	....	1	—	0
<i>Plus one of</i>										
2.211	Applied Organic Chemistry	}					1	—	3
2.331	Applied Physical Chemistry									
2.433	Inorganic Chemistry III									
2.533	Analytical Chemistry III									
2.811	Nuclear and Radiation Chemistry									
							5	—	8	

Honours in Applied Chemistry

Students desiring to take Honours must apply to the Head of the School not later than 31st December of the year in which the third year of the full-time (sixth 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 which may be undertaken in any one of the six departments by arrangement with the Head of the School. Honours will, however, not be awarded in any particular branch of the subject but in the subject as a whole. Attendance will be required at such lectures and seminars as the Head of the School directs.

Applied Chemistry Prizes

In past years it has been the custom of the School of Chemistry to award prizes for various stages and subjects of the Applied Chemistry Course. This practice will be continued this year.

The list of donors, to whom we express our gratitude, includes the following organisations:

The N.S.W. Department of Technical Education

Australian Glass Manufacturers Co. Pty. Ltd.

Chamber of Manufactures of N.S.W.

Drug Houses of Australia (N.S.W.) Pty. Ltd.

Holbrooks A/asia Pty. Ltd.

Inglis Hudson Bequest

Merck Sharp and Dohme (Aust.) Pty. Ltd.

Nestle's Food Specialities

Reichhold Chemicals Inc. (Australia) Pty. Ltd.

Tooheys Limited

Tooth and Company Ltd.

Unilever Australia Pty. Ltd.

University of New South Wales Chemical Society

University of New South Wales Science Association.

We trust this interest and generosity will continue.

CHEMISTRY TEXT AND REFERENCE BOOKS

2.001 Chemistry I

(One book from Group (A); plus Books (B) and (C) together with one book from Group (D).)

Text-books

- (A) Hildebrand, J. H., and Powell, R. E.: *Principles of Chemistry*.
6th. Ed. bound with Latimer, W. M., and Hildebrand, J. H.:
Reference Book of Inorganic Chemistry.

or

Sienko, M. G., and Plane, R. A.: *Chemistry*.

or

Pauling, L.: *General Chemistry*.

or

Quagliano, J.: *Chemistry*.

- (B) Brown, G. I.: *A Simple Guide to Modern Valency Theory*.

- (C) Vogel, A. I.: *Textbook of Qualitative Analysis*.

- (D) Fieser, L. F., and Fieser, M.: *Organic Chemistry Course*.

or

Getchell, R. W.: *Organic Chemistry: A Brief Course*.

or

Underkoffler, L. A.: *A Brief Introduction to Organic Chemistry*.

Reference Books

Moeller, T.: *Inorganic Chemistry*.

Ketelaar: *Chemical Constitution*.

Cartmell, E., and Fowles, G. W.: *Valency and Molecular Structure*.

Moore, W. J.: *Physical Chemistry*.

Vogel, A. I.: *Textbook of Quantitative Analysis*.

2.001/1 Chemistry I Part I

(One book from Group (A) together with Book (B).)

Text-books

- (A) Hildebrand, J. H., and Powell, R. E.: *Principles of Chemistry*.
6th Ed. bound with Latimer, W. M., and Hildebrand, J. H.:
Reference Book of Inorganic Chemistry.

or

Sienko, M. G., and Plane R. A.: *Chemistry*.

or

Pauling, L.: *General Chemistry*

or

Quagliano, J.: *Chemistry*.

- (B) Brown, G. I.: *A Simple Guide to Modern Valency Theory*.

Reference Books

- Moeller, T.: *Inorganic Chemistry*.
Ketelaar: *Chemical Constitution*.
Cartmell, E., and Fowles, G. W.: *Valency and Molecular Structure*.
Moore, W. J.: *Physical Chemistry*.

2.001/2 Chemistry I Part II

(One text-book from Group (A) together with Books (B) and (C).)

Text-books

- (A) Hildebrand, J. H., and Powell, R. H.: *Principles of Chemistry*.
6th Ed. bound with Latimer, W. M., and Hildebrand, J. H.:
Reference Book of Inorganic Chemistry.
or
Sienko, M. G., and Plane, R. A.: *Chemistry*.
or
Pauling, L.: *General Chemistry*.
or
Quagliano, J.: *Chemistry*.
(B) Brown, G. I.: *A Simple Guide to Modern Valency Theory*.
(C) Vogel, A. I.: *Textbook of Qualitative Analysis*.

Reference Books

- Moeller, T.: *Inorganic Chemistry*.
Ketelaar: *Chemical Constitution*.
Cartmell, E., and Fowles, G. W.: *Valency and Molecular Structure*.
Moore, W. J.: *Physical Chemistry*.
Vogel, A. I.: *Textbook of Quantitative Analysis*.

2.002 Chemistry II (Inorganic Section)

2.022 Chemistry II (Metallurgy, Inorganic Section)

2.032 Chemistry II (Industrial Chemistry, Inorganic Section)

2.411 Inorganic Chemistry I (Applied Chemistry)

Text-books

- Brown, G. I.: *A Simple Guide to Valency Theory*.
Emeleus, J. H., and Anderson, J. S.: *Modern Aspects of Inorganic Chemistry*.
Vogel, A. I.: *Textbook of Qualitative Analysis*.

Reference Books

- Bailar, J. C.: *The Chemistry of the Co-ordination Compounds*.
Pauling, L.: *The Nature of the Chemical Bond*. 2nd Ed.
Wells, A. F.: *Structural Inorganic Chemistry*.
Sidgwick, N. V.: *Chemical Elements and Their Compounds* (2 vols.).
Moeller, T.: *Inorganic Chemistry*.
Remy, H.: *Treatise on Inorganic Chemistry* (Vols. I and II).

2.003 Chemistry III (Inorganic Section)

Text-books

- Wells, A. F.: *Structural Inorganic Chemistry*.
Emeleus, J. H., and Anderson, J. S.: *Modern Aspects of Inorganic Chemistry*.

Reference Books

- Coulson, C. A.: *Valence*.
Pauling, L.: *The Nature of the Chemical Bond*. 2nd Ed.
Sidgwick, N. V.: *Chemical Elements and Their Compounds*.
Bailar, J. C.: *The Chemistry of the Co-ordination Compounds*.
Basolo, F., and Pearson, R. G.: *Mechanisms of Inorganic Reactions*.
Katz, J. J., and Seaborg, G. I.: *The Chemistry of the Actinide Elements*.
Methuen, 1957.
Cartmell, E., and Fowles, C. W.: *Valency and Molecular Structure*.
Syркин and Dyatkina: *The Structure of Molecules*.

2.433 Advanced Inorganic Chemistry

Text-books

- Cartmell, E., and Fowles, G. W.: *Valency and Molecular Structure*.
Wells, A. F.: *Structural Inorganic Chemistry*.
Emeleus, J. H., and Anderson, J. S.: *Modern Aspects of Inorganic Chemistry*.

Reference Books

- Coulson, C. A.: *Valence*.
Pauling, L.: *The Nature of the Chemical Bond*. 2nd Ed.
Sidgwick, N. V.: *Chemical Elements and Their Compounds* (2 vols.).
Bailar, F., and Pearson, R. G.: *Mechanisms of Inorganic Reactions*.
Katz, J. J., and Seaborg, G. I.: *The Chemistry of the Actinide Elements*. Methuen, 1957.
Syркин and Dyatkina: *The Structure of Molecules*.

2.211 Applied Organic Chemistry

Reference Books

- Weissberger, A.: *Techniques of Organic Chemistry Series*.
Gibbs, H.: *Optical Methods of Analysis*.
Delahay, P.: *Instrumental Analysis*.
Keulmans, A. J. M.: *Gas Chromatography*.
Kolthoff, I., and Lingane, J. J.: *Polarography*.
Markley, K. S.: *The Fatty Acids*.
Bailey, E. A.: *Industrial Oil and Fat Products*.
Ralston, A. W.: *Fatty Acids and Their Derivatives*.
Hilditch, T. P.: *The Chemical Constitution of Natural Fats*.
Progress in the Chemistry of Fats and Related Products Series.
Guenther, E.: *The Essential Oils*.
Simonsen, Sir J.: *The Terpenes*.
Rodd, E. H.: *The Chemistry of Carbon Compounds*.
Suter, C. M.: *Medicinal Chemistry Series*.
Manske, K. H. F., and Holmes, H. L.: *The Alkaloids Series*.
Henry, T. A.: *The Plant Alkaloids*.
Evers, N., and Smith: *Analysis of Drugs and Chemicals*.
Bamford, C. H., Elliott and Hanley: *Synthetic Polypeptides*.
High Polymer Series.
Simmonds, H. R., and Ellis, C.: *Handbook of Plastics*.
Schmidt, A. X., and Marlies, C. A.: *Principles of High Polymer Theory and Practice*.
American Society for Testing Materials: *Standards on Plastics*.
Frear, D. E. H.: *The Chemistry of Insecticides and Fungicides*.
West, R. S., and Campbell, G. A.: *D.D.T. and Newer Persistent Insecticides*.
Harris, R. S., and Thimann: *Vitamins and Hormones—Advances in Research and Applications*.
British Pharmacopoeia and Pharmacopoeia of the United States.

2.221 Applied Organic Chemistry (Food)

Reference Books

- Gibbs, H.: *Optical Methods of Analysis*.
Delahay, P.: *Instrumental Analysis*.
Wright, W. D.: *The Measurement of Colour*.
Deuel, H. J.: *Lipids I, II and III*.
Shoppee, C. W.: *Chemistry of the Steroids*.
Bates, C., and Associates: *Polarimetry, Saccharimetry and the Sugars*.
Browne, C. A., and Zerban, F. W.: *Sugar Analysis*.
Walton, H. F.: *Principles and Methods of Chemical Analysis*.
Winton, A. L., and Winton, K. G. B.: *Structure and Composition of Foods*.
Cox, H. E.: *Chemical Analysis of Foods*.
Leach, A. E.: *Food Inspection and Analysis*.
Kertesz, Z. I.: *The Pectic Substances*.
Joslyn, M. A.: *Methods in Food Analysis*.
Ling, E. R.: *Dairy Chemistry*.
Davies, W. L.: *The Chemistry of Milk*.

Neurath, H., and Benley, K.: *Proteins. Advances in Protein Chemistry Series.*
Advances in Carbohydrate Chemistry Series.
 Karrer, P., and Jucker, E.: *Carotenoids.*
 Goodwin, T. W.: *Comparative Biochemistry of the Carotenoids.*
 Kent-Jones, D. W., and Amos, A. J.: *Modern Cereal Chemistry.*
 Rosenberg, H. R.: *Chemistry and Physiology of the Vitamins.*
 Sebrell, N. H., and Harris, K. S.: *The Vitamins Series.*

It is expected that students will consult references from the current literature provided in lectures.

2.611 Organic Chemistry

2.002 Chemistry II (Organic Section)

2.032 Chemistry II (Organic Section)

2.042 Chemistry IIA (Organic Section)

Text-books: One of the following—

Noller, C. R.: *Chemistry of Organic Compounds.*
 Fieser, L. F., and Fieser, M.: *Organic Chemistry.*
 Morrison, R. T., and Boyd, R. N.: *Organic Chemistry.*
 Finar, I. L.: *Organic Chemistry* (Vol. I).

And one of the following—

Vogel, I. A.: *Elementary Practical Organic Chemistry. Part II—Qualitative Organic Analysis.*
 Wild, F.: *Characterisation of Organic Compounds.*
 Openshaw, H. T.: *Laboratory Manual of Qualitative Organic Analysis.*

Reference Books

Geissman, T. A.: *Principles of Organic Chemistry.*
 Barnett, E. de B.: *Mechanism of Organic Chemical Reactions.*
 Horwood Tucker, S.: *An Electronic Outline of Organic Chemistry.*

2.622 Organic Chemistry

2.003 Chemistry III (Organic Section)

Text-books: One of the following—

Turner, E. E., and Harris, M. M.: *Organic Chemistry.*
 Finar, I. L.: *Organic Chemistry* (Vol. II).

And one of the following—

Vogel, I. A.: *Elementary Practical Organic Chemistry. Part II—Qualitative Organic Analysis.*
 Wild, F.: *Characterisation of Organic Compounds.*
 Openshaw, H. T.: *Laboratory Manual of Qualitative Organic Analysis.*

Reference Books

Hine, J. S.: *Physical Organic Chemistry.*
 Barnett, E. de B.: *Mechanism of Organic Chemical Reactions.*
 Horwood Tucker, S.: *An Electronic Outline of Organic Chemistry.*
 Walling, O.: *Free Radicals in Solution.*
 Albert, A.: *Heterocyclic Chemistry.*
 Wheland, G. W.: *Advanced Organic Chemistry.*
 Baker, J. W.: *Electronic Theories of Organic Chemistry.*

2.341 Chemical Instrumentation

Text-books

Martin, L. C., and Johnson, B. K.: *Practical Microscopy.*
 Kinnard, I. F.: *Applied Electrical Measurements.*
 Millman and Seely: *Electronics.*

Reference Books

Spreadbury: *Electronic Measurements and Measuring Instruments.*
 Lion: *Instrumentation in Scientific Research.*
 Dunlap: *Introduction to Semi-Conductors.*
 Chamot, E. M., and Mason, C. W.: *Handbook of Chemical Microscopy.*
 Hartshorne, N. N., and Stuart, A.: *Crystals and the Polarising Microscope.*

2.311 Physical Chemistry I

2.002 Chemistry II

2.042 Chemistry IIA

(2.32 and 2.33 Chemistry)

2.032 Chemistry II

Text-book

Moore, W. J.: *Physical Chemistry*. Longmans Green.

or
Daniels, F., and Alberty, R. A.: *Physical Chemistry*. John Wiley & Sons Inc., New York.

Reference Book

Klotz, I.: *Chemical Thermodynamics*.

2.34 Chemistry

Text-books

West, W.: *Chemical Applications of Spectroscopy*. Interscience Pub., New York.

Frost, A. A., and Pearson, R. G.: *Kinetics and Mechanism*. Wiley.

Whitehouse and Putman: *Radioactive Isotopes*. Oxford Press.

Reference Books

Moelwyn Hughes, E. A.: *Physical Chemistry*. Pergamon.

Klotz, I.: *Chemical Thermodynamics*. Prentice Hall.

Laidler, K. J.: *Chemical Kinetics*. McGraw-Hill.

2.003 Chemistry (Physical Chemistry Section)

Text-books

Moore, W. J.: *Physical Chemistry*.

West, W.: *Chemical Applications of Spectroscopy*. Interscience Pub.

Frost, A. A., and Pearson, R. G.: *Kinetics and Mechanism*. Wiley.

Glasstone, S.: *Source Book of Atomic Energy*.

or
Friedlander and Kennedy: *Nuclear and Radiochemistry*.

Reference Books

Klotz, I.: *Chemical Thermodynamics*. Prentice Hall.

Laidler, K. J.: *Chemical Kinetics*. McGraw-Hill.

2.35 Applied Physical Chemistry

Text-books

Brand, J. C. D., and Speakman, J. C.: *Molecular Structure*. E. Arnold (London).

Le Fevre, R. J. W.: *Dipole Moments*. Methuen, London.

2.72 Mathematical Chemistry I

Text-book

Swinbourne, E. S.: *Mathematical Chemistry I Notes*. N.S.W. University of Technology.

Reference Books

Worthing, A. G., and Geffner, J.: *The Treatment of Experimental Data*.

Hitchcock, F. L., and Robinson, C. S.: *Differential Equations in Applied Chemistry*.

Crumpler, T. G., and Yoe, J. A.: *Chemical Computation and Errors*.

Bridgman, P. W.: *Dimensional Analysis*.

Babor, J. A., and Thiessen, G. W.: *How to Solve Problems in Physical Chemistry*.

2.73 Mathematical Chemistry II

2.351 Chemical Calculations

Text-books

- Lark, P. D.: *Mathematical Chemistry II Notes*. N.S.W. University of Technology.
Brownlee, K. A.: *Industrial Experimentation*.
Moroney, M. J.: *Facts from Figures*.

Reference Book

- Bennett, C. A., and Franklin, M. L.: *Statistical Analysis in Chemical Industry*.

2.511 Analytical Chemistry I

2.032 Chemistry II (Analytical Section)

2.022 Chemistry II (Analytical Section)

Text-book

- Vogel, A. I.: *A Text Book of Quantitative Inorganic Analysis*.

or

- Kolthoff, I. M., and Sandell, E. B.: *A Text Book of Quantitative Inorganic Analysis*.

or

- Willard, H. H., Furman, N. H., and Bricker, C. E.: *Elements of Quantitative Analysis*.

Reference Book

- Walton, H. F.: *Principles and Methods of Chemical Analysis*.

2.522 Analytical Chemistry II

Text-book

- Willard, H. H., and Diehl, H.: *Advanced Quantitative Analysis*.

Reference Books

- Hildebrand, W. F., Lundell, G. E. F., Bright, H. A., and Hoffman, J. I.: *Applied Inorganic Analysis*.
Sandell, E. B.: *Colorimetric Determination of Traces of Elements*.
American Society for Testing Materials: *Methods of Chemical Analysis of Metals*.
Lingane, J. J.: *Electrochemical Analysis*.

2.533 Analytical Chemistry III

Reference Books

- * Moeller, T.: *Inorganic Chemistry*.
Berl, W. G. A.: *Physical Methods in Chemical Analysis*. Vols. 1, 2, 3.
Luder, W. F., and Zuffanti, S.: *Electronic Theory of Acids and Bases*.
Fritz, J. S., and Hammond, G. S.: *Quantitative Organic Analysis*.
Kolthoff, I. M., and Lingane, J. J.: *Polarography* (2 vols.).
Samuelson, O.: *Ion Exchanges in Analytical Chemistry*.
Cassidy, H. G.: *Weissbergers' Organic Techniques*: Vol. X—*Fundamentals of Chromatography*.
B.D.H.: *Handbook of Non-Aqueous Titrations*.
* Schwarzenbach, G.: *Complexometric Titrations*.
Meites, L.: *Polarographic Techniques*.
* Particularly recommended.

2.002 Chemistry II (Analytical Section)

Text-book

- Vogel, A. I.: *A Text Book of Quantitative Inorganic Analysis*.

or

- Kolthoff, I. M., and Sandell, E. B.: *A Text Book of Quantitative Inorganic Analysis*.

or

- Willard, H. H., Furman, N. H., and Bricker, C. E.: *Elements of Quantitative Analysis*.

2.003 Chemistry III (Analytical Section)

Textbook

Willard, H. H., and Diehl, H.: *Advanced Quantitative Analysis*.

2.811 Nuclear and Radiation Chemistry

Text-book

Whitehouse and Putman: *Radioactive Isotopes*. Clarendon, Oxford, 1953.

or
Friedlander and Kennedy: *Nuclear and Radiochemistry*. Wiley, New York, 1955.

Reference Books

Cook and Duncan: *Modern Radiochemical Practice*. Clarendon, Oxford, 1952.

Haissinsky: *La Chimie Nucleaire et ses Applications*. Masson 2 Cie, Paris, 1957.

Bleuler and Goldsmith: *Experimental Nucleonics*. Pitman, 1952.

Taylor: *The Measurement of Radioisotopes*. Methuen, 1957.

Glasstone, S.: *Source Book on Atomic Energy*.

School of Mathematics

Throughout Australia and, in fact, throughout the world, there is an extreme shortage of mathematicians in universities, in industry, in research establishments and in schools. Employment can be found for mathematicians with almost every type of qualification.

In the past, the employment of mathematicians in Australian industry was rather rare. Over the last few years there has been a remarkable change. It is now realised that every reasonably large concern must employ a statistician. There must be efficient supervision of the quality and testing of products. Analysis of sales and business methods must be in the hands of an expert. Students interested in positions of this kind should complete the course in Theory of Statistics.

Statisticians are also found in many research establishments, where they are concerned with the design of experiments and the analysis of the results obtained. Analysis of data concerning the incidence of diseases such as poliomyelitis and lung cancer have been achievements of these professional mathematicians.

One of the spectacular aids to industry and research is the high-speed computer. The small machines costing a hundred or so pounds can be managed by relatively unskilled persons, but it requires skilled training to maintain and programme for a high-speed machine costing many hundreds of thousands of pounds. The number of persons in Australia qualified to take charge of a large machine is quite small. A graduate with satisfactory attainments in machine operation is assured of a well-paid and interesting position.

The courses in Applied Mathematics include training in programming for the digital computers and in numerical analysis. Students will have considerable practice on the university's computer UTECOM. The courses, in addition to computer work, contain a considerable body of work dealing with the application of mathematics to physical theory.

It must not be thought that an honours degree is necessary for success in these fields. Pass degrees are satisfactory for positions in government departments, insurance companies and laboratories, but, of course, an honours degree would in almost all cases give priority.

The growth of population in Australia has resulted in a large increase in the enrolments of Australian universities. At the moment the shortage of mathematicians in the universities is

desperate. A student who graduates with a B.Sc. degree with honours should find little difficulty in becoming a university lecturer after, perhaps, two or three years as a teaching fellow while working for a higher degree.

In striking contrast to the situation overseas, particularly in the U.S.A., Australian industry does not appear ready to employ pure mathematicians. This probably accounts for Australia losing many of its best pure mathematicians to overseas appointments. It is hoped that this will be rectified in the near future. The present avenues of employment for pure mathematicians in Australia are in the universities, C.S.I.R.O., other research establishments and the teaching service.

If the student examines carefully the comments following this preamble, he will notice that the courses in Theory of Statistics and Applied Mathematics may be so linked with the Pure Mathematics course that a student is able to change from one of these to Pure Mathematics at any stage.

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 (1961). Any student who does not feel confident that he understands the situation should consult one of the enrolment officers of the school.

HONOURS COURSES IN MATHEMATICS

The Honours courses require four years of study. In the fourth year the student must devote his full time to his chosen subject and to a course in Humanities.

There are three different fourth year Honours courses in the School of Mathematics, namely: Pure Mathematics, Applied Mathematics and the Theory of Statistics. The requirements for entry to fourth year mathematics courses are indicated below.

(a) Pure Mathematics

Permission to enter the fourth year course in Pure Mathematics is granted by the Head of the School. Such permission is not likely to be granted unless the applicant has passed in Pure Mathematics III (Higher). This work should be supplemented by courses in Applied Mathematics or Theory of Statistics.

(b) Applied Mathematics

Permission to enter the fourth year course in Applied Mathematics is granted by the Head of the School after consultation with the Professor of Applied Mathematics. Such permission is not likely to be granted unless the applicant has passed in Applied Mathematics III (Higher) and in Pure Mathematics III.

(c) Theory of Statistics

Permission to enter the fourth year course in the Theory of Statistics is granted by the Head of the School after consultation with the Associate Professor of Mathematical Statistics. Such permission is not likely to be granted unless the applicant has passed in Theory of Statistics II (Higher) and Pure Mathematics III (Higher).

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

All students, whether studying for Honours or not, will attend Mathematics I during the first year. Any student interested in gaining an Honours degree should consult one of the professors in the School of Mathematics during his first year. He should certainly have an interview before enrolling in the second year.

It should be noted that transfer from the Higher level to the ordinary level of the various mathematical subjects can be made at any time if the student feels that he has made a mischoice. Transfer from ordinary courses to Higher courses will leave the student with an almost impossible task and could only be made in exceptional circumstances.

PASS COURSES

Except for students who wish to take Theory of Statistics II, there are few restrictions on the choice of subjects. Naturally, there is the general rule that the first stage of a sequence of subjects must precede later stages.

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

Though there is no regulation to demand it, students who wish to specialise in Applied Mathematics are strongly advised to take Pure Mathematics III if they wish to attempt Applied Mathematics III in the third year. This would mean, of necessity, the inclusion of five mathematical subjects for the degree.

MATHEMATICS AS A SUBSIDIARY SUBJECT

It is the opinion of the School of Mathematics that in order to gain a major in Mathematics, five subjects should be completed by graduation. Students whose main interests lie in other fields will not desire to include so much Mathematics.

If it is intended that only three mathematical subjects are to be taken, then Mathematics I, Pure Mathematics II and Pure Mathematics III would be a sequence providing some depth. However, consideration should be given to the inclusion of Theory of Statistics I or Applied Mathematics II. These are second year (Group II) subjects. The combination of at least one of these with Pure Mathematics II gives a broader coverage at somewhat less depth than Pure Mathematics III. Both Theory of Statistics I and Applied Mathematics II can be attempted without the inclusion of Pure Mathematics II.

SCHOOL TEACHERS

There is no doubt that in order to be fully qualified as a High School teacher of Mathematics, it is desirable that Mathematics I, Pure Mathematics II and Pure Mathematics III should be passed. It is recommended that two other subjects 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 work.

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.

STUDENTS WITH LOW MATHEMATICAL QUALIFICATIONS

Students who have only General Mathematics at the Leaving Certificate or who have been inadequately prepared even though they have passed both Mathematics I and II, should see that they do not fall behind the class. 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 class, he should consult a senior member of the staff of the School of Mathematics.

STUDENTS TRANSFERRING FROM OTHER COURSES

In some cases the mathematical subjects of the Science Course differ quite considerably from the mathematics taught to students

following other courses (e.g. Engineering). Students transferring to the Science Course and wishing to obtain credit for work done in previous courses should make application through the Guidance 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 responsibility 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. However, 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 TEXT-BOOKS

10.001 Mathematics I

- Cooley: *First Course in Calculus* (Wiley).
 Keane and Senior: *Complementary Mathematics* (Science Press).
 Weiss, M.: *Higher Algebra for the Undergraduate* (Wiley).

10.111 Pure Mathematics II

- Burkill, J. C.: *Theory of Ordinary Differential Equations* (Oliver & Boyd).
 Churchill, R. V.: *Introduction to Complex Variables and Applications* (McGraw-Hill).
 Ince, E. L.: *Integration of Ordinary Differential Equations* (Oliver & Boyd).
 Kaplan, W.: *Advanced Calculus* (Addison Wesley).
 Murdoch, D. C.: *Linear Algebra for Undergraduates* (Wiley).
 or
 Halmos, P. R.: *Finite Dimensional Vector Spaces* (Van Nostrand).

10.121 Pure Mathematics II (Higher)

- Burkill, J. C.: *Theory of Ordinary Differential Equations* (Oliver & Boyd).
 Graves, L. M.: *The Theory of Functions of a Real Variable* (McGraw-Hill).
 Halmos, P. R.: *Finite Dimensional Vector Spaces* (Van Nostrand).
 Ince, E. L.: *Integration of Ordinary Differential Equations* (Oliver & Boyd).
 Kaplan, W.: *Advanced Calculus* (Addison Wesley).
 Miller, K. S.: *Advanced Complex Calculus* (Harper).
 Artin, E.: *Geometric Algebra* (Interscience).

Reference

- Baker, H. F.: *Principles of Geometry* Part II (Cambridge).
 Bourbaki, N.: *Elements de Mathematique* (Hermann, Paris).
 Caratheodory, C.: *Theory of Functions of a Complex Variable* (Chelsea).
 Hall, D. W., and Spencer, G. L.: *Elementary Topology* (Wiley).
 Hobson, E. W.: *Theory of Functions of a Real Variable and the Theory of Fourier Series* (Dover).
 Kelley, J. L.: *General Topology* (Van Nostrand).
 Somerville, D. M. Y.: *Analytical Conics* (Bell).

10.112 Pure Mathematics III

- Churchill, R. V.: *Fourier Series and Boundary Value Problems* (McGraw-Hill).
 Churchill, R. V.: *Introduction to Complex Variables and Applications* (McGraw-Hill).

- Eisenhart, L. P.: *An Introduction to Differential Geometry by the Use of the Tensor Calculus* (Princeton).
 Ledermann, W.: *Introduction to the Theory of Finite Groups* (Oliver & Boyd).
 Halmos, P. R.: *Finite Dimensional Vector Spaces* (Van Nostrand).
 or
 Murdoch, D. C.: *Linear Algebra for Undergraduates* (Wiley).

Reference

- Churchill, R. V.: *Modern Operational Mathematics in Engineering* (McGraw-Hill).
 Littlewood, D. E.: *A University Algebra* (Cambridge).

10.122 Pure Mathematics III (Higher)

- Churchill, R. V.: *Fourier Series and Boundary Value Problems* (McGraw-Hill).
 Graves, L. M.: *The Theory of Functions of a Real Variable* (McGraw-Hill).
 Halmos, P. R.: *Measure Theory* (Van Nostrand).
 Ledermann, W.: *Introduction to the Theory of Finite Groups* (Oliver & Boyd).
 Miller, K. S.: *Advanced Complex Calculus* (Harper).
 Wallace, A.: *Algebraic Topology* (Pergamon Press).

Reference

- Bourbaki, N.: *Elements de Mathematique* (Hermann, Paris).
 Ince, E. L.: *Ordinary Differential Equations*.
 Kelley, J. L.: *General Topology* (Van Nostrand).
 Littlewood, D. E.: *A University Algebra* (Cambridge).
 Northcott, D. C.: *Ideal Theory* (Cambridge Math. Tracts).
 Weatherburn, C. E.: *Differential Geometry of Three Dimensions*, Vol. I (Cambridge).

10.211 Applied Mathematics II

- Courant and Hilbert: *Methods of Mathematical Physics*, Vol. I (Interscience).
 Hartree: *Numerical Analysis* (Wiley).
 McCuskey: *Introduction to Advanced Dynamics* (Addison Wesley).

10.221 Applied Mathematics II (Higher)

- As for Applied Mathematics II together with:
 Abraham and Becker: *Theory of Electricity*, Vol. I (Blackie).

10.212 Applied Mathematics III

- Courant and Hilbert: *Methods of Mathematical Physics*, Vol. II (Interscience).
 Hartree: *Numerical Analysis* (Wiley).
 Prandtl and Tietjens: *Fundamentals of Hydro- and Aero-mechanics* (Dover).
 Jaeger: *Elasticity, Fracture and Flow* (Methuen).
 Landau and Lifshitz: *Quantum Mechanics: Non Relativistic Theory* (Pergamon).
 Rossi: *High Energy Particles* (Prentice Hall).
 Abraham and Becker: *Theory of Electricity*, Vol. I (Blackie).

10.222 Applied Mathematics III (Higher)

- Courant and Hilbert: *Methods of Mathematical Physics*, Vol. II (Interscience).
 Hartree: *Numerical Analysis* (Wiley).
 Prandtl and Tietjens: *Fundamentals of Hydro- and Aero-mechanics* (Dover).
 Jaeger: *Elasticity, Fracture and Flow* (Methuen).
 Landau and Lifshitz: *Quantum Mechanics: Non Relativistic Theory* (Pergamon).
 Moller: *The Theory of Relativity* (Clarendon Press, Oxford).
 Rossi: *High Energy Particles* (Prentice Hall).
 Landau and Lifshitz: *Statistical Physics* (Pergamon Press).

10.11-B/2 Mathematics

Cooley, H. R.: *First Course in Calculus*.
Keane and Senior: *Complementary Mathematics*.

10.311 and 10.321 Theory of Statistics I and Theory of Statistics I (Higher)

Introductory Reading

Dixon, W. J., and Massey, F. J.: *Introduction to Statistical Analysis* (McGraw-Hill).
Huff, D.: *How to Lie with Statistics* (Gollancz).
Moroney, M. J.: *Facts from Figures* (Pelican).
Tippett, L. H. C.: *Statistics* (Oxford University Press).

Text-books

Anderson, R. L., and Bancroft, T. A.: *Statistical Theory in Research* (McGraw-Hill).
Fraser, D. A. S.: *Statistics: An Introduction* (Wiley).
Hogg, R. V., and Craig, A. T.: *Introduction to Mathematical Statistics* (Macmillan).

Reference

Cramer, H.: *The Elements of Probability Theory and Some of its Applications* (Wiley).
Hoel, P. G.: *Introduction to Mathematical Statistics* (Wiley).
Kendall, M. G., and Stuart, A.: *The Advanced Theory of Statistics*, Vol. I (Griffin).
Parzen, E.: *Modern Probability and Its Applications* (Wiley).
Neyman, J.: *First Course in Probability and Statistics* (Holt).
Mood, A. M.: *Introduction to the Theory of Statistics* (McGraw-Hill).
Weatherburn, C. E.: *A First Course in Mathematical Statistics* (C.U.P.).

10.312 and 10.322 Theory of Statistics II and Theory of Statistics II (Higher)

Introductory Reading

Cox, D. R.: *Planning of Experiments* (Wiley).

Text-books

As for Theory of Statistics I plus—

Feller, W.: *An Introduction to Mathematical Probability and Its Applications* (Wiley).
Pearson, E. S., and Hartley, H. O. (Ed.): *Biometrika Tables for Statisticians* (Vol. I) (C.U.P.).
Mood, A. M.: *Introduction to the Theory of Statistics* (McGraw-Hill).

Reference

Cramer, H.: *Mathematical Methods of Statistics* (Princeton).
Kendall, M. G.: *The Advanced Theory of Statistics* (Vol. II) (Griffin).
Rao, C. R.: *Advanced Statistical Methods in Biometric Research* (Wiley).
Anderson, T. W.: *An Introduction to Multivariate Statistical Analysis* (Wiley).
Kempthorne, O.: *The Design and Analysis of Experiments* (Wiley).
Cochran, W. G., and Cox, G.: *Experimental Designs* (Wiley).
Cochran, W. G.: *Sampling Techniques* (Wiley).
Gass, S. R.: *Linear Programming Methods and Applications*.
Wilks, S. S.: *Mathematical Statistics* (Princeton).

School of Physics

It may fitly be said that the science of Physics underlies all experimental Science. It is by the work of physicists that the deepest present understanding of the inanimate world around us has been attained; and it is only with comprehension of their physical aspects that the nature and qualities of living (and of thinking) beings can be properly appreciated. Moreover, principles and techniques of Physics are to be seen everywhere incorporated in the technology on which modern civilisation is based.

Thus a study of Physics leading to some acquaintance with its elements is suitable for inclusion in any curriculum of study. A good working knowledge of at least the older-established parts of Physics is an essential item for engineers and technologists and indeed for those pursuing any other branch of experimental pure Science. This school has, therefore, as one of its principal functions, the provision of such courses for the benefit of those not intending to follow a professional career in Physics.

However, the main objective of the school is the education and professional training of physicists. The Pass-Degree Course offered is one which seeks to give a broad and balanced treatment of all branches of Physics, without specific emphasis on any branch or topic which may be temporarily prominent. This course precedes an Honours Course in which the student's work will be to some extent specialised in certain fields. These studies are provided for within the framework of the Science Course (see p. 29ff), as sequences which are appropriate for students seeking qualification as professional physicists, whether they intend to engage in research or industrial practice, or to become teachers of Physics.

For a pass degree with a major in Physics it is necessary to complete Physics I, Physics II, and Physics III. Mathematics I is pre-requisite for Physics II, and Pure Mathematics II for Physics III. The Science Course regulations also require the student to complete four other Science subjects for a pass degree. The common First Year regulations require Chemistry I and one other Group I subject to comprise two of these four; the remaining two would normally be one other Group II subject plus one other Group III subject.

The following programmes show typical alternatives, any of which, together with the prescribed humanities subjects, complete requirements for a pass degree.

FIRST YEAR	SECOND YEAR	THIRD YEAR
Physics I	Physics II	Physics III
Mathematics I	Pure Mathematics II	Mathematical Physics
Chemistry I	Chemistry II	or
Engineering I	or	Physics III (Applied)
or	Theory of Statistics I	or
General Biology	.	Pure Mathematics III

The normal preparation for Physics IV (Honours) is the study of Physics III and Mathematical Physics in the Third Year. Students intending to study for Honours and/or proceed to a higher degree should include these subjects in their programme.

School of Physics Staff Prize

A prize of £25 is offered annually by the lecturing staff of the School of Physics to the student who most distinguishes himself in the subject Physics III.

PHYSICS TEXT-BOOKS

1.001 (Physics I), 1.001/1 (Physics I/1), 1.001/2 (Physics I/2)

Resnick and Haliday: *Physics for Students of Science and Engineering*, Vols. I and II or combined volume.

(Particularly recommended for students with a good background in Physics and Mathematics.)

Ference, Lemon and Stephenson: *Analytical Experimental Physics*.

Sears and Zemansky: *University Physics*, Vols. I and II.

Richards, Sears, Wehr and Zemansky: *Modern University Physics*.

1.212 (Physics II(T))

Halliday and Resnick: *Physics for Students of Science and Engineering*, Vol. II.

Bitter: *Currents, Fields and Particles*.

Reference Books

Wehr and Richards: *Physics of the Atom*.

Kronig: *Textbook of Physics*.

Jenkins and White: *Fundamentals of Physical Optics*.

1.43D and 1.222 (Additional Physics for Electrical Engineering Students)

Wehr and Richards: *Physics of the Atom*.

Penning: *Electrical Discharges in Gases*.

1.011 (Old course 1.91 for Architecture and Manual Arts)

Freeman: *Modern Introductory Physics*.

Sears and Zemansky: *College Physics*.

Physics II (Science Course)

Text-books

Bleaney and Bleaney: *Electricity and Magnetism*.

Zemansky: *Heat and Thermodynamics*.

Richtmyer, Kennard and Lauritson: *Introduction to Modern Physics*.

or

Wehr and Richards: *Physics of the Atom*.

Jenkins and White: *Fundamentals of Physical Optics*.

Reference Books

Kronig: *Textbook of Physics*.
Kaplan: *Nuclear Physics*.
Mitchell: *Fundamentals of Electronics*.

Physics III (Science Course)

Text-books

Bleaney and Bleaney: *Electricity and Magnetism*.
Pippard: *Classical Thermodynamics*.
Richtmyer, Kennard and Lauritson: *Introduction to Modern Physics*.
Dekker: *Solid State Physics*.

Reference Books

Kronig: *Textbook of Physics*.
Leighton: *Principles of Modern Physics*.
Hill: *Introduction to Statistical Thermodynamics*.
Kaplan: *Nuclear Physics*.
Kittel: *Elementary Statistical Physics*.
Slater and Frank: *Electromagnetism*.
Harnwell: *Principles of Electricity and Electromagnetism*.
Schiff: *Quantum Mechanics*.
Farley: *Elements of Pulse Circuits*.
von Engel: *Ionized Gases*.
Arnot: *Collision Processes in Gases*.
Emeleus: *Conduction of Electricity in Gases*.

Mathematical Physics (Science Course)

Text-books

Goldstein: *Classical Mechanics*.
Nye: *Physical Properties of Crystals*.
Arley and Buch: *Introduction to the Theory of Probability and Statistics*.
Panofsky and Phillips: *Classical Electricity and Magnetism*.
Landau and Lifschitz: *Theory of Elasticity*.
Schiff: *Quantum Mechanics*.

Department of Optometry

The Department of Optometry is located at Ultimo on the second floor of the main administrative building of the Sydney Technical College in Mary Ann Street.

The courses in Optometry offered at the University of New South Wales are the only courses of professional training for optometrists given in this State. The Department of Optometry provides instruction in the Optometry degree course and in the Optometry conversion course for holders of the A.S.T.C. diploma in Optometry.

Under an agreement reached between the University and the Department of Technical Education the majority of A.S.T.C. diploma courses, including the course in Optometry, previously offered by the University on behalf of the Department, are being withdrawn and progressively replaced by courses leading to a University degree. The diploma course in Optometry has been replaced by a full-time four-year course leading to the degree of Bachelor of Optometry (B. Optom.) and new enrolments in the Optometry diploma course will not be accepted in 1961 or thereafter. In 1961, therefore, students in the Optometry diploma course may continue in that course for the award of the diploma or they may transfer, with such standing as may be granted, to the new full-time degree course in Optometry. However, those students currently enrolled in the diploma course and who elect to continue in the diploma course for the A.S.T.C. award must complete the balance of the course in the minimum time plus one year.

In the new full-time course, extending over four years, students in their first year will take General Biology and, in common with other students in the Faculty of Science, Chemistry I, Physics I, Mathematics I. In the remaining three years, students will take six professional subjects, special courses in psychology and statistics and, in addition, a number of subjects from the Humanities group.

The degree of Bachelor of Optometry may be awarded at Pass or Honours level.

Holders of the diploma in Optometry may proceed to the conversion course with full credit for their diploma studies. This course may be completed in two or three years of part-time study and leads to the degree of Bachelor of Science, which may be awarded at Pass or Honours level.

Suitably qualified graduates wishing to pursue their studies in

Optometry beyond the Bachelor of Optometry or Bachelor of Science level may enrol with the University as candidates for the degree of Master of Science or Doctor of Philosophy. The regulations setting out the conditions for the award of these degrees are printed in the University Calendar.

SCHOLARSHIPS AND PRIZES

Students are reminded that they may apply to the University Branch Office, Department of Education, University Grounds, University of Sydney, for the award of a Commonwealth Scholarship. Application must be made before 30th November of the year immediately preceding the year in which the scholarship is desired.

A number of prizes are awarded each year for students displaying proficiency in certain subjects of the course.

BACHELOR OF OPTOMETRY DEGREE COURSE

The course leading to the degree of Bachelor of Optometry (B.Optom.) extends over four years of full-time study. The time-tables in the professional years (2nd, 3rd and 4th years) have been arranged so that students will be required to attend the University on five half-days only per week. This arrangement will give students the opportunity to engage in part-time employment with practising optometrists if they so desire. In addition, where students are unable to take the first year as a full-time year, they may complete the subjects of the first year of the course in two part-time years.

FIRST YEAR (30 weeks full-time course)

		<i>Hours per week for 3 terms</i>	
		Lec.	Lab./Tut.
1.001	Physics I	3	3
2.001	Chemistry I	3	3
10.001	Mathematics I	4	2
17.001	General Biology	2	4
		12	12

SECOND YEAR (30 weeks full-time course)

		<i>Hours per week for 3 terms</i>	
		Lec.	Lab./Tut.
1.811	Optometry I	4	4
1.821	Special Anatomy and Physiology	4	4
12.101	Psychology I*	3	0
	English Language and Literature	2	0
		13	8

* This subject is identical with the theory part of the Psychology I course taken by students in the Arts, Science and B.Sc. (Applied Psychology) courses.

THIRD YEAR
(30 weeks full-time course)

		<i>Hours per week for 3 terms</i>	
		Lec.	Lab./Tut.
1.812	Optometry II	6	— 6
1.831	Diseases of the Eye	3	— 1
	Statistics	1½	— ½
	Philosophy <i>or</i> History	1	— 0
	Economics <i>or</i> Government <i>or</i> Psychology <i>or</i> Sociology	1	— 0
		<hr/> 12½	<hr/> — 7½

FOURTH YEAR
(30 weeks full-time course)

		<i>Hours per week for 3 terms</i>	
		Lec.	Lab./Tut.
1.813	Optometry III	6	— 0
1.841	Clinical Optometry	0	— 12
12.741	Psychology II (Special)	2	— 0
	Advanced Elective (Humanities)	2	— 0
		<hr/> 10	<hr/> — 12