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DEGREES GRANTED

The following degrees, administered by the Faculty of Science, may be conferred or awarded by the University of Newcastle:

BACHELOR OF SCIENCE: B.Sc.
MASTER OF SCIENCE: M.Sc.
DOCTOR OF PHILOSOPHY: Ph.D.
DOCTOR OF SCIENCE: D.Sc.

GUIDE FOR STUDENTS — 1966.

The Guide for Students published by the University contains information on the following:

General Information
The University of Newcastle.
The Organisation of the University.
Matriculation Requirements, 1966.
Undergraduate Courses.
Post-Graduate Awards.

Information on Procedures
Enrolment Procedures.
Payment of Fees.
Undergraduate Course Fees and other Fees.
Higher Degree Fees.
Examinations.

General Requirements
General Requirements.
Restrictions on Re-enrolment.
Re-admission after Exclusion.

University Services
The Union.
The Students' Association.
The Sports Union.
The Library.
Counselling Services.
Chaplaincy Service.
Travel Concessions.

STAFF OF THE FACULTY OF SCIENCE

DEAN OF THE FACULTY — Professor C. D. Ellyett.

CHEMISTRY

J. A. Allen, M.Sc.(Qld.), Ph.D.(Bristol), F.R.A.C.I. — Prof.
P. H. Scaife, B.Sc.(N.S.W.) — Teaching Fellow
E. A. Magnuson, B.Sc., Ph.D.(Lond.), Ph.D.(N.S.W.) — Visiting Sr. Lectr.
Mrs. A. Rowley — Secretary

Technical Staff:

K. F. Sorensen — Sr. Lab. Techn.
H. Steigler — Lab. Craftsman
D. Lassam — Lab. Asst.
Miss E. Stewart — Lab. Asst.
J. Talin — Lab. Attend.
R. Gaut — Lab. Attend.
J. Gillespie — Lab. Attend.
J. Smythe — Lab. Attend.

GEOLOGY

Beryl Nashar, B.Sc.(Syd.), Dip.Ed.(Syd.), Ph.D.(Tas.) — Prof.
C. F. K. Diessel, Dipl. Geol. Dr.ar.re.nat.(Berlin) — Lectr.
B. J. Hensen, B.Sc.(Leiden) — Demonstrator

Mrs. J. Ogdens — Secretary
The Faculty of Science comprises the Departments of Chemistry, Geology, Mathematics and Physics, together with the Departments of Geography and Psychology from the Faculty of Arts. Prior to 1960 the science course had been offered under the regulations published in the Calendar of the University of New South Wales, 1960, p. 353, modified in various ways to suit local conditions. It comprised eight science subjects chosen in accordance with the regulations together with prescribed studies in the Humanities.

During 1960 the Council of the University of New South Wales resolved that henceforth the Science course would comprise nine science subjects including Chemistry I, Mathematics I and Physics I, with prescribed Humanities. The regulations set out below implement this decision and have been approved specifically for implementation in Newcastle from the beginning of 1961. These regulations have been adopted by the University of Newcastle until such time as they are replaced by new courses approved by the Council of the University of Newcastle.

Students who were enrolled in 1960 and had completed one Group I subject before 1st March, 1961, will be permitted to complete the course in accordance with the previously existing regulations.

**CONDITIONS FOR THE AWARD OF THE DEGREE OF BACHELOR OF SCIENCE IN THE FACULTY OF SCIENCE**

A Pass degree may be awarded after three years, or an Honours degree after four years, of full-time study. The course may be taken by part-time study.

Students in any doubt as to the choice of their subjects should discuss the matter with the Dean of the Faculty of Science.

**B.Sc. COURSE IN SCIENCE:**

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.*

<table>
<thead>
<tr>
<th>Hours per Week</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Humanities I</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Humanities II</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

*A student who selects an unusual combination of subjects or subjects chosen from more than one group in one year may be required, owing to the exigencies of the time-table to attend for more than the minimum number of years and/or at evening classes.

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**Group I:**

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Hours per Week</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry I</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Mathematics I</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Physics I</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Geology I</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>(Plus 4 days field work)</td>
</tr>
<tr>
<td>Geography I</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>(Plus 4 days field work)</td>
</tr>
<tr>
<td>Psychology I</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Engineering I</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

**Technical Staff:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>F. B. A. Fliskowski</td>
<td>Lab. Techn.</td>
</tr>
<tr>
<td>P. W. McNabb</td>
<td>Sr. Lab. Craftsman</td>
</tr>
<tr>
<td>F. S. Daniels</td>
<td>Lab. Asst.</td>
</tr>
<tr>
<td>J. R. Baskin</td>
<td>Lab. Attend.</td>
</tr>
</tbody>
</table>

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**FACULTY OF SCIENCE**
Group II:
Chemistry II ....... 9
Pure Mathematics II ....... 5
Applied Mathematics II ....... 5
Theory of Statistics I ....... 7
Mathematics II ....... 4
Physics II ....... 10 (Laboratory notebooks are written up in class time)
Geology II ....... 9 (Plus 8 days field work)
Psychology II ....... 7 (Plus 7 days field work)
Geography II ....... 4 (Plus 7 days field work)

Group III:
Geography III ....... 4 (Plus 7 days field work)
Psychology III ....... 8 (Plus 7 days field work)
Chemistry III ....... 12
Chemistry IIII ....... 12
Pure Mathematics III ....... 5
Applied Mathematics III ....... 5
Geology III ....... 12
Geology IIII ....... 12 (Plus 10 days field work)
Physics III ....... 12
Physics IIII ....... 12 (Plus 10 days field work)

2. In order to qualify for admission to the degree of Bachelor of Science under these regulations a candidate must attend the classes, complete laboratory and other assignments and satisfy the examiners in the following subjects:
(a) The Humanities listed under Section I (a), provided that a student may, with the permission of the Dean of the Faculty of Arts, substitute one Arts subject for Humanities II or two Arts subjects for Humanities I and II.
(b) Nine subjects selected from the Science subjects listed under Section I (b) to include four subjects from Group I, three subjects from Group II and two subjects from Group III, provided that:
(i) a student may substitute a subject from Group I for a subject from Group II; and/or
(ii) a student may substitute a subject from Group II for a subject from Group III;
(iii) the proposed course must be approved by the Dean or his representative during enrolment;
(iv) the selected course includes Chemistry I, Physics I, Mathematics I;
(v) the requirements of Section 4, with respect to pre-requisite and co-requisite subjects are satisfied;
(vi) a student may not include in his nine subjects:
(i) Mathematics II and Pure Mathematics II;
(ii) Mathematics II and Applied Mathematics II.

3. Progression in the course is by subject except that Chemistry I, Physics I, Mathematics I and one other Group I subject must be completed within the first two years full-time or four years part-time of the course.
In general, a full-time student should complete his course as follows:

First Year Programme:
Chemistry I, Physics I, Mathematics I and one other Group I subject.

Second Year Programme:
(a) Humanities I
(b) Three subjects from Group II OR Two subjects from Group II and one from Group I.

Third Year Programme:
(a) Humanities II.
(b) Two subjects from Group III OR One subject from Group III and one from Group II.
In general a part-time student should complete his course by spreading each of the suggested full-time yearly programmes over two successive part-time years.

4. (a) Before enrolling for any subject listed in Group II, the student shall have attended the classes, completed laboratory and other assignments 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, completed laboratory and other assignments 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, completed laboratory and other assignments and satisfied the examiners in the subjects indicated as pre-requisites.

Subject:
Physics II
Theory of Statistics I
Chemistry III
Physics III
Geology III
Geology IIII

Pre-requisites:
Mathematics I
Mathematics I
Mathematics I
Pure Mathematics II or Applied Mathematics II
Chemistry I and Physics I
Mathematics I and Physics I

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

Subject:
Applied Mathematics II
Applied Mathematics III
Chemistry IIII
Geology IIII

Co-requisites:
Pure Mathematics II
Pure Mathematics III
Chemistry III
Geology III

5. (a) Where any alteration in the course approved at enrolment is desired the student must obtain the approval of the Dean or his representative for the new course.
(b) A student who wishes to attempt an Honours degree should seek the advice of the Head of the appropriate Department at the end of his first-year programme. (See 3 above.)
(c) A student wishing to enrol in an Honours course in a Department may be required to complete extra work concurrently with the Pass degree work.
HONOURS:

6. (a) A qualified candidate may be admitted to an Honours course in one of the following subjects requiring an extra year of full-time or two extra years of part-time work.
   (i) Chemistry.
   (ii) Geography.
   (iii) Geology.
   (iv) Mathematics.
   (v) Physics.
   (vi) Psychology.

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

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

(d) A student proceeding to Honours in Geography or Mathematics will be required to undertake additional work during his Pass degree course.

DESCRIPTION OF SUBJECTS
DEPARTMENT OF CHEMISTRY

Chemistry I
A course of about 90 lectures and 90 hours laboratory work to be examined by two papers, each of three hours duration. The course will include general chemistry (20 lectures), inorganic chemistry (20 lectures), physical chemistry (25 lectures) and organic chemistry (20 lectures).

Chemistry II
A course of about 120 lectures and 150 hours laboratory work to be examined by four papers, each of two hours duration. The course will be arranged on the following pattern:

<table>
<thead>
<tr>
<th>Lecture</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Term 1</td>
<td>Inorganic</td>
<td>Physical</td>
<td>Analytical</td>
<td>Physical</td>
</tr>
<tr>
<td>Term 2</td>
<td>Inorganic</td>
<td>Physical</td>
<td>Analytical</td>
<td>Physical</td>
</tr>
<tr>
<td>Term 3</td>
<td>Inorganic</td>
<td>Physical</td>
<td>Analytical</td>
<td>Physical</td>
</tr>
</tbody>
</table>

Brief outlines are as follows:

Inorganic Chemistry
Valence; the shapes of molecules and ions; simple crystal structures; co-ordination chemistry; systematic chemistry of the transition elements.

Physical Chemistry
Thermodynamics; phase equilibria; kinetics; surface chemistry.

Analytical Chemistry
Principles of gravimetric, volumetric, electrolytic and colorimetric methods of analysis.

Organic Chemistry
A study of functional groups in aliphatic and aromatic systems with modern theoretical concepts.

Chemistry IIT (for students in Metallurgy)
A course of about 90 lectures and 110 hours laboratory work, to be examined by three papers each of two hours duration. The course will comprise the Inorganic, Physical, and Analytical Chemistry sections of Chemistry II.

Chemistry III
A course of about 120 lectures and 240 hours laboratory work to be examined by four papers, each of three hours duration. The course will be arranged on the following pattern:

<table>
<thead>
<tr>
<th>Lecture</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Term 1</td>
<td>Inorganic</td>
<td>Physical</td>
<td>Analytical Chemistry and Physical Methods</td>
<td>Organic</td>
</tr>
<tr>
<td>Term 2</td>
<td>Inorganic</td>
<td>Physical</td>
<td>Analytical Chemistry and Physical Methods</td>
<td>Organic</td>
</tr>
<tr>
<td>Term 3</td>
<td>Inorganic</td>
<td>Physical</td>
<td>Analytical Chemistry and Physical Methods</td>
<td>Organic</td>
</tr>
</tbody>
</table>
Brief outlines are as follows:

**Inorganic Chemistry**
Modern valency theory; non stoichiometric compounds; unusual bond types; radiochemistry; nuclear fuel processing; actinides and lanthanides; co-ordination chemistry; chemistry of group 8.

**Physical Chemistry**
Thermodynamics of non-ideal systems and systems of variable composition; electrochemistry; electrode processes, electrolytic solutions; kinetics; surface chemistry.

**Analytical Chemistry and Physical Methods**
Chemical equilibria; Physical methods of chemical analysis and structure determination.

**Organic Chemistry**
Stereochemistry; reaction mechanisms; heterocyclic compounds; carbohydrates; amino acids and proteins.

**Chemistry III (for students in Industrial Chemistry)**
A course of about 60 lectures and 120 hours laboratory work to be examined by two papers, each of three hours duration. The course will comprise the Physical and the Organic sections of Chemistry III.

**Chemistry IIIIN**
A course of 90 to 120 lectures with associated laboratory work to be examined by a minimum of three papers, each of three hours duration. The course will comprise a guided selection of topics from the following:
Quantum chemistry; molecular spectroscopy; polymer chemistry; radiation chemistry; theory of analytical separation techniques; modern physical methods of analysis; theoretical organic chemistry; polyfunctional compounds; selected natural products; reaction mechanisms in organic chemistry; applied physical chemistry.

**Chemistry IV**
A course extending over one full-time academic year to be examined by a minimum of three papers, each of three hours duration. The course will comprise:
Part A—Lecture-tutorial courses with directed reading.
Part B—A research project, the results of which are to be embodied in a thesis.

**RESEARCH IN THE DEPARTMENT OF CHEMISTRY**
As required for a balanced approach to chemistry, the research interests of the department cover most aspects of this discipline. Individual research groups concentrate on particular branches of study but there is sufficient overlap to ensure uniform development of all phases.

One group of organic chemists (under Dr. Duewell) is studying the components of Xanthorrhoea resins and other natural products. This research programme includes synthesis of xanthorrheol and related products.

The synthesis of metal complexes and elucidation of their structure interests another group within the department (under Dr. Walker). A range of copper (II) complexes have been studied and currently the metal complexes involved in particular types of solvent extraction systems are under investigation.

Metal complexes containing both inorganic and organic ligands are considered by the theoretical chemistry group (under Dr. Magnusson). The approach of this group may be considered as a combination of chemistry, mathematics and physics. Knowledge from the same three disciplines is utilised in the projects of the physical chemistry section. One team (under Mr. G. Curthoys) is investigating the thermodynamics of the formation of metal complexes in aqueous solution and the adsorption of gases on solids.

The kinetics of reactions involving gases or vapours and solids are studied by another group (under Prof. Allen) in order to elucidate the mechanisms involved and thus contribute to knowledge in the field of catalysis.

An understanding of reaction mechanisms is also one aim of the investigations involving the oxidation of glycols, nitroanilines and hydroxy acids by trivalent iodine compounds (under Dr. Dyall), and the oxidation of nitrogenous compounds by silver oxides (under Prof. Pickering). Mechanism studies also involve the determination of the strengths of acids and bases and the stability of complex compounds.

Modern physico-chemical techniques are applied to each of the problems. Among the techniques currently being utilised are infra-red spectroscopy, visible-U.V. absorption spectroscopy, N.M.R., X-ray diffraction, electro-analytical procedures e.g. polarography, radio-active tracers and gas chromatography.
TEXT BOOK LIST 1966
DEPARTMENT OF CHEMISTRY

Chemistry I
Fundamental Chemistry Andrews and Kokes.
Organic Chemistry Topsom and Vaughan.
Introduction to Semimicro Qualitative Analysis Scorn.

Optional
Structural Principles in Inorganic Compounds Addison.
Chemical Calculations Benson.
OR Theory and Problems of College Chemistry Schaum.

Chemistry II and IIIT

Inorganic Chemistry
Valency and Molecular Structure Cartmell and Fowles.
Inorganic Chemistry Heslop and Robinson.
OR Advanced Inorganic Chemistry Cotton and Wilkinson.
Synthetic Inorganic Chemistry Jolly.
OR Experimental Inorganic Chemistry Palmer.

Physical Chemistry
Physical Chemistry Barrow.
OR Physical Chemistry Moore.
OR Elements of Physical Chemistry Glasstone and Lewis.
Experimental Physical Chemistry Daniels et al.

Analytical Chemistry and Physical Methods
Fundamentals of Analytical Chemistry Skoog and West.

Organic Chemistry (NOT for Chemistry IIIT)
OR Organic Chemistry Morrison and Boyd.
OR Organic Chemistry F. G. Bordwell.
Practical Organic Chemistry Mann and Saunders.
Outline of Organic Chemistry; Problems and Answers C. Hansch and G. Helmkamp.

Chemistry III

Inorganic Chemistry
Valency and Molecular Structure Cartmell and Fowles.
Advanced Inorganic Chemistry Cotton and Wilkinson.
Synthetic Inorganic Chemistry Jolly.
OR Experimental Inorganic Chemistry Palmer.

Optional
Valence Coulson.
Introduction to Co-ordination Chemistry Graddon.

Physical Chemistry
Physical Chemistry Barrow.
OR Physical Chemistry Moore.
Experimental Physical Chemistry Daniels et al.
Thermodynamics for Chemists Glasstone.

Analytical Chemistry and Physical Methods
Instrumental Methods of Chemical Analysis Ewing.

Organic Chemistry
OR Organic Chemistry Morrison and Boyd.
OR Organic Chemistry F. G. Bordwell.
Guidebook to Mechanism in Organic Chemistry Sykes.
Practical Organic Chemistry Mann and Saunders.

Chemistry IIIN and Chemistry IV
CONSULT LECTURERS CONCERNED.

DEPARTMENT OF GEOGRAPHY — SEE FACULTY OF ARTS.
DEPARTMENT OF GEOLOGY

Geology I
A course of three lectures and three laboratory hours per week for three terms, together with four days field work, to be examined by two papers, each of three hours duration. The course covers Material, Physical and Historical Geology. Brief outlines are as follows:

Material Geology
Introductory crystallography, mineralogy and petrology; classification of rocks; economic mineral deposits.

Physical Geology
Erosion cycle; agents of erosion; diastrophism; structural geology; geomorphology.

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

Geology IE (for students in Engineering)
A course of one lecture and two laboratory hours per week for two terms, together with three days field work, to be examined by one paper of three hours duration.

The course introduces the principles of geology and their application to engineering problems.

Geology IT (for students in Metallurgy)
This course will not be offered after 1966. It occupies two hours per week for one term and is examined internally upon completion. The course comprises a brief introduction to crystallography, mineralogy, petrology and economic mineral deposits.

Geology II
A course of three lectures and six laboratory hours per week for three terms, together with eight days field work, to be examined by two papers, each of three hours duration. The course covers Mineralogy, Petrology, Stratigraphy and Palaeontology and Structural Geology and Geotectonics.

Brief outlines are as follows:

Mineralogy
Crystallography; chemistry and physics of minerals; genesis of minerals.

Petrology
Rock forming minerals; intrusive and extrusive igneous bodies; crystallization from a magma; petrography and classification of igneous and metamorphic rocks.

Stratigraphy and Palaeontology
Stratigraphy of Australia; invertebrate palaeontology.

Structural Geology and Geotectonics
Nomenclature and origin of diastrophic and non-diastrophic structures.

Geology III
A course of five lectures and seven laboratory hours per week for three terms, together with ten days field work, to be examined by four papers each of three hours duration. The course covers Advanced Petrology, Stratigraphy and Palaeontology, Structural Geology and Economic Geology.

Brief outlines are as follows:

Advanced Petrology
Petrogenesis; Petrographic techniques of igneous, metamorphic and sedimentary rocks.

Stratigraphy and Palaeontology
Principles of stratigraphy; world stratigraphy; micro-palaeontology; theoretical and evolutionary palaeontology.

Structural Geology
Advanced structural geology and geotectonics; photogeology.

Economic Geology
Ore mineralogy; principles of formation and classification of mineral deposits; problems of ore genesis; ore microscopy.

Geology III N
A course in applied geology of five lectures and seven laboratory hours per week for three terms, together with ten days field work, to be examined by four papers each of three hours duration. The course covers Geology of Fuels, Geophysics, Exploration and Mining Geology, Advanced Mineralogical Techniques and Engineering Geology.

Brief outlines are as follows:

Geology of Fuels
Properties and classification, origin and genesis, world and geological distribution of coal and petroleum.

Geophysics
Geophysical characteristics of the earth and its components; principles and application of geophysical techniques.

Exploration and Mining Geology
Geology applied to exploration and development of mineral resources.

Advanced Mineralogical Techniques
Advanced optical techniques, X-ray crystallography, differential thermal analysis, thermal gravimetric analysis and staining techniques.

Engineering Geology
Soil mechanics; engineering properties of rocks, subsurface water; geological problems in engineering design and construction; sedimentation engineering.

Geology IV
A course extending over one full-time academic year, to be examined by a minimum of three papers, each of three hours duration.

PART A—Lecture—tutorial courses with directed reading.

PART B—A research project, the results of which are to be embodied in a thesis.
RESEARCH ACTIVITIES IN DEPARTMENT OF GEOLOGY

The detailed Geology of the Hunter Valley in all its aspects is the concern of all members of staff but individual or team research projects include the petrology and petrogenesis of coal and associated sediments, sedimentation studies, secondary minerals and the role of chromatography in geology.

Dr. C. F. K. Diesell is carrying out detailed petrologic investigations of the South Coast and Newcastle coals in order to elucidate their genesis and the influence of their composition on technological problems such as coking, sizing and washing while Dr. S. St.J. Warne is undertaking detailed studies of the development and application of advanced mineralogical techniques directed towards the elucidation of coal mineral matter problems applied to coal seam correlation, washing, coking, etc.

Mr. J. H. Rattigan is studying evidence of cyclic sedimentation in the late Carboniferous and early Permian sediments of the Hunter Valley as well as deformational structures in Carboniferous varved shales and associated sediments.

In collaboration with Mr. R. Basden (Chemistry Department), Professor Nashar is carrying out laboratory studies on the solubility of basalt under atmospheric conditions and the derived solutes.

The role of chromatography in geology has claimed the attention of Mr. A. S. Ritchie who is seeking chromatographic methods applicable to the analysis of geologic materials under field and base camp conditions.

TEXT BOOKS FOR 1966
DEPARTMENT OF GEOLOGY

Geology I
Dana's Minerals and How to Study Them (3rd. Ed.) Hurlbut (Editor).
OR
Geology (5th. Ed.) Emmons, Allison, Stauffer and Thiel.
Essentials of Earth History Stokes.
Distribution of the Elements in our Planet Ahrens.

Geology II
Mineralogy Berry and Mason.
Petrography Williams, Turner and Gilbert.
Outlines of Structural Geology Hills.
Palaeontology Woods.

Geology III
Ore Deposits Park and McDiamid.
Elements of Structural Geology Hills.

Geology IV
VIII Commonwealth Mining Congress, Melbourne.
Structural Methods for the Exploration Geologist Badgley.
Manual of Field Geology Compton.
Geology and Engineering (2nd. Ed.) Legget.
Principles of Engineering Geology and Geotechnics McKinstry.
Soil Mechanics in Engineering Practice Terzaghi and Peck.
Mining Geology McKinstry.

Geology V
Geology and Engineering (2nd. Ed.) Legget.

Geology VI
Dana's Minerals and How to Study Them (3rd Ed.) Hurlbut (Editor).
MATHEMATICS I
A course of four lectures and two tutorial hours per week for three terms, covering the following topics:
Differential calculus, integral calculus and their applications; special functions; differential equations; number systems, matrices and determinants; introduction to groups and rings; co-ordinate geometry in two and three dimensions; introduction to vectors and their applications.
From time to time there is an option for students to take a course of more advanced lectures.

PURE MATHEMATICS II
A course of four lectures and one tutorial hour per week for three terms arranged on the following pattern:

<table>
<thead>
<tr>
<th>Lecture</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Term 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linear</td>
<td></td>
<td>Analysis</td>
<td>Calculus (Several variables)</td>
<td>Vector Calculus</td>
</tr>
<tr>
<td>Algebra</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>Term 2</td>
<td></td>
<td>Linear</td>
<td>Differential Equations</td>
<td>Complex Variable</td>
</tr>
<tr>
<td>Algebra</td>
<td>E</td>
<td>F</td>
<td>G</td>
<td>H</td>
</tr>
<tr>
<td>Term 3</td>
<td></td>
<td>Differential Geometry</td>
<td>Complex Variable</td>
<td>Calculus</td>
</tr>
<tr>
<td></td>
<td>J</td>
<td>K</td>
<td>L</td>
<td>M</td>
</tr>
</tbody>
</table>

PURE MATHEMATICS II DISTINCTION
The course consists of all the topics in Pure Mathematics II together with two lectures per week for three terms on topics including the following:
Analysis of the real number system; real variable theory; theory of groups and rings.
An essay on a general topic will also be required.

APPLIED MATHEMATICS II
A course of four lectures and one tutorial hour per week for three terms arranged on the following pattern:

<table>
<thead>
<tr>
<th>Lecture</th>
<th>1</th>
<th>2</th>
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<th>4</th>
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</thead>
<tbody>
<tr>
<td>Term 1</td>
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<tr>
<td>Dynamics</td>
<td>N</td>
<td>P</td>
<td>Q</td>
<td>R</td>
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<tr>
<td>Term 2</td>
<td></td>
<td>FORTRAN Programming</td>
<td>Hydro-dynamics</td>
<td>Statistics</td>
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<td>S</td>
<td>T</td>
<td>U</td>
<td>V</td>
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<tr>
<td>Term 3</td>
<td></td>
<td>Electro-Magnetism</td>
<td>Hydro-dynamics</td>
<td>Statistics</td>
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<tr>
<td></td>
<td>W</td>
<td>X</td>
<td>V</td>
<td>Z</td>
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</table>

APPLIED MATHEMATICS II DISTINCTION
The course consists of all the topics in Applied Mathematics II together with two lectures per week for three terms on topics including the following:
Statistics; numerical analysis; elasticity; waves and vibrations; calculus of variations; probability.

THEORY OF STATISTICS I
A course of four lectures and three hours per week of tutorial and laboratory work for three terms comprising the following:
Probability; variates; standard and sampling distributions; point and interval estimation; tests of significance; regression.
NOTE: This course will not be available in 1966.

MATHEMATICS II
A course of four lectures per week for three terms, comprising twelve modules selected from Pure Mathematics II and Applied Mathematics II as follows:
1st Term — Modules C D Q R.
2nd Term — Modules G H U V.
3rd Term — Modules L M Y Z.
Part-time students may take Mathematics II in two parts, each of two lectures per week for three terms:
Mathematics II, Part 1, Comprises Modules C, D, G, H, L, M.

MATHEMATICS III
The course comprises the following Modules:
1st Term — Modules C, Q, R.
2nd Term — Modules G, V.
3rd Term — Module Z.

PURE MATHEMATICS III
A course of four lectures and one tutorial hour per week for three terms, comprising the following:
Analysis of the real number system; real variable theory; metric topology; theory of groups and rings; general topology; complex variable theory; differential equations.

PURE MATHEMATICS III DISTINCTION
A course of six lectures and one tutorial hour per week for three terms, including topics from the following:
Analysis of the real number system; real variable theory; metric topology; theory of groups and rings; general topology; complex variable theory; differential equations. Further work on topology, complex variable and differential equations; general algebra; measure theory.
An essay on a general topic will also be required.

APPLIED MATHEMATICS III
A course of four lectures and one tutorial hour per week for three terms, comprising the following:
Calculus of variations; numerical analysis; mechanics of continuous media; Cartesian and general tensors; special relativity; statistics.

APPLIED MATHEMATICS III DISTINCTION
A course of six lectures and one tutorial hour per week for three terms, including topics from the following:
Calculus of variations; numerical analysis; mechanics of continuous media; special relativity; statistics. Further work on numerical analysis and mechanics of continuous media; integral transforms; quantum mechanics; probability.
MATHEMATICS IV
A course extending over one full-time academic year, to be examined by a minimum of three papers, each of three hours duration.

PART A—Lectures, reading-tutorial courses, and seminars, as required.

PART B—A thesis, i.e. a study under direction of a special topic using relevant published material and presented in written form.

10.051 MATHEMATICS
An elementary course for students in the Faculty of Architecture. Two lectures per week are given for three terms. The course comprises the following:
Practical applications of trigonometry. Analytical geometry, including some work on conic sections. Further work on calculus and a study of the equation $y''=f(x)$ with a variety of boundary conditions.

RESEARCH IN DEPARTMENT OF MATHEMATICS

Research is being carried out in a wide variety of problems in pure and applied mathematics, with work in numerical analysis and computing providing the links between the various branches.

An active programme in algebra is at present being developed. The main participants are Professor I. D. Macdonald and Mr. W. Brisley, with a further strong appointment in this field awaited in 1966. Interest is focussed on the theory of groups, and work has been done on varieties of groups (especially p-groups), FC-groups, generators and relations, group products, nilpotent groups, and related topics. Applications of electronic computing to group theory is receiving attention, with the co-operation of Dr. I. L. Rose and Mr. J. A. Lambert.

Another aspect of pure mathematics, namely differential geometry, is receiving the attention of Mr. J. R. Giles. He is attempting to generalise Rund's method for developing the differential geometry of Minkowsky spaces as a type of semi-inner-product space. This axiomatic generalisation eliminates the explicit reference to differentiability of the norm function and permits extension to infinite dimensional spaces.

On the applied side, Mr. W. T. F. Lau is concerned with fluid dynamics and in particular with some unsolved problems on potential flow theory. Two problems are currently being investigated: the first is in connection with two dimensional flow in the neighbourhood of stagnation point and the second is the difficult interaction problem of a jet with a stream of different total head.

Mr. J. A. Lambert is carrying on research in statistics. He is presently studying the likelihood surface for samples from 4-parameter log-normal distributions in order to estimate the parameters. The approach is being applied to eliminate the singularities in the likelihood surface. This places emphasis on the essential discreet nature of any observed random variate.

Dr. I. L. Rose is investigating the use and properties of an invariant matrix for polynomial representations and numerical interpolation; this is in the field of numerical analysis. He is also carrying on his work in quite a different field, namely the mathematical aspects of porous conduits.

Further activities include the development of special-purpose computer programmes for various departments, including supporting programmes for research in the Department of Mathematics; some work in neurodynamics; and research in mathematics teaching, notably the preparation of programmed texts by several members of the staff.
TEXT BOOKS FOR 1966
DEPARTMENT OF MATHEMATICS

MATHEMATICS I
Complementary Mathematics Edited by A. Keane and S. A. Senior.
Differential and Integral Calculus
Frank Ayres (Schaum Publishing Co.).
Higher Algebra for the Undergraduate (2nd Ed.)
M. J. Weiss and R. Dubisch.

PURE MATHEMATICS II
Advanced Calculus W. Kaplan.
Mathematical Methods Edited by A. Keane and S. A. Senior.
Linear Algebra and Matrix Theory E. D. Nering.
The Laplace Transform: An Introduction E. D. Rainville.
Introduction to Topology B. Mendelson.
Differential Geometry C. E. Weatherburn.

APPLIED MATHEMATICS II
Vector Analysis H. E. Newell.
Electricity A. Coulson.

MATHEMATICS II
Mathematical Methods Edited by A. Keane and S. A. Senior.
Vector Analysis H. E. Newell.

MATHEMATICS II, PART I
Mathematical Methods Edited by A. Keane and S. A. Senior.
Vector Analysis H. E. Newell.

MATHEMATICS II, PART II
Mathematical Methods Edited by A. Keane and S. A. Senior.

MATHEMATICS III
Mathematical Methods Edited by A. Keane and S. A. Senior.

PURE MATHEMATICS III
Introduction to Topology and Modern Analysis G. F. Simmons (International Student Edition).
Topics in Algebra I. N. Herstein.

APPLIED MATHEMATICS III
Elements of Tensor Calculus A. Lichnerowicz.
Cartesian Tensors H. Jeffreys.
Special Relativity W. Rindler.
Introduction to Numerical Analysis F. B. Hildebrand.

DEPARTMENT OF PHYSICS

PHYSICS I
A general course comprising all fields of physics at an elementary level for students in the Faculty of Architecture. A course of about 60 hours lectures and demonstrations; a final examination of three hours.

PHYSICS II
The course includes study of mechanics, properties of matter, heat, light, wave motion, sound, electricity and magnetism. The first term work will be common to all students. For the second and third terms, depending on school grading in the subject and first term performance, the class will be divided into Physics IA and Physics IB.
The Physics IA course will assume a rather elementary prior knowledge of the subject, and the syllabus will be a general introductory one.
The Physics IB course will assume a rather greater knowledge of Physics on entrance. The introductory material will be covered at a faster rate and additional lecture material of a broader scope, such as some elements of astronomy, will be introduced. Both courses will be of the same length, involving about 90 lectures, together with 90 hours of laboratoy/tutorial work, together with a final examination of two three-hour papers.
Second year work will not be transferred into Physics IB. Consequently a satisfactory pass in either Physics IA or Physics IB will qualify for entry to Physics II.
(A detailed syllabus for Physics I and Physics II students will be issued early in the year.)

PHYSICS I
A course which includes the following:
1. Electricity and Magnetism:
2. Electronics:
   A survey of the principles of electronic circuitry, using valves.
3. Physical Optics and Radiation:
   Electromagnetic wave and quantum concepts; interference; diffraction; polarization.
4. Atomic Physics:
   Quantum theory of radiation; X-rays; nucleus, isotopes, radioactivity; optical spectra; Bohr theory.
5. Solid State Physics:
   Electronic and thermal properties of solids; the perfect solid; defects in solids; strength of solids.
6. Thermodynamics and Kinetic Theory:
   The first and second laws of thermodynamics; specific heats; ideal gases; Carnot cycle; entropy; absolute scale of temperature; the approach to absolute zero; practical cycles; kinetic molecular theory; van der Waal's equation; Maxwell distribution; mean free path; transfer phenomena; introduction to the classical statistical mechanics.
7. Electromagnetism:
   Introductory field concepts; law of force; constitutive equations; Maxwell's equations, electromagnetic wave propagation in free space.
RESEARCH ACTIVITIES IN DEPARTMENT OF PHYSICS

A. SPECTROSCOPY (Dr. S. Baker)

Development of the Ebert scanning monochrometer continues and resolution exceeding 500,000 in the visible region has been attained. Vacuum plant and a microwave oscillator are now ready for the preparation and excitation of spectra. Hyperfine structures of selected substances are being examined directly.

B. EXO-ELECTRON EMISSION (Mr. J. Ramsey)

Electron emission from freshly abraded aluminum under high and ultra-high vacuum is being studied. It has been found that the development of the emitting surface is due to residual gas interaction subsequent to the development of the mono layer. Further lines of work are clearly indicated.

C. IONOSPHERIC AND SPACE PHYSICS (Professor C. Ellyett)

(i) The major effort under this heading, involving a team of about six people, is a study of micropulsations of the earth's magnetic field. A field-station is now operational near Patterson, some 20 miles from Newcastle. Equipment is being built to measure the velocity of hydromagnetic waves, which appear as micropulsations at the earth's surface. The project is supported by the Office of Naval Research, U.S.N.

(ii) Studies are also commencing at Patterson on the measurement of solar radio noise and of ionospheric absorption produced most probably at mid-latitudes by solar X-ray emission. This project is supported both by the Australian Radio Research Board and the U.S.A.F.

(iii) Computational work is under way on meteor incidence on the earth's upper atmosphere. This project is supported by N.A.S.A. (U.S.A.)
TEXT BOOKS FOR 1966
DEPARTMENT OF PHYSICS

PHYSICS 1.011 (for Architects)
Physical Science Study Committee “Physics” (Heath).

PHYSICS I
Physics for Students of Science and Engineering
Halliday and Resnick.

PHYSICS II AND III
Physics for Students of Science and Engineering
Intermediate Electromagnetic Theory .................................................. Halliday and Resnick.
Elementary Modern Physics .......................................................... Nebendahl and Sells.
Modern Physics .................................................................................. Sproull.

Additional for Science Students
Principles of Mechanics ................................................................. Syng and Griffith.
An introduction to Thermodynamics, the Kinetic Theory of Gases, and Statistical Mechanics ........... Sears.

PHYSICS III
Introduction to Modern Physics Richtmeyer, Kennard and Lauritsen,
Fundamentals of Modern Physics ......................................................... Eiseberg.
Electricity and Magnetism ................................................................. Bleaneys and Bleaneys.
Vacuum Tube and Solid-conductor Electronics ........................................ Millman.
Classical Thermodynamics ................................................................. Jenkins and White.
Optics .................................................................................................. Cobine.
Gaseous Conductors ................................................................................ Cobine.
Introduction to Statistical Thermodynamics .............................................. Hill.
Solid State Physics ................................................................................. Dekker.

OR
Introduction to Solid State Physics (2nd Ed.) ........................................ Kittell.
RECOMMENDED FOR PRELIMINARY AND PARALLEL READING:
Elementary Solid State Physics ........................................................ Kittell.
Introduction to Statistical Mechanics for Physicists ................................. Kittell.

PHYSICS IV
TEXT-BOOK TITLES SHOULD BE OBTAINED FROM THE LECTURERS CONCERNED.

DEPARTMENT OF PSYCHOLOGY—SEE FACULTY OF ARTS

CONDITIONS FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE

1. An application to register as a candidate for the degree of Master of Science shall be made on the prescribed form which shall be lodged with the Dean at least one full calendar month before the commencement of the term in which the candidate desires to register.

2. An applicant for registration for the degree of Master shall have been admitted to the degree of Bachelor of Science in the University of Newcastle, or other approved University, in an appropriate School.

3. (i) In exceptional cases persons may be permitted to register as candidates for the degree of Master if they submit evidence of such academic and professional attainments as may be approved by the Senate.
(ii) The registration of diplomas of the New South Wales Department of Technical Education as candidates for the degree of Master of Science shall be determined in each case by the Senate. Normally, such applicants shall be required to produce evidence of academic and professional progress of a period of five years from the time of gaining the diploma.

4. Notwithstanding any other provisions of these regulations the Senate may require an applicant to demonstrate his fitness for registration by carrying out such work and sitting for such examinations as the Senate may determine.

5. In every case, before permitting an applicant to register as a candidate, the Senate shall be satisfied that adequate supervision and facilities are available.

6. An applicant approved by the Senate shall register in one of the following categories—
   (i) Student in full-time attendance at the University.
   (ii) Student in part-time attendance at the University.

7. (i) Every candidate for the degree shall be required to submit a thesis embodying the results of an original investigation or design, to take such examinations and to perform such other work as may be prescribed by the Senate. The candidate may submit also for examination any work he has published, whether or not such work is related to the thesis.
(ii) The investigation or design and other work as provided in paragraph 7 (i) shall be conducted under the direction of a supervisor appointed by the Senate or under such conditions as the Senate may determine.
(iii) Every candidate shall submit three copies of the thesis as provided under paragraph 7 (i). All copies of the thesis shall be in double-spaced typescript, shall include a summary of approximately 200 words, and a certificate signed by the candidate to the effect that the work has not been submitted for a higher degree to any other University or institution. The original copy of the thesis for deposit in the Library shall be prepared and bound in a form approved by the University.† The other two copies of the thesis shall be bound in such manner as allows their transmission to the examiners without possibility of their disarrangement.
(iv) It shall be understood that the University retains the three copies of the thesis and is free to allow the thesis to be consulted or borrowed. Subject to the provisions of the Copyright Act (1912-1950) the University may issue the thesis in whole or in part in photostat or microfilm or other copying medium.

8. No candidate shall be considered for the award of the degree until the lapse of six complete terms from the date from which the registration becomes effective, save that in the case of a candidate who has obtained the degree of Bachelor with Honours or who has had previous research experience, this period may, with the approval of the Senate, be reduced by up to three terms.

9. The candidate shall give in writing two months’ notice of his intention to submit his thesis and such notice shall be accompanied by the appropriate fee.
10. For each candidate there shall be two examiners appointed by the Senate, one of whom shall, if possible, be an external examiner.

† Separate sheet on the preparation and binding of higher degree theses is available on application.

CONDITIONS FOR THE AWARD OF DEGREE OF DOCTOR OF PHILOSOPHY IN THE DIVISION OF SCIENCE

1. The degree of Doctor of Philosophy may be granted by the Council on the recommendation of the Senate to a candidate who has made an important contribution to knowledge and who has satisfied the following By-laws and Regulations made in accordance with these By-laws.

QUALIFICATIONS

2. A candidate for registration for the degree of Ph.D. shall:
   (i) hold an honours degree from the University of Newcastle; or
   (ii) hold an honours degree of equivalent standing from any other approved University; or
   (iii) if he holds a degree without honours from the University of Newcastle or an approved University has achieved by subsequent work and study a standard recognised by the Board as equivalent to honours; or
   (iv) in exceptional cases, submit such other evidence of general and professional qualifications as may be approved by the Senate.

3. When the Senate is not satisfied with the qualifications submitted by a candidate, the Senate may require him, before he is permitted to register, to undergo such examination or carry out such work as the Senate may prescribe.

REGISTRATION

4. A candidate for registration for a course of study leading to the degree of Ph.D. shall:
   (i) apply to the Faculty Office on the prescribed form at least one calendar month before the commencement of the term in which he desires to register; and
   (ii) submit with his application a certificate from the Head of the Department in which he proposes to study stating that the candidate is a fit person to undertake a course of study leading to the Ph.D. degree and that the Department is willing to undertake the responsibility of supervising the work of the candidate and of reporting to the Senate at the end of the course on the merits of the candidate's performance in the prescribed course of study.

COURSE OF STUDY

5. Subsequent to registration, the candidate shall pursue a course of advanced study and research for at least nine academic terms, save that:
   (i) a candidate who is not fully engaged in research work for his degree will be required to satisfy the Senate on the amount of time he can devote to research work for the degree; and
   (ii) he may not proceed to the degree before the expiration of ten academic terms from the date of registration as a candidate.

   (i) any candidate who before registration was engaged upon research to the satisfaction of the Senate, may be exempted from three academic terms.

6. A candidate shall present himself for examination not later than fifteen academic terms from the date of his registration, unless special permission for an extension of time be granted by the Senate.

7. The course, other than field work, must be carried out in a Department of the University, under the direction of a supervisor appointed by the Senate, or under such conditions as the Senate may determine, save that a candidate may be granted special permission by the Senate to spend a period of not more than three academic terms in research at another institution approved by the Senate.

8. Not later than three academic terms after registration the candidate shall submit the subject of his thesis for approval by the Senate. After the subject has been approved it may not be changed except with the permission of the Senate.

9. A candidate may be required to attend a formal course of study appropriate to his work.

THESIS

10. On completing his course of study every candidate must submit a thesis which complies with the following requirements:
   (i) The greater proportion of the work described must have been completed subsequent to registration for the Ph.D. degree.
   (ii) It must be a distinct contribution to the knowledge of the subject.
   (iii) It must be written in English and reach a satisfactory standard of literary presentation.

11. The thesis must consist of the candidate's own account of his research. In special cases work done conjointly with other persons may be accepted provided the Senate is satisfied on the candidate's part in the joint research.

12. Every candidate shall be required to submit with his thesis a short abstract of the thesis comprising not more than 300 words.

13. A candidate may not submit as the main content of his thesis any work or material which he has previously submitted for a University degree or other similar award.

14. It shall be understood that the University retains four copies of the thesis and is free to allow the thesis to be consulted or borrowed. Subject to the provisions of the Copyright Act (1912-1950) the University may issue the thesis in whole or in part in photostat or microfilm or other copying medium.

ENTRY FOR EXAMINATION

15. The candidate shall give in writing two months' notice of his intention to submit his thesis and such notice shall be accompanied by the appropriate fee.

16. Four copies of the thesis shall be submitted together with a certificate from the supervisor that the candidate has completed the course of study prescribed in his case.

17. The thesis shall be in double-spaced typescript. The original copy for deposit in the Library shall be prepared and bound in a form approved by the University. The other three copies shall be bound in such manner as allows their transmission to the examiners without possibility of disarrangement.

18. The candidate may also submit as separate supporting documents any work he has published, whether or not it bears on the subject of the thesis.

19. The Senate shall appoint the examiners, two of whom shall normally be external examiners.
20. After the examiners have read the thesis they may—
(i) without further test recommend the candidate for rejection; or
(ii) request additional work on the thesis before proceeding further with the examination.

21. If the thesis reaches the required standard, the examiners may arrange for the candidate to be examined orally, and, at their discretion, by written papers and/or practical examinations on the subject of the thesis and/or subjects relevant thereto.

22. If the candidate's work is inadequate but the candidate fails to satisfy the examiners at the oral or other examinations, the examiners may recommend the University to permit the candidate to re-present the same thesis and submit to a further oral, practical or written examination within a period specified by them but not exceeding eighteen months.

23. At the conclusion of the examination, the examiners will submit to the Senate a concise report on the merits of the thesis and on the examination results.

CONDITIONS FOR AWARD OF DEGREE OF DOCTOR OF SCIENCE

1. The degree of Doctor of Science may be granted by the Council on the recommendation of the Senate for an original contribution (or contributions) of distinguished merit to some branch of Science, Engineering or Applied Science.

2. A candidate for the degree of Doctor of Science shall hold a degree of the University of Newcastle or an approved university or shall have been admitted to the status of such degree. No candidate shall present himself for the degree of Doctor of Science unless five years after the award of his original degree.

3. The degree shall be awarded on the published work* of the candidate although in special circumstances additional unpublished work may be considered provided that these circumstances are recognised as sufficient by the Senate.

4. A candidate for the degree shall forward to the Vice-Principal an application, including—
   (i) Four copies (wherever possible) of the work referred to in paragraph 3.
   (ii) Any additional work, published or unpublished, which he may desire to submit in support of his application.
   (iii) A Statutory Declaration indicating those sections of the work, if any, which have been submitted previously for a degree or diploma in any University.

5. Every candidate in submitting his published work and such unpublished work as he deems appropriate shall submit a short discourse describing the research activities embodied in his submission. The discourse shall make clear the extent or originality and the candidate's part in any collaborative work.

6. The work shall be submitted to a committee of three examiners appointed by the Senate who may require the candidate to answer orally or in writing any questions concerning his work.

* In these regulations, the term "published work" shall mean printed in a periodical or as a pamphlet or as a book readily available to the public. The purpose of requiring publication is to ensure that the work submitted has been available for criticism by relevant experts, and examiners are given discretion to disregard any of the work submitted if, in their opinion, the work has not been so available for criticism.
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<tr>
<th>Course</th>
<th>Days</th>
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<td><strong>PSYCHOLOGY I</strong></td>
<td>Mon. 2, 3</td>
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<td>Tues. 3</td>
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<td><strong>HUMANITIES I</strong></td>
<td>Mon. 9, 10</td>
<td>M218</td>
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<td><strong>CHEMISTRY II</strong></td>
<td>Mon. 11</td>
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<td>or (Mon. 6-8:30 SS3 and</td>
<td>or Thurs. 6-8:30 SS3/MG24*</td>
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<td>Laboratory (at Shortland)</td>
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<td>Tues. 9, 10</td>
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<td>Wed. 11, 12 M203</td>
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<td>Part 2</td>
<td>Tues. 9, 10 A-G28</td>
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<td>Mon. 2</td>
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<td>Laboratory (at Shortland)</td>
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<td><strong>GEOGRAPHY II</strong></td>
<td>Tues. 5, 6</td>
<td>A-G28</td>
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<td>Fri. 5, 6</td>
<td>A-G28</td>
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<td><strong>PSYCHOLOGY II</strong></td>
<td>Wed. 5</td>
<td>A-132</td>
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<td>Wed. 7</td>
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<td>Thurs. 5, 6</td>
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<tr>
<td>Laboratory</td>
<td>Mon. 2, 3</td>
<td>A-132</td>
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<td>or Mon. 5, 6</td>
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**HUMANITIES II**
- Tues. 9, 10 M218
- Wed. 7 B-01
- Thurs. 8 A-127
- Laboratory (at Tighes Hill)
- Mon. 1-5 SS3
- Thurs. 1-5 MG24*/S42†
- 1st half-year.

**CHEMISTRY III**
- Mon. 9 S40
- Tues. 11 S40
- Thurs. 10, 11 S40
- Laboratory (at Tighes Hill)
- Mon. 6-10 S3
- Thurs. 1-5 MG24*/S42†
- 1st half-year. 2nd half-year.

**CHEMISTRY III N**
- Mon. 6 S1
- Tues. 6 S1
- Wed. 5 S1
- Fri. 5 S1

**GEOLOGY III**
- Mon. 4 C-G04
- Tues. 6 C-G04
- Wed. 9 C-G04
- Thurs. 2 C-G04
- Fri. 6 C-G04
- Laboratory (at Shortland)
- Mon. 6-9 and Thurs. 9-1

**PURE MATHEMATICS III**
- Mon. 2, 3 A-G25
- Mon. 5 A-G25
- Mon. 10, 11 A-G24

**APPLIED MATHEMATICS III**
- Mon. 4 M123
- Tues. 4, 5 M123
- Thurs. 4, 5 M123

**PHYSICS III**
- Mon. 11, 12 D-G08
- Wed. 9 D-G08
- Fri. 10 D-G08
- Laboratory (at Shortland)
- Mon. 1-5 and Wed. 1-5

**GEOGRAPHY III**
- Mon. 5, 6 A-LG16
- Thurs. 5, 6 A-LG16

**PSYCHOLOGY III**
- Mon. 5, 6 A-LG24
- Tues. 5, 6 A-LG29
- Seminar
- Lab. Wed. 4-5 or Thurs. 7-8
- Laboratory
- Wed. 2-4 or Wed. 5-7