FACULTY OF MATHEMATICS
HANDBOOK 1975

THE UNIVERSITY OF NEWCASTLE
NEW SOUTH WALES 2308
May I first welcome all those students who are enrolled, or are contemplating enrolling, in the Faculty of Mathematics. I assure you that the staff of the Faculty will always be ready to help with your proposed course and to discuss other academic matters with you.

Your desire to study mathematics is, I am sure, based on the conviction that mathematics will be the most enjoyable of all those disciplines open to you—there can be no better reason. If you enjoy mathematics you will welcome the demands it makes upon you and your studies will be most rewarding. May I commend to you the essay on Mathematics by Professor E. C. Zeeman in the book *University Choice* (edited by Klaus Boehm) pp. 261-270, Penguin 1966.

Although Faculties of Mathematics are not uncommon overseas, the Faculty of Mathematics at the University of Newcastle was the first in Australia. This lead has now been followed by the University of Adelaide.

In constituting this Faculty the Council of the University recognised the central role of mathematics in most universities, and especially in Newcastle.

The Senate, before recommending the proposal to Council, had considered very carefully two crucial questions:

- how best can the needs of students requiring studies in mathematics, supplementary and complementary to their principal subject of study, be met;
- how best can the needs of students reading mathematics as their major discipline, be met?

Senate concluded that the broad applicability and servicing aspects of mathematics constituted the strongest argument for the location of mathematics in an independent faculty. Such a faculty would be able to arrange appropriate combined degree courses emphasising these areas of application. The needs of the student specialising in mathematics would also be best met by an independent faculty.

This handbook details the manner in which the Faculty of Mathematics is implementing the wishes of Council and Senate. The postgraduate course leading to the award of the Diploma in Computer Science introduced in 1972, has proved particularly successful. The major innovation for 1975 is the provision for concurrent studies leading to the award of two degrees. The first of these would be Bachelor of Mathematics; but the other may be Bachelor of Arts, Commerce, Metallurgy or Science. Full details are given on pp. 13.

The application of mathematics to physical problems has, of course, been well established for centuries, but mathematics is now used in a large number of other endeavours, and this number is rapidly
increasing. This wide spectrum of applications is reflected in the provision for joint honours degrees and also in the membership of the Faculty Board on which almost all departments of the University are represented.

The needs of students who wish to specialise in mathematics are met not only by the provision of topics in the conventional disciplines of pure mathematics, applied mathematics and statistics, but also by the provision of topics in computing science, operations research and other aspects of modern applied mathematics. It is confidently expected that the number of topics offered will increase as the University expands. Summaries of all topics offered in 1975 appear in this handbook.

Finally, may I encourage you to take an active part in other facets of University life. You should find there is time available for these general activities in addition to that required for your studies.

R. G. KEATS
Dean
Faculty of Mathematics

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Faculty of Mathematics

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REQUIREMENTS FOR THE DEGREE OF BACHELOR OF MATHEMATICS

SECTION 1 — GENERAL

1. Definitions
In these Requirements, unless the contrary intention appears, “the Faculty” means the Faculty of Mathematics and “the Faculty Board” means the Faculty Board of the Faculty of Mathematics.

2. Grading of Degree
The degree of Bachelor of Mathematics may be conferred either as an ordinary degree or as an honours degree.

3. Approval of First Enrolment
A candidate when enrolling in the Faculty for the first time shall report in person to the Dean, or his nominee, to have his enrolment for that year approved.

4. Timetable Requirements
No candidate may enrol in any year for any combination of subjects which is incompatible with the requirements of the timetable for that year.

5. Annual Examinations
The Annual Examinations shall normally be held at the end of third term and shall be conducted by means of written examinations supplemented by such oral or practical work testing as the examiners think fit.

6. Special Examinations
A candidate may be granted a special examination in accordance with the provisions of By-Law 5.9.3.

7. Examination Grades
The results of successful candidates at Annual Examinations and Special Examinations shall be classified:
High Distinction, Distinction, Credit, Pass.

8. Withdrawal
(a) A candidate may withdraw from a subject only by notifying the Secretary of the University in writing of his withdrawal within seven days of the date of withdrawal.
(b) A candidate who withdraws after the sixth Monday in second term from a subject in which he has enrolled shall be deemed to have failed in that subject. However, such a candidate may apply to the Dean, who, after consultation with the Head of Department concerned, may allow him to withdraw without penalty.
9. Subjects Offered

(a) A candidate shall select at least five of his subjects from the Schedules appended to these Requirements and shall comply with the rules relating to the selection of subjects set out in the Schedule.

(b) Up to four subjects from those offered in other degree courses in the University may, with the permission of the Dean, be counted as qualifying subjects for the degree. When approving a subject, the Dean shall determine whether the subject concerned shall be classified as Part I; Part II; Part III; or Part IV.

10. Relaxing Clause

In order to provide for exceptional circumstances arising in particular cases, the Senate, on the recommendation of the Faculty Board, may relax any requirement.

SECTION II — THE ORDINARY DEGREE

11. A Subject

(a) To complete a subject qualifying towards the degree, hereinafter called a subject, a candidate shall attend such lectures, tutorials, seminars, laboratory classes and field work and submit such written work as the Department concerned shall require.

(b) To pass a subject a candidate shall satisfy the requirements of the previous clause and pass such examinations as the Faculty Board concerned shall require.

12. Degree Patterns

Except as provided in Section IV of these Requirements,

(a) to qualify for the ordinary degree a candidate shall pass nine subjects provided that:

(i) at least five are subjects in Mathematics;

(ii) at least two are Part III Mathematics subjects; and

(iii) no more than five are Part I subjects,

(b) notwithstanding the provisions of subsection (a) of this clause, a candidate may substitute for one Part III Mathematics subject another Part III subject from the Schedule of subjects with a substantial mathematical content. (Schedule B)

13. Prerequisites and Corequisites

No candidate may enrol in a subject unless he has satisfied the prerequisites and corequisites for that subject.

14. Progression

(a) Progression in the course is by subject. A full-time student is required to pass four subjects and a part-time student is required to pass two subjects in the first two years of his course. A part-time student is required to pass four subjects in the first four years of his course.

(b) The following restrictions on yearly course loads shall apply. The Dean may, in individual cases, relax restrictions (i), (ii), (iii), but only if he is satisfied that the academic merit of the candidate warrants such relaxation.

(i) No one academic year is to involve more than four subjects.

(ii) If four subjects are taken in any one year, at least three of them must be Part I subjects, and none may be a Part III subject.

(iii) If three subjects are taken in any one year, not more than two of them may be a Part III subject.

15. Time Requirements

Except with the special permission of the Faculty Board, a candidate shall complete the Requirements for the ordinary degree within nine calendar years of the commencement of the degree course. A candidate who has been granted standing in recognition of work completed elsewhere shall be deemed to have commenced his degree course from a date to be determined by the Dean.

16. Standing

The Faculty Board may grant standing under the following conditions.

(a) A candidate may be granted standing in recognition of work, completed in another tertiary institution or faculty, provided that:

(i) the subjects for which credit is given shall have a reasonable correspondence with those offered in the Faculty;

(ii) an undergraduate of another tertiary institution shall not receive credit for more than four subjects;

(iii) a graduate or diplomate of another tertiary institution or faculty shall not receive credit for more than four subjects and if granted credit may not include as a qualifying subject any subject equivalent to one counted towards his previous qualification.

(b) Notwithstanding the provision of section (a) (i) of this clause, a graduate or undergraduate of another tertiary institution may be given credit for subjects not offered for the degree of Bachelor of Mathematics in the University of Newcastle provided that:

(i) the candidate complies with all other conditions of these Requirements;

(ii) the candidate has his proposed pattern of course approved at the time at which the concession is granted and does not depart from the proposed pattern without the approval of the Dean.

17. Preparation for Honours

(a) A candidate who wishes to enrol in an Honours course must obtain the approval of the Head of the appropriate Department, or Departments, by the dates specified.
20. A candidate wishing to enrol in an Honours course will be required to complete extra work concurrently with work for the ordinary degree.

SECTION III — THE HONOURS DEGREE

18. Honours in Mathematics
To qualify for admission to Honours in Mathematics a candidate shall:
(i) have satisfied the requirements for admission to the ordinary degree; the subjects Mathematics IIIA and Mathematics IIIB must be included;
(ii) have completed additional work concurrently with his ordinary degree, as prescribed by the Department of Mathematics;
(iii) pass the subject Mathematics IV.

19. Combined Honours
To qualify for admission to combined Honours, a candidate shall:
(i) have satisfied the requirements for admission to the ordinary degree and have included in his course such prerequisite subjects as may be prescribed for admission to the combined Honours subject or subjects;
(ii) have completed such additional work concurrently with his ordinary degree as may be prescribed by the Department of Mathematics and the other Department concerned;
(iii) pass the combined Honours subject or subjects, (Schedule C).

20. Time Requirements
(a) Except with the special permission of the Faculty Board, a candidate for Honours shall complete the requirements within five years from the commencement of his degree course, provided that where it is deemed practical to allow a part-time student to become a candidate for Honours, the corresponding period shall be seven years.
A candidate wishing to proceed to Honours who has been given standing in recognition of work completed elsewhere shall be deemed to have commenced his degree course from a date determined by the Dean.
(b) The Dean may permit a part-time candidate for Honours to complete the Honours subject or subjects over two successive years.

21. Classes of Honours
There shall be three classes of Honours, namely Class I, Class II and Class III. Class II shall have two divisions, namely Division (I) and Division (II).

22. Medal
In each Honours subject, including combined subjects, the most distinguished candidate of the year may be awarded a University Medal.

23. Equivalent Honours
(a) On the recommendation of a Head of Department in the Faculty and with the permission of the Dean, a graduate who, in the disciplines concerned, has not completed a fourth year Honours subject either as a full-time or a part-time student at this or at any other Australian university, may enrol in fourth year Honours as a full-time or a part-time student.
(b) Such a graduate who has completed all of the requirements of fourth year Honours shall be issued with a statement to this effect by the Secretary; the statement shall indicate the Honours level equivalent to the standard achieved by the student in completing fourth year Honours.

SECTION IV — COMBINED DEGREE COURSES

24. General
A candidate may complete the Requirements for the degree of Bachelor of Mathematics in conjunction with another Bachelor's degree by completing a combined course approved by the Faculty Board of the Faculty of Mathematics and the other Faculty Board concerned provided that:
(i) admission to a combined course shall normally be at the end of the first year and shall be subject to the approval of the Deans of the two Faculties concerned;
(ii) admission to combined courses will be restricted to students with an average of at least Credit level;
(iii) the Deans of both Faculties shall certify that the work in the combined degree course is no less in quantity and quality than if the two courses were taken separately;
(iv) the Requirements for both degrees shall be satisfied except as provided below.

25. Arts/Mathematics
(a) A candidate shall comply with all the provisions of the Requirements for the degree of Bachelor of Arts other than Clause 12 and all the Requirements for the degree of Bachelor of Mathematics.
(b) To qualify for admission to the ordinary degrees of Bachelor of Arts and Bachelor of Mathematics, a candidate shall pass fourteen subjects, five of which shall be Mathematics I, Mathematics II, Mathematics IIIA, Mathematics IIIB, Mathematics IIIA and either Mathematics IIIB or a Part III subject chosen from Schedule B of the Schedule of subjects approved for the degree of Bachelor of Mathematics and
the remainder of which shall be chosen from the other subjects listed in the Schedule of subjects approved for the degree of Bachelor of Arts, provided that:

(i) not more than three subjects from Group II of the Schedule of subjects approved for the degree of Bachelor of Arts may be counted;

(ii) not more than five Part I subjects out of the total fourteen may be counted;

(iii) at least three subjects shall be Part III subjects;

(iv) a candidate counting Psychology IIIIC shall not count either Psychology IIIIA or Psychology IIIB;

(v) a candidate counting Economics IIIIC shall not count either Economics IIIIA or Economics IIIB.

26. Mathematics/Science

After completing the first year of study towards either the degree of Bachelor of Mathematics or the degree of Bachelor of Science including a pass at a satisfactory level in the subject Mathematics I, a candidate may enrol in a combined Mathematics/Science course. A candidate who has enrolled in such a combined course shall qualify for admission to the ordinary degrees of Bachelor of Mathematics and Bachelor of Science by passing fourteen subjects, five of which shall be Mathematics I, Mathematics II A, Mathematics II C, Mathematics III A and either Mathematics III B or a Part III subject chosen from Schedule B of the Schedule of subjects approved for the degree of Bachelor of Mathematics and the remainder of which shall be chosen from the other subjects listed in the Schedule of subjects approved for the degree of Bachelor of Science provided that:

(a) the maximum total number of Part I subjects shall be six;

(b) the minimum total number of Part III subjects shall be three;

(c) a candidate counting Psychology IIIIC shall not count either Psychology IIIIA or Psychology IIIB;

(d) a candidate counting Economics IIIIC shall not count either Economics IIIIA or Economics IIIB.

27. Mathematics/Metallurgy

After completing the first year of study towards either the degree of Bachelor of Mathematics or the degree of Bachelor of Metallurgy, including passes at a satisfactory level in the subjects Mathematics I, Materials Science I and Physics IA, a candidate may enrol in a Mathematics/Metallurgy course. A candidate who has enrolled in such a combined course shall qualify for admission to the ordinary degree of Bachelor of Mathematics and Bachelor of Metallurgy by passing eighteen subjects, five of which shall be Mathematics I, Mathematics II A, Mathematics II C, Mathematics III A and either Mathematics III B or a Part III subject chosen from Schedule B of the Schedule of subjects approved for the degree of Bachelor of Mathematics and the remainder of which shall be chosen from the other subjects listed in the Schedule of subjects approved for the degree of Bachelor of Mathematics, and the remainder of which shall by themselves satisfy the Requirements for the degree of Bachelor of Metallurgy, except that:

(a) Metallurgical Computations Part A shall be replaced by Mathematics IIB, which may be taken in two parts, each of three terms duration;

(b) Mathematics I shall be replaced by Engineering I or Chemistry I or Geology I or any other subject approved by the Dean;

(c) Mathematics II B shall not be taken as a Year II elective;

(d) Elective Mathematics shall not be taken as a Year III elective.
### SCHEDULE A — MATHEMATICS SUBJECTS

<table>
<thead>
<tr>
<th>Subject</th>
<th>Remarks including Prerequisites and Corequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PART I</strong></td>
<td></td>
</tr>
<tr>
<td>Mathematics I</td>
<td>It is assumed that students have studied Higher School Certificate Mathematics at second level short course or higher.</td>
</tr>
<tr>
<td><strong>PART II</strong></td>
<td></td>
</tr>
<tr>
<td>Mathematics IIA</td>
<td>Prerequisite Mathematics I</td>
</tr>
<tr>
<td>Mathematics IIB</td>
<td>Prerequisite Mathematics I</td>
</tr>
<tr>
<td>Mathematics IIC</td>
<td>Prerequisite Mathematics I</td>
</tr>
<tr>
<td><strong>PART III</strong></td>
<td></td>
</tr>
<tr>
<td>Mathematics IIIA</td>
<td>Prerequisites Mathematics IIA &amp; Mathematics IIC</td>
</tr>
<tr>
<td>Mathematics IIB</td>
<td>Prerequisites Mathematics IIIA &amp; Mathematics IIC</td>
</tr>
<tr>
<td><strong>PART IV</strong></td>
<td></td>
</tr>
<tr>
<td>Mathematics IV</td>
<td>Prerequisites Mathematics IIIA &amp; Mathematics IIC</td>
</tr>
</tbody>
</table>

### SCHEDULE B — SUBJECTS WITH A SUBSTANTIAL MATHEMATICAL CONTENT

<table>
<thead>
<tr>
<th>Subject</th>
<th>Remarks including Prerequisites and Corequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economics IIIC</td>
<td>Prerequisite Economics IIA</td>
</tr>
<tr>
<td>Chemical Engineering IIIC</td>
<td>Prerequisites Chemical Engineering I*, Mathematics IIA &amp; Mathematics IIC (including Topics E &amp; F)</td>
</tr>
<tr>
<td>Civil Engineering IIIM</td>
<td>Prerequisites Civil Engineering IIIM, Mathematics IIA &amp; Mathematics IIC (including Topic E)</td>
</tr>
<tr>
<td>Industrial Engineering I</td>
<td>Prerequisite Mathematics I</td>
</tr>
<tr>
<td>Communications and Automatic Control</td>
<td>Prerequisites Mathematics IIA &amp; Mathematics IIC (including Topics C, D &amp; E)</td>
</tr>
<tr>
<td>Digital Computers and Automatic Control</td>
<td>Prerequisites Mathematics IIA &amp; Mathematics IIC (including Topics C, D &amp; E)</td>
</tr>
<tr>
<td>Mechanical Engineering IIIC</td>
<td>Prerequisites Mathematics IIA &amp; Mathematics IIC, (including Topics E, F &amp; H)</td>
</tr>
<tr>
<td>Physics IIIA</td>
<td>Prerequisite Physics II</td>
</tr>
<tr>
<td>Psychology IIIIC</td>
<td>Prerequisite Psychology IIIA</td>
</tr>
</tbody>
</table>

### SCHEDULE C — COMBINED HONOURS SUBJECTS

<table>
<thead>
<tr>
<th>Subject</th>
<th>Remarks including Prerequisites and Corequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics/Physics IV</td>
<td>Prerequisites Mathematics IIA &amp; Physics IIIA</td>
</tr>
<tr>
<td>Mathematics/</td>
<td>Prerequisites Mathematics IIIA &amp; Psychology IIIIC</td>
</tr>
</tbody>
</table>

### NOTES ON COMBINED DEGREE COURSES

**ARTS/MATHEMATICS**

The details for the combined course follow simply from the Requirements for each degree. Each degree requires nine subjects so the combined degree requires 18 subjects less four subjects for which standing may be given, thus the combined degree should contain 14 subjects. The Bachelor of Mathematics requires Mathematics I, Mathematics IIA, Mathematics IIC.

A candidate with better than pass level in Physics I and Chemistry I and the ability to write real situations in mathematical terms and to read around his subject, could complete the components of Chemical Engineering IIIC without Chemical Engineering I, and may, after interview, be granted exemption by the Head of the Department of Chemical Engineering.
Mathematics IIA and either Mathematics IIB or a Part III subject from Schedule B of the Requirements. This leaves nine subjects which must clearly satisfy the Requirements for the Arts degree.

The course could be pursued in the following manner:

Year I  Mathematics I and three other Part I subjects,
Year II  three Part II subjects including Mathematics IIA and Mathematics IIC and another subject which should be a Part I or Part II subject approved for the degree of Bachelor of Arts,
Year III Mathematics IIA plus two other subjects which must include at least one Part III subject,
Year IV  either Mathematics IIB or a Schedule B subject from the Requirements for Bachelor of Mathematics plus two other subjects which will complete the Requirements for the Arts degree.

MATHEMATICS/SCIENCE

The details for the combined course follow simply from the Requirements for each degree. Each degree requires nine subjects so the combined degree requires 18 subjects less four subjects for which standing may be given, thus the combined degree should contain 14 subjects. The Bachelor of Mathematics requires Mathematics I, Mathematics IIA, Mathematics IIC, Mathematics IIA and either Mathematics IIB, or a Part III subject from Schedule B of the Requirements. This leaves nine subjects which must clearly satisfy the Requirements for the Science degree.

The course could be pursued in the following manner:

Year I  Mathematics I and three other Part I subjects,
Year II  three Part II subjects including Mathematics IIA and Mathematics IIC and another Part I subject,
Year III Mathematics IIA plus two other subjects which must include at least one Part III subject,
Year IV  either Mathematics IIB or a Schedule B subject from the Requirements for Bachelor of Mathematics plus two other subjects which will complete the Requirements for the Science degree.

MATHEMATICS/METALLURGY

The details for the combined course in Mathematics and Applied Science follow simply from the Requirements for each degree. The degree in Mathematics require nine subjects, that in Applied Science, thirteen, so that the combined degree requires 22 subjects, less four subjects for which standing may be given. Thus the combined degree should contain 18 subjects. The Bachelor of Mathematics requires Mathematics I, Mathematics IIA, Mathematics IIC, Mathematics IIA and either Mathematics IIB, or a Part III subject from Schedule B of the Requirements. This leaves 13 subjects which must clearly satisfy the Requirements for Bachelor of Metallurgy.

The course could be pursued in the following manner.

Year I  Mathematics I, Materials Science I, Physics IA, and one of Engineering I, Chemistry I, Geology I, or any other subject approved by the Deans.
Year II Mathematics IIA, Mathematics IIB Part I, Metallurgical Computations Part B, Metallurgy I, and one of Engineering II, Chemistry I, Geology I, or any other subject approved by the Deans.
Year III Mathematics IIC, Mathematics IIB Part III, Metallurgy IIA, Metallurgy IIB.
Year IV Mathematics IIA, and either Mathematics IIB, or Schedule B Part III subject from the Requirements for B Math, and one of Electronics & Instrumentation II, Physics II, Engineering Metallurgy IA, or Engineering Metallurgy IB.
Year V Metallurgy III, Metallurgy Project, Elective Subject.

1 Mathematics IIA -- Topics A, C, D, E.
Mathematics IIB, Part I -- Topics F, G.
Mathematics IIB, Part II -- Topics B, J.
Mathematics IIC -- Topics H, I, K, L.
2 Excluding the subject taken in Year I.
3 With another (Engineering) topic substituted for Mathematics II, Topic B, Complex Analysis.
4 Excluding Elective Mathematics.

NOTE ON SUBJECT ENTRIES

Subject outlines and reading lists are set out in a standard format to facilitate easy reference. An explanation is given below of some of the technical terms used in this Handbook.

(a) Prerequisites are subjects which must be passed before a candidate enrols in a particular subject. The only prerequisites noted for topics are any topics or subjects which must be taken before enrolling in the particular topic. To enrol in any subject which the topic may be part of, the prerequisites for that subject must still be satisfied.

Where a prerequisite is marked "(advisory)", lectures will be given on the assumption that the subject or topic has been completed as indicated.

(b) Corequisites for subjects are those which the candidate must pass before enrolment, or be taking concurrently.

Corequisites for topics are those which the candidate must take before enrolment, or be taking concurrently.

18
DESCRIPTION OF SUBJECTS

SCHEDULE A

Preliminary Notes

The Department offers and examines subjects. Each subject is composed of topics, each topic consisting of about 27 lectures and 13 tutorials throughout the year. Each of the Part I, Part II, and Part III subjects consists of four topics. For Mathematics I, there is no choice of topics; for Mathematics II, III, IV there is some choice available to students; for Mathematics V, VI there is a wider choice. No topic may be counted twice in making up distinct subjects. (Students who passed some mathematics subjects before this arrangement of subjects was introduced should consult the "transition arrangements" set out on p.155 of the 1970 Faculty of Arts handbook, and p.76 of the 1973 Faculty of Mathematics handbook. Note that the "code letters" for the topics may vary slightly from year to year.)

Progressive Assessment

From time to time during the year students will be given assignments, tests, etc. The student's performance in this work will be taken into account in the following manner.

(a) For the implementation of By-law 5.4.1-1, which deals with unsatisfactory progress. A copy of this By-law appears in the General Supplement supplied with this Handbook.

(b) Where a student's performance during the year has been better than his performance in the final examination, then the former will be taken into account in determining his final result. On the other hand, when a student's performance during the year has been worse than his performance in the final examination, then his performance during the year will be ignored in determining his final result.

PART I SUBJECT

661100 Mathematics I

Prerequisites Nil

Hours Four lecture hours and two tutorial hours per week for three terms

Examination Two 3-hour papers

Content

Topics

AN — Real Analysis
AL — Algebra
CA — Calculus
NM — Numerical Mathematics

PART I TOPICS

Topic AN — Real Analysis — M. J. Hayes

Prerequisites Nil

Hours One lecture hour per week and one tutorial hour per fortnight

Content

Real Numbers, Sequences and series. Functions of one real variable, continuity, differentiability, integrability. Power series, Taylor Series.

Texts

(This is the general text for the course)

Giles, J. R. Real Analysis — an Introductory Course (Wiley 1973)

(It is recommended that students intending to major in Mathematics should have this book)

Reference

Spivak, M. Calculus (W. A. Benjamin Inc., 1967)

Topic AL — Algebra — W. Brisley

Prerequisites Nil

Hours One lecture hour per week and one tutorial hour per fortnight

Content

Introduction to basic algebraic objects and ideas. Matrices, permutations, complex numbers. Linear Algebra: vector spaces, homomorphisms, matrices, determinants; algorithms for solution of equations; rank, nullity; eigenvectors and eigenvalues; applications various.
The selection rules and definitions of the Part II subjects follow.

### 662100 Mathematics IIA

**Prerequisite** Mathematics I

**Hours** Four lecture hours and two tutorial hours per week for three terms

**Examination** Each topic is examined separately

**Content**

Topics B, C, D, and E. In exceptional circumstances and with the consent of the Head of Department, one topic from A, F, G, or H may be substituted for B. Additional substitutions may be allowed in the case of candidates who have passed the subject Mathematics IIB.

### 662200 Mathematics IIB

**Prerequisite** Mathematics I

**Hours** Four lecture hours and two tutorial hours per week for three terms

**Examination** Each topic is examined separately

**Content**

Four topics chosen from A to H and approved by the Head of the Department. In exceptional circumstances, and with the consent of the Head of the Department one or more of the topics I, J, K or L may be included. Students in the Faculty of Mathematics may, with the consent of the Dean, take Mathematics IIB in two parts, each consisting of two topics.

### 662300 Mathematics IIC

**Prerequisite** Mathematics I

**Pre- or Corequisite** Mathematics IIA

**Hours** Four lecture hours and two tutorial hours per week for three terms

**Examination** Each topic is examined separately

### Notes

1. Students whose course includes a Schedule B subject may have their choice of topics restricted further than is set out in the rules above.
2. Students whose courses include Physics IIIA are advised to include topics C, E, G, H in their Mathematics Part II subjects; this may require the use of the substitution rules.
3. Students who passed a Part II Mathematics subject prior to 1974 and who wish to take further Part II Mathematics subjects should note that the topic coded “L” in 1974 and 1975 corresponds to the topic coded “A” in previous years. Such students may require special permission for their selection of Part II topics, and should consult with the Head of the Department.

### PART II TOPICS


**Prerequisite or Corequisite** Topic C

**Hours** One lecture hour per week and one tutorial hour per fortnight

**Examination** One 2-hour paper

**Content**

This topic is designed to introduce students to the idea of a mathematical model. Four or five realistic situations will be treated beginning with an analysis of the non-mathematical origin of the problem, the formulation of the mathematical model, solution of the mathematical problem and interpretation of the theoretical results. For example, models involving applications of operations research, probability and differential equations will be developed.

**Text** Nil

**References**


Noble, B. *Applications of Undergraduate Mathematics in Engineering* (M.A.A./Collier-Macmillan 1967)

Rapoport, Anatol & Chammah, A. M. *Prisoner’s Dilemma* (University of Michigan Press 1965)
Taha, H. A.  
*Operations Research — an Introduction*  
(Macmillan 1971)

Wagner, H. M.  
*Principles of Operations Research*  
(Prentice-Hall 1969)

662102  Topic B — Complex Analysis — R. F. Berghout

Prerequisite or Corequisite  
Topic C

Hours  
One lecture hour per week and one tutorial hour per fortnight

Examination  
One 2-hour paper

Content  

Text  
Spiegel, M. R.  
*Theory and Problems of Complex Variables*  
(McGraw-Hill 1964)

References  
Markushevich, A. I.  
*Theory of Functions of a Complex Variable*  

Pennisi, Louis L.  
*Elements of Complex Variables*  
(Holt, Rinehart & Winston 1963)

662103  Topic C — Calculus and Vector Calculus — R. J. Vaughan

Prerequisites  
Nil

Hours  
One lecture hour per week and one tutorial hour per fortnight

Examination  
One 2-hour paper

Content  

Text  
Spiegel, M. R.  
*Theory and Problems of Advanced Calculus*  
(McGraw-Hill 1963)

References  
Courant, R.  
*Differential and Integral Calculus Vols I & II*  
(Blackie 1949)

Kaplan, W.  
*Advanced Calculus*  
(Addison-Wesley 1952)

Keane, A. & Senior, S. A.  
*Mathematical Methods*  
(Sydney, Science Press 1961)

Widder, D. V.  
*Advanced Calculus*  
(2nd ed. Prentice-Hall 1961)

662104  Topic D — Linear Algebra — W. Brisley

Prerequisites  
Nil

Hours  
One lecture hour per week and one tutorial hour per fortnight

Examination  
One 2-hour paper

Content  

Text  
Lipschutz, S.  
*Linear Algebra*  
(Schaum 1968)

References  
Ayres, F.  
*Matrices*  
(Schaum 1962)

Brisley, W.  
*A Basis for Linear Algebra*  
(Wiley 1973)

Lange, L. H.  
*Elementary Linear Algebra*  
(Wiley 1968)

Nering, E. D.  
*Linear Algebra and Matrix Theory*  
(Wiley 1964)

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27
Pipes, L. A.\ Matrix Methods for Engineering (Prentice-Hall 1964)
Tropper, Mary A.\ Linear Algebra (Nelson 1969)

662201 Topic E — Differential Equations and Integral Transforms — J. G. Couper

Prerequisite

or Corequisite

Hours
Examination

Content


Text


Prerequisite

Nil

Hours
Examination

Content


Texts

Weinberger, H. F.\ A First Course in Partial Differential Equations (Ginn Blaisdell 1965)
AND
Sneddon, I. N.\ Fourier Series (Routledge 1961)

Reference

Kaplan, W.\ Advanced Calculus (Addison-Wesley 1965)
662204 Topic H — Probability and Statistics — R. G. Keats

Prerequisite or Corequisite

One lecture hour per week and one tutorial hour per fortnight

Examination

One 2-hour paper

Content

This topic is an introduction to the Theory of Probability and Statistics. No previous knowledge of Probability or Statistics will be assumed. The lectures will include a discussion of the following: Finite probability space, simple random variable, expectation, mean, variance, covariance, correlation, independence, frequency function, distribution function, joint frequency function, moments and binomial variates, Error propagation, Tchebichev inequality and the weak law of large numbers. Elementary random variables, Poisson's theorem; conditional probability, Bayes' theorem, tree diagrams, Continuous random variables, frequency function, expectation, joint frequency function, moments. Normal variates. Classification of experimental data, histograms, empirical moments, measures of location and scatter. Statistical inference, hypothesis testing, types of error, power function, sampling theory, maximum likelihood estimation; frequency functions of the mean (\( \bar{X} \)), difference of two means (\( \bar{X} - \bar{Y} \)), and the statistics \( X^2, S^2, F \) with applications.

Text

Freund, J. E. Mathematical Statistics (2nd ed, Prentice-Hall 1971)


References


Gnedenko, B. V. The Theory of Probability Chapters I & II (Chelsea 1962)

Kolmogorov, A. N. Foundations of the Theory of Probability (Chelsea 1950)

Lipschutz, S. Theory and Problems of Probability (Schaum 1968)

Loève, M. Probability Theory pp. 1-18 (Van Nostrand 1960)

Moran, P. A. P. An Introduction to Probability Theory (Oxford University Press 1968)

662301 Topic I — Topic in Statistics — Non-Parametric Methods — R. W. Gibberd

Prerequisite or Corequisite

Topic H

Hours

One lecture hour per week and one tutorial hour per fortnight

Examination

One 2-hour paper

Content

This topic is an introduction to some non-parametric methods in statistics which are used to test hypotheses and also to estimate parameters of probability distributions. The lectures will include tests concerning one-sample, two-sample, and k-sample problems, randomized blocks, goodness-of-fit tests, and tests involving independence, correlation, and regression. This topic will conclude with an elementary introduction to the concept of casual relationships and multivariate problems using non-parametric methods.

Text

Conover, W. J. Practical Non-parametric Statistics (Wiley 1971)

References

Gibbons, J. D. Nonparametric Statistical Inference (McGraw-Hill 1971)


Statistical Tables (W. H. Freeman 1969)


Prerequisites or Corequisite

Topics C and E

Hours

One lecture hour per week and one tutorial hour per fortnight

Examination

One 2-hour paper

Content

Mass and momentum — Newton's First Law, Force, Newton's Second Law, Conservation of Energy, Rotating frames of reference, transformation from one reference frame to another. Coriolis forces and centrifugal forces. Rigid bodies, centres of mass, angular momentum,
moments of inertia, conservation of angular momentum. Principle of virtual work and d'Alembert's principle, Hamilton's principle, generalized co-ordinates, Lagrange's equation and the Hamilton-Jacobi formulation of mechanics. The course will involve the study of numerous examples and applications.

**Text**

Spiegel, M. R.  
*Theory and Problems of Theoretical Mechanics*  
(New York, Schaum Publishing Co.)

**References**

Feynman, R. F., Leighton, R. B. & Sands, M.  
*The Feynman Lectures in Physics* Vol. I  
(Addison-Wesley Publishing Co.)

Sommerfeld, A.  

662303 **Topic K** --- Topic in Pure Mathematics  
*e.g. Group Theory* --- M. J. Hayes

**Prerequisites**  
Nil

**Hours**  
One lecture hour per week and one tutorial hour per fortnight

**Examination**  
One 2-hour paper

**Content**


**Text**

Macdonald, I. D.  
*The Theory of Groups* (Oxford University Press 1968)

OR

Baumslag, B. & Chandler, B.  
*Group Theory* (Schaum 1968)

**Reference**

Rotman, J. J.  
*The Theory of Groups: an Introduction*  
(Allyn & Bacon 1966)

662304 **Topic L** --- Analysis of Metric Spaces --- J. R. Giles

**Prerequisites**  
Nil

**Hours**  
One lecture hour per week and one tutorial hour per fortnight

**Examination**  
One 2-hour paper

**Content**

Examples of metric and normed linear spaces; the topology of metric spaces, equivalent metrics. Convergence of sequences, completeness. Cluster points and closure, density and separability. Continuity of mappings and of linear mappings on normed linear spaces, uniform continuity. Uniform convergence of sequences and series of real mappings, applications to differentiation and integration of sequences and series of real mappings, power series; Weierstrass' Approximation Theorem. Compactness, the equivalence of the various forms of compactness for metric spaces, application to the topological equivalence of finite dimensional normed linear spaces.

**Text**

Giles, J. R.  
*Analysis of Metric Spaces* (University of Newcastle)

**References**

Dieudonné, J.  
*Foundations of Modern Analysis*  
(Academic Press 1960)

Giles, J. R.  
*Real Analysis --- an Introductory Course*  
(Wiley 1973)

Goldberg, R. R.  
*Methods of Real Analysis* (Ginn Blaisdell 1964)

Mendelson, B.  
*Introduction to Topology* (Blackie 1963)

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

White, A. J.  
*Real Analysis* (Addison-Wesley 1968)

**PART III SUBJECTS**

The Mathematics Department offers two Part III subjects, each comprising four topics chosen from the list below.

Students wishing to proceed to Honours in Mathematics are required to take both these subjects. Students wishing to proceed to Combined Honours are required to take Mathematics IIIA together with the appropriate subject from Schedule B. Students proceeding to Honours will also be required to study additional topics as prescribed by the Heads of the Departments concerned.

Passes in both Mathematics IIIA and IIC are prerequisite for entry to Mathematics IIIA, and Mathematics IIIA is pre- or corequisite for Mathematics IIIB. It will be assumed that students taking a third-year subject in 1975 have already studied topics C, D, E, K in their Part II subjects.
Students from other Faculties who wish to enrol in particular Part III topics, according to the course schedules of those Faculties, should consult the particulars of the list below, and should consult the lecturer concerned. In particular, the prerequisites for subjects may not all apply to isolated topics. Summaries of these topics, together with texts and references, appear on page 35 et seq. of this handbook.

List of Topics for Part III Mathematics

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The selection rules and definitions of the Part III subjects follow.

663100  Mathematics IIIA

**Prerequisites**
Mathematics IIA and Mathematics IIC

**Hours**
Four lecture hours and two tutorial hours per week for three terms

**Examination**
Each topic is examined separately

**Content**
A subject comprising four topics, which must include O, and at least one of P, Q, R, or U. In addition, students taking this subject will be required to complete an essay on a topic chosen from the history or philosophy of Mathematics.

663200  Mathematics IIIB

**Prerequisite or Corequisite**
Mathematics IIIA

**Hours**
Four lecture hours and two tutorial hours per week for three terms

**Examination**
Each topic is examined separately

**Content**
A subject comprising four topics chosen from the fifteen listed above.

**Notes**
1. In order to take both Mathematics IIIA and Mathematics IIIB, a student must study eight topics from M to Z above with the restriction that Topic O, and at least one of P, Q, R or U must be included in these eight topics. 
2. Students whose course includes a subject from Schedule B may have their choice of topics further restricted. 
3. Students aiming to take Mathematics IV may be required to undertake study of more topics than the eight comprising the two part III subjects.

**PART III TOPICS**

663101  Topic M — General Tensors — W. T. F. Lau

**Prerequisites**
Nil

**Hours**
One lecture hour per week and one tutorial hour per fortnight

**Examination**
One 2-hour paper

**Content**

**Text**
Nil

**References**

Abram, J.  
Lichnerowitz, A.  
McConnel, A. J.  
Spain, B.

Tensor Calculus (Butterworths 1965)  
Elements of Tensor Calculus (Methuen 1962)  
Applications of Tensor Calculus (New York, Dover 1957)  
Tensor Calculus (Oliver & Boyd 1953)
663102  Topic N — Variational Methods — W. P. Wood

Prerequisites  Nil

Hours  One lecture hour per week and one tutorial hour per fortnight

Examination  One 2-hour paper

Content
Introduction — statement and formulation of relevant problems —
functionals. Euler-Lagrange equation — fixed boundaries — weak
variations — corner conditions — the second variation — functionals
involving derivatives of higher order — several independent variables
— parametric representation. Moveable boundaries — transversality
conditions — Hilbert's integral. Strong variations. Isoperimetric
problems. Direct methods of solving variational problems — numerical
solutions in the simplest problem — Rayleigh-Ritz method — Galerkin
method. Applications — dynamics of particles — vibrating string —
Sturm-Liouville eigenvalue-eigenfunction problems — vibrating mem-
brane — groundstate of the helium atom — nonlinear problems —
growth models in economics.

Text
ElsgoIc, L. E.  Calculus of Variations (Pergamon Press 1963)

References
Arthurs, A. M.  Complementary Variational Principles
(Oxford, Pergamon Press 1964)

Hadley, G. & Kemp, M. C.  Variational Methods in Economics
(Amsterdam, North-Holland 1971)

Mikhlin, S. G.  Variational Methods in Mathematical Physics
(Oxford, Pergamon Press 1964)

Weinstock, R.  Calculus of Variations (New York, McGraw-Hill 1952)

663103  Topic O — Mathematical Logic — R. W. Robinson

Prerequisites  Nil

Hours  One lecture hour per week and one tutorial hour per fortnight

Examination  One 2-hour paper

Content
Introduction: inference rules as a formalisation of deductive processes;
sets; axiomatic theories; predicates. The sentential calculus, predicate
calculus and predicate calculus with equality. First order theories;
consistency, independence and completeness. Examples will be taken
from the usual axiomatically defined Mathematical systems, and
Gödel's theorem will be discussed.

Text
Enderton, H. B.  A Mathematical Introduction to Logic
(Academic Press 1972)

References
Crossley, J. et al  What is Mathematical Logic? (London, Oxford
University Press 1972)

Kleene, S. C.  Introduction to Metamathematics (Van
Nostrand 1952)

Kleene, S. C.  Mathematical Logic (Wiley 1967)

Mendelson, E.  Introduction to Mathematical Logic (Van
Nostrand 1964)

Shoenfield, J. R.  Mathematical Logic (Addison-Wesley 1967)

663104  Topic P — Differential and Integral Equations — J. G. Couper

Prerequisite  Topic E

Hours  One lecture hour per week and one tutorial hour per fortnight

Examination  One 2-hour paper

Content
Differential equations: Stability for linear systems with constant
coefficients. Existence of solutions of non-linear systems, uniqueness
and properties of solutions. Stability for non-linear systems. Integral
equations: Neumann series for reciprocal kernel. Fredholm's alter-
native for equations with degenerate kernels and for equations with
continuous kernels.

Text
Sanchez, D. A.  Ordinary Differential Equations and Stability
Theory: an Introduction (Freeman 1968)

References
Cochran, J. A.  The Analysis of Linear Integral Equations
(McGraw-Hill 1972)

Courant, R. & Hilbert, D.  Methods of Mathematical Physics Vol. I
(Interscience 1953)

Kanwal, R. P.  Linear Integral Equations: Theory & Technique
(Academic Press 1971)

663108  Topic PD — Theory of Partial Differential Equations —
T. K. Sheng

Prerequisites  Nil

Hours  One lecture hour per week and one tutorial hour per fortnight
Examination One 2-hour paper

Content
An exhaustive study of the simplest linear homogeneous equations of second order in two independent variables presented as an "outline" of the field of boundary value problems and followed by the presentation of successively more difficult and general theorems. Theory of characteristics and type classification, Picard iteration, Riemann method, Cauchy-Kovalevski theorem, classical potential theory, Green's function in n-dimensions, variational principles for estimating eigenvalues and other quadratic functionals, retarded potentials and the wave equation in n-dimensions.

Text Nil

References
Friedman, A. Generalized Functions and Partial Differential Equations (Prentice-Hall 1963)
Kellogg, O. D. Foundations of Potential Theory (Dover 1953)
Weinberger, H. F. A First Course in Partial Differential Equations with Complex Variables and Transform Methods (Ginn Blaisdell 1965)

663105 Topic Q — Fluid Dynamics — W. T. F. Lau
Prerequisite Topic B
Hours One lecture hour per week and one tutorial hour per fortnight
Examination One 2-hour paper

Content
Introduction; governing equations and boundary conditions; momentum theorem; vortex theorems. Potential Flows: uniqueness theorems; kinetic energy; simple solutions; equation of streamlines; combination of solutions; method of images; axisymmetrical motion; Stokes' stream function. Two dimensional motion: complex potential; complex velocity; simple solutions; Milne-Thomson's circle theorem; Blasius theorem; conformal transformation and its applications.

Text

Reference
Milne-Thompson, L. M. Theoretical Hydrodynamics (Macmillan 1968)

663106 Topic R — Probability and Statistics — J. G. Couper
Prerequisite Topic H
Hours One lecture hour per week and one tutorial hour per fortnight
Examination One 2-hour paper

Content
This topic consolidates and extends the study of probability and statistics made in Topic H. Items studied include random vectors, generating functions of random vectors, multinomial and multivariate normal random vectors. Sampling theory, the t and F distributions. Point and interval estimation. Decision theory, Bayes decision rules. Hypothesis testing, Neyman-Pearson Lemma, likelihood ratio. Linear regression and analysis of variance.

Text
Zehna, Peter, W. Probability Distributions and Statistics (Allyn & Bacon 1970)

References
Johnson, N. L. & Leone, F. C. Statistics and Experimental Design in Engineering and the Physical Sciences (2 Vols.) (Wiley 1964)

663107 Topic S — Geometry — T. K. Sheng
Prerequisites Nil
Hours One lecture hour per week and one tutorial hour per fortnight
Examination One 2-hour paper
Content
Euclidean geometry: axiomatic and analytic approach, transformations, isometries, decomposition into plane reflections, inversions, quadratic geometry.
Geometry of incidence: the real projective plane, invariance, projective transformation, conics, finite projective planes.

References
Ayres, F. *Projective Geometry* (Schaum 1967)
Fishback, W. T. *Projective and Euclidean Geometry* (Wiley 1962)
Moise, E. E. *Elementary Geometry from an Advanced Standpoint* (Addison-Wesley 1963)

663201 Topic T — Group Theory — M. J. Hayes

Prerequisites Nil

Hours One lecture hour per week and one tutorial hour per fortnight

Examination One 2-hour paper

Content
Finite Abelian groups.
Finite groups; Sylow theorems and their application to an analysis of isomorphism classes.
Series; Jordan-Holder theorem, soluble and nilpotent groups.
Infinitely Abelian groups; torsion, torsion-free, free Abelian, finitely generated and divisible groups.

Text
Baumslag, B. & Chandler, B. *Group Theory* (Schaum 1968)
OR

Reference

663202 Topic U — Operations Research — W. D. Wallis

Prerequisites Nil

Hours One lecture hour per week and one tutorial hour per fortnight

Examination One 2-hour paper

Content
In 1975 this course will consider mainly the mathematics of deterministic models in operations research. Topics covered will include game theory; linear programming; utility theory; networks and flows; activity analysis; dynamic programming.

References
Dantzig, G. B. *Linear Programming and Extensions* (Princeton 1963)
Hall, M. Jnr. *Combinatorial Theory* (Ginn Blaisdell 1967)
Luce, R. D. & Raiffa, H. *Games and Decisions* (Wiley 1957)
Vajda, S. *Mathematical Programming* (Addison-Wesley 1961)

663203 Topic V — Measure Theory and Integration — M. J. Hayes

Prerequisite Analysis of Metric Spaces

Hours One lecture hour per week and one tutorial hour per fortnight

Examination One 2-hour paper

Content
References

Asplund, E. & Bungart, L.
Berherian, S. K.
Halmos, P. R.
Halos, P. R.

Text

Bartle, R. G. *The Elements of Integration* (New York, Wiley 1966)

References

Asplund, E. & Bungart, L.
Berherian, S. K.
Halmos, P. R.

663204 Topic W — Analysis of Normed Linear Spaces — J. R. Giles

Prerequisite

Analysis of Metric Spaces

Hours

One lecture hour per week and one tutorial hour per fortnight

Examination

One 2-hour paper

Content

Banach spaces; continuous linear mappings; topological and isometric isomorphisms. Finite dimensional spaces and their special properties. Dual spaces; the form of continuous linear functionals on example spaces. Hilbert space; the representation of continuous linear functionals. Hahn-Banach theorem; reflexivity. Category and Baire’s theorem; the open mapping, closed graph and uniform boundedness theorems. Conjugate mappings; adjoint and self-adjoint operators in Hilbert space. Complete orthonormal sets in Hilbert space.

Text


References

Banach, S. *Théories des Opérations Linéaires* (2nd ed. Chelsea)
Giles, J. R. *Analysis of Metric Spaces* (University of Newcastle)
Simmons, G. F. *Introduction to Topology and Modern Analysis* (McGraw-Hill 1963)
Wilansky, A. *Functional Analysis* (Blaisdell 1964)

663205 Topic X — Rings and Fields — R. F. Berghout

Prerequisites

Nil

Hours

One lecture hour per week and one tutorial hour per fortnight

Examination

One 2-hour paper

Content

This course arises from some classical geometric and algebraic problems such as the trisection of arbitrary angles and the solution of polynomials by radicals. The setting is provided by the study of some fundamental properties of rings and ideals, in particular rings of polynomials and fields of rational functions. This leads to the study of extension fields, algebraic and transcendental elements, automorphisms of fields of polynomials, relations between fields and groups of automorphisms and finally Abel’s theorem on the insolubility of the general quintic equation by radicals.

Text

Herstein, I. N. *Topics in Algebra* (New York, Ginn Blaisdell 1965)

References

Adamson, I. T. *Introduction to Field Theory* (Oliver & Boyd 1964)
Artin, E. *Galois Theory* (University of Notre Dame Press 1944)
Birkhoff, G. D. & MacLane, S. *A Survey of Modern Algebra* (Macmillan 1953)
Galois, E. *Oeuvres Mathématiques* (Gauthiers-Villars 1951)
Kaplansky, I. *Fields and Rings* (University of Chicago 1969)
Lang, S. *Structures of Algebra* (Addison-Wesley 1967)

663206 Topic Y — Topic in Applied Probability

e.g. Information Theory — W. P. Wood

Prerequisite

Topic H

Hours

One lecture hour per week and one tutorial hour per fortnight

Examination

One 2-hour paper
This topic is an introduction to that theory of information which originated in the work of C. E. Shannon in 1948. The uniqueness theorem for the information content $H$ will be proved followed by proof of several inequalities involving this function. The concept of a channel and its capacity will be introduced and Shannon's fundamental theorem for discrete channels without memory will be proved. If time permits some other aspects of information theory, e.g. Wiener prediction and filtering, will be discussed.

**Text**

Ash, R. *Information Theory* (New York, John Wiley 1965)

**References**


Gallagher, R. G. *Information Theory and Reliable Communications* (Wiley 1968)

Khinchin, A. I. *Mathematical Foundations of Information Theory* (Dover 1957)

Kotz, S. *Recent Results in Information Theory* (London, Methuen 1966)


663207 **Topic 2 — Mathematical Principles of Numerical Analysis** — W. Summerfield

**Prerequisites**

Nil

**Hours**

One lecture hour per week and one tutorial hour per fortnight

**Examination**

One 2-hour paper

**Content**

The general theory of convergence of linear iterative methods for approximating solutions of linear systems of algebraic equations and its efficient utilization to approximate solutions of boundary value problems by way of finite difference or “continuous” discretizations. Adaptation to the understanding of asymptotic stability of linear marching schemes and the general importance of numerical stability in the numerical handling of initial-value problems. Numerical treatment of non-linear systems of algebraic equations. Various applications of the numerical methods will be analyzed. Some analysis background and some experience in programming computers is assumed but no prerequisites of numerical analysis courses will be expected.

**Text**


**PART IV SUBJECT**

664100 **Mathematics IV**

**Prerequisites**

Mathematics IIIA and Mathematics IIIA, and additional work as prescribed by the Head of the Department of Mathematics.

A student desiring admission to this subject must apply in writing to the Head of Department before 7th December of the preceding year.

**Hours**

At least eight lecture hours per week over one full-time year or four lecture hours per week over two part-time years.

**Examination**

At least seven final papers, each of two hours duration.

Each student will be required to present a thesis; i.e. a study under direction of a special topic using relevant published material and presented in written form.

The topics offered may be from any branch of Mathematics including Pure Mathematics, Applied Mathematics, Statistics, Computing Science and Operations Research as exemplified in the publication Mathematical Reviews.

**Content**

A selection of topics, each of about 27 lectures, will be offered. Summaries of topics which may be offered in 1975 follow.
PART IV TOPICS

664117 Origins of Contemporary Mathematics — R. F. Berghout

Prerequisites
Topic T or X, and Topic V or W.

Hours
About 27 lecture hours

Examination
One 2-hour paper

Content
This topic deals with the emergence of the main branches of mathematics up to about 1900. One term will examine some typical successes and concerns of pre-1600 mathematicians such as polynomial equations (going back to the Babylonians) and problems concerning irrationals and infinitesimals which find echoes in later mathematics. Further lectures will discuss classical mathematics, increasing concerns with rigour and the divergence of various disciplines. While lectures will mainly treat "pure" mathematics, fourth year students will be expected to write two essays, one on the development of an applied mathematics topic, and one on the development of any branch of mathematics into this century.

Text
Nil

References
Kline, M. *Mathematical Thought from Ancient to Modern Times* (Oxford University Press 1972)
and various other articles and books mentioned during the course.

664101 Algebra and Group Theory — W. Brisley

Prerequisites
Topics A, D, K, O.

Hours
About 27 lecture hours

Examination
One 2-hour paper

Content
A course on "Universal Algebra" and the theory of groups, which will discuss some of the important and basic algebraic notions and ideas, with illustrations and applications drawn mainly from group theory, lattice theory, and set- and category-theory. Topics covered will include: ω-algebras, congruences, homomorphism, ω-word algebras, free objects, products, properties of "properties", Krull-Schmidt decomposition, Jordan-Hölder resolution, the concepts of a variety of objects.

Text
Nil

References
Cohn, P. M. *Universal Algebra* (Harper & Row 1965)
Gratzer, G. *Universal Algebra* (Van Nostrand 1968)
Hall Jr., M. *The Theory of Groups* (Macmillan 1962)
Lang, Serge *Algebra* (Addison-Wesley 1965)
Scott, W. R. *Group Theory* (Prentice-Hall 1964)
and various other articles and books mentioned during the course.

664127 Topology — J. G. Couper

Prerequisites
Nil

Hours
About 27 lecture hours

Examination
One 2-hour paper

Content
Topological spaces are sets with enough cohesive properties to allow continuity to be defined. These lectures will concentrate on the geometric aspects of these spaces, and will include the following topics. Metric and topological spaces, homeomorphism. Bases, countable bases, separation. Connected spaces, compact spaces. Product spaces, homotopy and the fundamental group. Simplicial complexes, chains and homology. Orientation. Fixed points.

Text
Nil

References
Lefschetz, S.* Introduction to Topology* (Princeton 1949)
Patterson, E. M.* Topology* (2nd ed. Oliver & Boyd 1959)
Simmons, G. F.* Introduction to Topology and Modern Analysis* (McGraw-Hill 1963)
Wallace, A. H.* An Introduction to Algebraic Topology* (Pergamon 1961)

664111 Fluid Statistical Mechanics — C. A. Croxton

Prerequisites
Nil

Hours
About 27 lecture hours

Examination
One 2-hour paper
Content

Text
Croxton, C. A. Introduction to Liquid State Physics (Wiley)

Reference

664120 Quantum Mechanics — C. A. Croxton
Prerequisites
Topic G

Hours
About 27 lecture hours

Examination
One 2-hour paper

Content

Texts
Croxton, C. A. Introductory Eigenphysics (Wiley 1974)
Matthews, P. T. Introduction to Quantum Mechanics (McGraw-Hill 1968)

664119 Population Dynamics — R. W. Gibberd
Prerequisites
Nil

Hours
About 27 lecture hours

Examination
One 2-hour paper

Content
This topic will cover the models and techniques used by demographers and biologists for predicting and studying population growth and mobility. The initial emphasis will be on human populations and various 'computer experiments' will be carried out to determine the effects of varying age-specific fertility, mortality and migration rates on the future population structure in different countries and cities; then models dealing with the problem of several interacting species will be discussed.

Text
Nil

References
United Nations Demographic Yearbook (United Nations, published annually)
Keyfitz, N. *Introduction to the Mathematics of Population* (Addison-Wesley 1968)


Rogers, A. *Matrix Methods in Urban and Regional Analysis* (Holden Day 1971)

664114 Linear Operators — J. R. Giles  
**Prerequisites** Topics V and W  
**Hours** About 27 lecture hours  
**Examination** One 2-hour paper

**Content**
The theory of linear operators on Hilbert and Banach spaces is a very recent theory and is valuable for applications. We discuss operators on Hilbert space: self-adjoint, normal and unitary operators. We consider operators on Banach space: compact operators. We analyse the spectrum of an operator, its decomposition, the numerical range of an operator, and the spectrum for different types of operator. The course concentrates on spectral theory for different types of operator on Hilbert space: compact normal, self-adjoint and normal operators.

**Text** Nil

**References**
Dunford, N. & Schwartz, J. *Linear Operators* (Interscience 1958)
Lorch, E. *Spectral Theory* (Oxford University Press 1962)

664116 Mathematical Models of Phase Transitions — A. J. Guttmann  
**Prerequisites** Nil  
**Hours** About 27 lecture hours  
**Examination** One 3-hour paper

**Content**

**Text**
Thompson, C. J. *Mathematical Statistical Mechanics* (Macmillan 1971)

**References**
Brout, R. H. *Phase Transitions* (Academic Press 1972)
Huang, K. *Statistical Mechanics* (Wiley 1963)

664103 Banach Algebra — M. J. Hayes  
**Prerequisite or Corequisite** Topic W  
**Hours** About 27 lecture hours
Content
A Banach Algebra is a mathematical structure where the two main strands of pure mathematical study—the topological and the algebraic—are united in fruitful contact. The course will cover the following subject matter. Normed algebras; regular and singular elements; the spectrum of an element and its properties; the Gelfand-Mazur theorem; topological divisors of zero; the spectral radius and spectral mapping theorem for polynomials; ideals and maximal ideals.

Commutative Banach algebras; the Gelfand theory and the Gelfand representation theorem.

Weak topologies, the Banach-Alaoglu theorem, the Gelfand topology. Involutions in Banach algebras; hermitian involutions; the Gelfand-Naimark representation theorem for commutative \( B^* \) algebras. Numerical range of an element in a normed algebra; relation of the numerical range to the spectrum; \( B^* \) algebras are symmetric, discussion of the Gelfand-Naimark representation theorem for \( B^* \) algebras.

Applications of Banach algebra theory.

Text
Nil

References
Gelfand, I. M., Raikov, D. A. & Shilov, G. E. Commutative Normed Rings (Chelsea 1964)
Naimark, M. A. Normed Rings (Noordhoff 1959)
Rickart, C. E. General Theory of Banach Algebras (Van Nostrand 1960)
Simmons, G. F. Introduction to Topology and Modern Analysis (McGraw-Hill 1963)
Wilansky, A. Functional Analysis (Blaisdell 1964)

664125 Stochastic Processes — R. G. Keats

Content
This topic will cover the theory of stochastic processes and some of its applications. The topic will include the concepts of stationarity, covariance function, regular process, mean square continuity, differentiation, integration, ergodicity, spectrum, processes with uncorrelated or orthogonal increments, Wiener process, Poisson process. Applications to prediction, filtering or signal detection, will also be studied.

Text
Nil

References
Bartlett, M. S. Stochastic Processes (Cambridge University Press 1955)
Doob, J. L. Stochastic Processes (Wiley 1953)
Hannan, E. J. Time Series Analysis (Methuen 1960)
Loève, M. Probability (3rd ed. Van Nostrand 1963)
Parzen, E. Stochastic Processes (Holden-Day 1962)
Solodovnikov, V. V. Introduction to the Statistical Dynamics of Automatic Control (Dover 1960)
Yaglom, A. M. Theory of Stationary Random Functions (Prentice-Hall 1965)

664124 Signal Detection — R. G. Keats

Prerequisites
Topics H and R

Hours
About 27 lecture hours

Examination
One 2-hour paper

Content
This topic will cover the theory of stochastic processes and some of its applications. The topic will discuss the application of likelihood ratio, Bayes and other tests to signal detection and processing in a variety of situations including known signals in white Gaussian noise and known signals in coloured Gaussian noise. The Shannon sampling theorem, Karhunen-Loève expansion, sequential detection and the effect of clipping will also be discussed.
References

Davenport, W. B. & Root, W. L.
Franks, L. E.
Hancock, J. C.
Hancock, J. C. & Wintz, P. A.
Helstrom, C. W.
Middleton, D.
Middleton, D.
Rowe, H. E.
Selin, I.
Thomas, J. B.
Van Trees, H. L.
Wax, N. (ed.)
Woodward, P. M.

Davenport, W. & Root, W. L.
Franks, L. E.
Hancock, J. C.
Hancock, J. C. & Wintz, P. A.
Helstrom, C. W.
Middleton, D.
Middleton, D.
Rowe, H. E.
Selin, I.
Thomas, J. B.
Van Trees, H. L.
Wax, N. (ed.)
Woodward, P. M.

Introduction to The Theory of Random Signals and Noise (McGraw-Hill 1958)
Signal Theory (Prentice-Hall 1969)
An Introduction to the Principles of Communication Theory (McGraw-Hill 1961)
Signal Detection Theory (McGraw-Hill 1966)
Introduction to Statistical Communication Theory (McGraw-Hill 1960)
Topics in Communication Theory (McGraw-Hill 1965)
Detection Theory (Princeton University Press 1965)
Introduction to Statistical Communication Theory (Wiley 1969)
Detection, Estimation & Modulation Theory (Wiley 1967)
Selected Papers on Noise and Stochastic Processes (Dover 1954)
Probability and Information Theory with Application to Radar (Pergamon Press 1960)

64104 Chemical Rate Processes — D. I. S. McElwain

Prerequisites

Nil

Hours

About 27 lecture hours

Examination

One 2-hour paper

Content

A review of statistical mechanics applied to gases, the dissociation of a diatomic gas will be studied in detail. The simple harmonic oscillator model of Montroll and Shuler, the Lighthill ideal dissociating gas and the classical oscillator of Keck and Carrier will be compared and the consequences of the models discussed. Also included will be an outline of the use of perturbation methods in the description of relaxation phenomena in gases and an introduction to the theory of laser action in gases.

Text

Nil

References

Keck, J. & Carrier, G.
Lighthill, M. J.
Montroll, E. W. & Shuler, K. E.
Vincenti, W. G. & Kruger, C. H.

Diffusion Theory of Nonequilibrium Dissociation and Recombination (J. Chem. Phys. 43, 2284, 1965)
Dynamics of a Dissociating Gas (J. Fluid Mech. 2, 1, 1957)
Introduction to Physical Gas Dynamics (Wiley 1965)

66410 Fluid Dynamics — W. T. F. Lau

Prerequisite

Topic Q

Hours

About 27 lecture hours

Examination

One 2-hour paper

Content

Selected topics on viscous flow, compressible flow, rotating flow and the flow of non-homogeneous fluids will be given.

Text

Nil
664106 Combinatorics — R. W. Robinson

Prerequisites Nil

Hours About 27 lecture hours

Examination One 2-hour paper

Content
Introduction. Permutations and combinations, inclusion-exclusion and generating functions. Pólya's theorem and its application to counting various kinds of structures and graphs will be discussed. Also asymptotic analysis of many of the exact results.

Text
Li, C. L. Introduction to Combinatorial Mathematics (McGraw-Hill 1968)

References
Beckenbach, E. F. Applied Combinatorial Mathematics (Wiley 1964)
Hall, M. Combinatorial Theory (Blaisdell 1967)
Riordan, J. Combinatorial Analysis (Wiley 1958)

664122 Rational Analysis — T. K. Sheng

Prerequisites Nil

Hours About 27 lecture hours

Examination One 2-hour paper

Content
Rational numbers, approximation by rationals, rational points on the real line, rational points on curves, the group of Heron angles, group of K-rational angles, rational polygons, Schoenberg’s rational polygon problem, distribution of algebraic numbers and algebraic integers in the complex plane, dispersiveness and explosiveness of linear operators over the rationals.

Text Nil

References


664109 Ergodic Theory — E. R. Smith

Prerequisites Nil

Hours About 27 lecture hours

Examination One 2-hour paper

Content
This course will be an introduction to the classical theorems of ergodic theory, and the ideas of Bernoulli systems, K-systems, mixing systems and ergodic systems. It is hoped to include a discussion of the recent work of Sinai on the ergodicity of hard-sphere gas systems.

Text Nil

References

Halmos, P. R. Lectures on Ergodic Theory (New York, Chelsea 1955)

664123  Rigorous Statistical Mechanics — E. R. Smith

Prerequisites  Nil

Hours  About 27 lecture hours

Examination  One 2-hour paper


Text  Huang, K.  *Statistical Mechanics* (Wiley 1963)

References  Ruelle, D.  *Statistical Mechanics: Rigorous Results*  (Benjamin 1969)

Thompson, C. J.  *Mathematical Statistical Mechanics*  (Macmillan 1971)


Wannier, G. H.  *Statistical Physics* (Wiley 1966)

664107  Dynamic Oceanography — W. Summerfield

Prerequisite  Topic Q

Hours  About 27 lecture hours

Examination  One 2-hour paper

Content  Structure and physical properties of the oceans. Kinematics: conservation laws; rotating frame of reference; Coriolis acceleration. Dynamics: Boussinesq approximation; dimensionless parameters; turbulent flow; vorticity. The introductory lectures will be followed by detailed examinations of a selection of topics from theories of the ocean circulation, surface wave theory and estuarine oceanography.

Text  Nil


Kraus, E.  *Atmosphere-Ocean Interaction* (Oxford 1972)


Phillips, O. M.  *The Dynamics of the Upper Ocean*  (Cambridge University Press 1966)


Sverdrup, H. V., Johnson, M. W. & Fleming, R. H.  *The Oceans: Their Physics, Chemistry and General Biology* (Prentice-Hall 1963)
Content
The course will examine some properties of points and lines distributed in two-dimensional Euclidean space. The multivariate normal distribution will be used to describe possible connections between two different sets of points on a plane. Shortest path curves will be examined when cost varies with both direction and position. Applications to traffic movement and urban geography will be emphasised. The course will rely heavily on continuous probability distributions.

References
Kendall, M. G. & Moran, P. A. P.
Mardia, K. V.

664105 Combinatorial Designs — W. D. Wallis

Prerequisites Nil
Hours About 27 lecture hours
Examination One 2-hour paper

Content
An introduction to various types of designs and their properties. Pairwise balanced designs: the basic theory, some existence theorems, Wilson’s theorems. Latin squares and balanced incomplete block designs: the existence theory using pairwise balanced designs, and various constructions. Partial balance. Room squares. Hadamard matrices. Block designs on graphs, such as handcuffed designs.

Text Nil
References
Hall Jr., M.
Mann, H. B.
Raghavan, D.
Ryser, H. J.
Vajda, S.
Vajda, S.
Wallis, W. D., Street, A. P. & Wallis, J. S.

664102 Asymptotic Methods in Analysis — W. P. Wood

Prerequisites Nil
Hours About 27 lecture hours
Examination One 2-hour paper

Content
This topic will outline methods useful in the solution of a wide class of problems occurring in Applied Mathematics. The topic will include an introduction to asymptotics, asymptotic series, implicit functions, summation formulae, Mellin transforms, the Laplace method for integrals, the saddle point method, the method of steepest descents, indirect asymptotics, iterated functions, differential equations with a large parameter, singularities of differential equations, estimation of the remainder in an asymptotic expansion, numerical quadrature and asymptotic expansions, some examples of asymptotic problems in mathematical physics, e.g., motion in a stratified atmosphere, instability of shear flows, spiral structure of disc galaxies.
664121 Random and Restricted Walks — W. P. Wood

**Prerequisites**
Nil

**Hours**
About 27 lecture hours

**Examination**
One 2-hour paper

**Content**
Problem of Random walk; lattice walks; walks in continuous time; spatial restrictions; correlated walks; self-avoiding walks; diffusion and Brownian motion; applications to polymer physics, astronomy, numerical analysis and solid state physics.

**Text**
Nil

**References**
Barber, M. N. & Ninham, B. W.
*Random and Restricted Walks* (Gordon & Breach 1970)

Feller, W.

Spitzer, F.
*Principles of Random Walk* (New York, Van Nostrand 1964)

Wax, N. (ed.)
*Selected Papers on Noise and Stochastic Processes* (New York, Dover 1954)
Content
A Study of Force and Motion
The forces involved in motion; gravity, dry friction, viscous friction, rolling friction. The "free body" and control volume techniques.
Internal and external forces and equilibrium.
Newton's laws of motion applied to point masses, rigid bodies and connected bodies moving in straight line or curved paths or in simple rotation. Reference frames and relative motion; inertial frames, accelerating frames and rotating frames. Coriolis acceleration with illustrations.
Momentum and impulse, both linear and angular, related to point masses and rigid bodies.
Energy and the conservation principle applied to mechanical work, strain energy, kinetic energy, potential energy and friction "losses," in the context of point masses and rigid bodies.

References

(iii) 522202 ME231 Fluid Mechanics --- A. J. Chambers

Prerequisites
Nil

Hours
One and a half hours per week

Examination
Progressive assessment

Content

Text
Johnston, A. K. & Hill, B. J. Force and Motion (University of Newcastle)

References


OR

(iii) 522202 ME251 Fluid Mechanics --- A. J. Chambers

Prerequisites
Nil

Hours
One and a half hours per week

Examination
Progressive assessment

Content

Text
Johnston, A. K. & Hill, B. J. Force and Motion (University of Newcastle)

References


(iv) 522102 CE212 Mechanics of Solids I --- P. W. Kleeman

Corequisites
Mathematics I

Hours
One and a quarter lecture hours and three quarters of a tutorial hour per week

Examination
One paper of three hours duration

Content
Uniaxial loading, states of stress and strain, stress and strain relationships; internal forces, internal stresses, deflection of beams, torsion, buckling.

Text
Hall, A. S. An Introduction to the Mechanics of Solids (Wiley 1973)
References

**PART II**

**522700 Civil Engineering IM**

Corequisites Mathematics I and Civil Engineering IM
Hours Five lecture hours and two and a half tutorial and laboratory hours per week
Examination Two papers of three hours duration and progressive assessment

**Content**
Analysis component of CE313 — Structural Analysis and Design I. Analysis of elastic statically determinate and indeterminate systems by classical methods; plastic analysis.

**Texts**

(i) 523105 CE313A Structural Analysis I — A. W. Page/N. O. Betts

**Prerequisites** Mathematics I and CE212 Mechanics of Solids I
**Hours** Two lecture hours and one tutorial hour per week
**Examination** One paper of three hours duration

**Content**
Analysis component of CE313 — Structural Analysis and Design I. Analysis of elastic statically determinate and indeterminate systems by classical methods; plastic analysis.

**Texts**

(ii) 523301 CE332 Fluid Mechanics II — F. M. Henderson

**Prerequisite** CE231 Fluid Mechanics I
**Hours** Two lecture hours and one tutorial and laboratory hour per week
**Examination** One paper of three hours duration

**Content**
Similitude; flow nets, boundary layers; closed conduit flow; pipe networks; unsteady flow; waterhammer; hydraulic machinery, open channel hydraulics, backwater curves.

**Texts**
Rouse, H. & Ince, S. History of Hydraulics (Dover 1963)
Olson, R. M. Engineering Fluid Mechanics (3rd ed. Tutech 1973)
Henderson, F. M. Open Channel Flow (Collier Macmillan 1966)

**References**
Morris, H. M. Applied Hydraulics in Engineering (Ronald Press 1963)
Rouse, H. Engineering Hydraulics (Wiley 1958)
Valentine, H. R. Applied Hydrodynamics (Butterworths 1959)

(iii) 543101 ME301 Engineering Computations — L. W. B. Browne

**Prerequisites** Nil
**Hours** One and a half hours per week
**Examination** Progressive assessment

**Content**

**Texts**
Duncan, A. K. Fortran (Dataset Pty. Ltd. 1973)
McCracken, D. P. & Dorn, W. S. Numerical Methods with Fortran IV Case Studies (Wiley International 1972)
References

Forsythe, G. & Moler, C. B. A First Course in Numerical Analysis (Prentice-Hall 1967)

Ralston, A. Computer Solution of Linear Algebraic Systems (McGraw-Hill 1965)

PART III

413900 Accounting IIA

Prerequisites Mathematics IIA, Mathematics IIC and either Accounting IIA or Accounting IIB

Hours Four lecture hours and one tutorial hour per week

Examination Two papers of three hours duration and two papers of two hours duration

Content Either Accounting IIA or Accounting IIB and two appropriately chosen Part III topics (e.g. topics U and R) offered by the Department of Mathematics and approved by the Head of the Department.

EITHER

(i) 413100 Accounting IIA

Prerequisite Accounting IIA

Hours Two lecture hours per week

Examination Two papers of three hours duration

Content Selected contemporary problems in the theory and practice of financial accounting, company financial reporting and public practice including a study of current approaches to the formulation of accounting theory; governmental and institutional accounting.

Texts


Levy, V. M. Public Financial Administration (Law Book Co.)

References

American Accounting Association A Statement of Basic Accounting Theory

American Institute of C.P.A.’s Accounting Research Studies


Barradell, M. Ethics and the Accountant (Gee 1969)

Baxter, W. T. & Davidson, S. Studies in Accounting Theory (Sweet & Maxwell 1966)

Bray, F. S. The Accounting Mission (Melbourne University Press)

Briolof, A. J. The Effectiveness of Accounting Information (Praeger 1967)

Chambers, R. J. Accounting Evaluation and Economic Behaviour (Prentice-Hall 1966)

Davidson, S. et al An Income Approach to Accounting Theory (Prentice-Hall 1965)


Littleton, A. C. Readings in Accounting Theory (Houghton Millin 1966)

Goldberg, L. Accounting Concepts of Profit (Ronald)

Goldberg, L. An Inquiry into the Nature of Accounting (American Accounting Association 1965)

Hendriksen, E. S. Concepts of Depreciation (Law Book Co. 1960)


Keller, T. F. & Zeff, S. A. (eds.) Law and Practice of Company Accounting in Australia (Butterworths 1973)

Keller, T. F. & Zeff, S. A. (eds.) Law and Practice of Company Accounting in Australia (Butterworths 1973)


Keller, T. F. & Zeff, S. A. (eds.) International Accounting (Macmillan 1967)

Keller, T. F. & Zeff, S. A. (eds.) Advanced Public Accounting Practice (Irwin 1966)


Keller, T. F. & Zeff, S. A. (eds.) Accounting Theory (Butterworths 1973)

Keller, T. F. & Zeff, S. A. (eds.) An Introduction to Corporate Accounting Standards (American Accounting Association 1965)
Staubus, G. J. \textit{A Theory of Accounting to Investors} (California University Press 1964)  
Storey, R. K. \textit{The Search for Accounting Principles} (A.I.C.P.A. 1964)  
Vatter, W. J. \textit{The Fun Theory of Accounting} (Chicago University Press 1951)  
\textit{A Theory of Accounting to Investors} (California University Press 1964)  
\textit{The Search for Accounting Principles} (A.I.C.P.A. 1964)  
\textit{The Fun Theory of Accounting} (Chicago University Press 1951)  
\textit{Accounts' Handbook} (Ronald 1970)  

(ii) 413200 Accounting IIB  
\textbf{Prerequisite} Accounting IIB  
\textbf{Hours} Two lecture hours per week  
\textbf{Examination} Two papers of three hours duration  
\textbf{Content} Selected contemporary problems in the theory and practice of managerial accounting. Topics studied included the development of management accounting, decision theory and information systems, profit planning, cost-volume profit analysis, incremental analysis, intra company pricing and divisional performance evaluation, product pricing direct costing, allocation of costs, cost accounting for income determination, feedback for accounting control, behavioural considerations in management accounting and general concepts of management accounting including decision making for small and medium sized manufacturers.  
\textbf{Texts} Articles are selected from Abacus, The Accounting Review, Journal of Accounting Research, Journal of Business, etc. Text books should not be purchased until the course has commenced.  
\textbf{References}  
Benston, G. J. \textit{Contemporary Cost Accounting and Control} (Dickenson 1970)  
Bierman, H. \textit{Topics in Cost Accounting and Decisions} (McGraw-Hill 1963)  
Greene, W. C. \textit{Case Problems in Management Accounting} (Holt, Rinehart & Winston 1964)  
Greenwood, W. T. \textit{Decision Theory and Information Systems} (South Western 1969)  
Hofstede, G. H. \textit{The Game of Budget Control} (Associated Book Publishers 1967)  
Horngren, C. T. \textit{Accounting for Management Control} (Prentice-Hall 1965)  
Parker, R. H. \textit{Management Accounting: An Historical Perspective} (Macmillan 1969)  
Rosen, L. S. \textit{Topics in Managerial Accounting} (McGraw-Hill 1970)  
Stedry, A. C. \textit{Budget Control and Cost Behaviour} (Prentice-Hall — Ford Foundation Series 1961)  
Thomas, W. E. (ed.) \textit{Readings in Cost Accounting Budgeting and Control} (South Western 1968)

713200 Biology IIB — B. A. Conroy/R. C. Jones/J. W. Patrick  
\textbf{Prerequisites} Mathematics IIA and Mathematics IIC and either Biology IIA or Biology IIB.  
\textbf{Hours} Four lecture hours and eight tutorial and laboratory classes per week. A field excursion.  
\textbf{Examination} Two papers of three hours duration  
\textbf{Content}  
\textbf{Animal and Plant Breeding} Genetics of quantitative characters, Heritability. Breeding systems.  
Community Analysis
Structure and dynamics of biological communities.

Environmental Physiology
Functional adaptations (homeostatic and developmental) of organisms to their environments.

Texts
- Falconer, D. S. *Introduction to Quantitative Genetics* (Oliver & Boyd 1964)
- Mettler, L. E. & Gregg, T. G. *Population Genetics and Evolution* (Prentice-Hall 1969)

References
- Briggs, D. & Walters, S. M. *Plant Variation and Evolution* (World University Library 1969)
- Ford, E. B. *Ecological Genetics* (Methuen 1965)
- Phillipson, J. *Ecological Energetics* (Edward Arnold 1966)

Additional texts and references may be recommended at the beginning of the course.

423800 Economics IIIC

Prerequisite
- Economics IIA

Hours
- Five and a half lecture hours per week and one seminar hour per fortnight

Examination
- As prescribed by the Head of the Department of Economics

Content
(i) Econometrics I
(ii) Growth and Development
AND EITHER
(iii) Public Economics
OR
(iv) International Economics

(ii) 423104 Growth and Development — N. J. Dickinson/I. J. Fairbairn

Prerequisite
- Economics IIB

Hours
- Two lecture hours per week

Examination
- One paper of three hours duration

Content
- A knowledge of matrix algebra and of the mathematical statistics dealt with in Statistical Analysis is recommended for students attempting this course. The course is concerned with examining the usefulness of single equation regression analysis in applied economic research and also with providing an introduction to simultaneous estimation procedures.

Text

References
- Goldberger, A. *Econometrics* (John Wiley & Sons 1964)
- Hadley, G. *Linear Algebra* (Addison-Wesley 1969)
- Huang, D. S. *Regression and Econometric Methods* (John Wiley & Sons 1970)
- Kmenta, J. *Elements of Econometrics* (Macmillan 1971)

(i) 423208 Econometrics I — R. W. McShane/G. R. Keating/J. A. Doeleman

Prerequisite
- Economic Statistics II or Statistical Analysis

Hours
- Two lecture hours per week

Examination
- One paper of three hours duration

Preliminary Reading
- Bober, Stanley *The Economics of Cycle and Growth* (New York, Wiley 1968)
Enke, S. *Economics for Development* (London, Dobson 1963)
Meier, G. I. *Neher, Phillip A., Szentes, T.*
Szentes, T. *The Political Economy of Underdevelopment* (Budapest, Akademia Kiado 1973)


AND ONE OF EITHER

(iii) 423103 Public Economics — N. J. Dickinson/P. W. Sherwood

Prerequisites Nil
Hours Three lecture hours per fortnight
Examination One paper of three hours duration

Content
The course considers the effect of government intervention in the economy through the budget and through the operation of various publicly-owned business undertakings. At the microeconomic level there is an analysis of tax and expenditure policies. In particular, the effects of these policies on community welfare and on incentives are examined.

The macroeconomic aspects of the budget are also discussed. Aggregative models are used to analyse the relation of fiscal policy to other economic policies for stability and growth. Inter-governmental fiscal relationships and the place of fiscal policy in less developed countries are briefly considered.

Preliminary Reading

Texts
Allen, C. M. *The Theory of Taxation* (Penguin 1971)
Nevile, J. W. *Fiscal Policy in Australia* (Cheshire 1971)

References
Buchanan, J. M. *The Public Finances* (Wiley 1970)
Johansen, L. *Public Economics* (North Holland 1971)
Shoup, C. S. *Public Finance* (Weidenfeld & Nicolson 1970)

OR

(iv) 423102 International Economics — P. W. Sherwood

Hours Three lecture hours and one seminar hour per fortnight
Examination One paper of three hours duration

Content
The course begins with an analysis of balance of payments problems and of various policies of adjustment, such as internal expenditure changes, devaluation and revaluation, floating exchange rates and direct controls. It goes on to examine the present international monetary system and its reform. The course then considers certain theoretical aspects of international capital movements and the implications of overseas investment in Australia. This is followed by a study of the theories of international trade in its non-monetary aspects. The theory of restrictions on trade is then discussed with particular emphasis on the role of tariffs and of customs unions, followed by an assessment of Australian tariff policy. Finally, the course examines the effects of economic growth on trade as well as the role of international trade on economic development.

Preliminary Reading

Texts
OR
Södersten, B. *International Economics* (Macmillan 1971)
References

513900 Chemical Engineering IIIC

Prerequisites Chemical Engineering I, (see note on page 17), Mathematics IIA and Mathematics IIC

Hours See under individual topics below

Examination As prescribed by the Head of the Department of Chemical Engineering

Content
Eight of the following ten topics:

(i) ChE301 Computation
(ii) ChE312 Reaction Engineering
(iii) ChE313 Transport Principles (2 topics)
(iv) ChE314 Process Control
(v) ChE322 Particulate Systems (2 topics)
(vi) ChE331 Process Economics
(vii) ChE412 Radiant Heat Transfer
(viii) ChE413 Selected Topics in Heat and Mass Transfer

(i) ChE301 Computation — J. Roberts

Hours As prescribed by the Head of the Department

Examination One and a half hours per week for half a year

Content
Computations for heat and mass transfer, thermodynamic functions and data processing will be used as an introduction to numerical methods emphasizing iterative techniques. Extensive use of FORTRAN IV and Input/Output operations, sub-programs, subroutines, ICL computer packages and efficient programming in FORTRAN will be made.

Topic Outlines
Curve fitting by classical graphical methods. Curve fitting with data transforms by least squares polynomial approximation, mini-max polynomials; coefficient errors.
Iterative solution of algebraic and transcendental single-simultaneous equations by first or second order methods, weighting factors on convergence efficiency.
Matrix methods in solving sets of equations.
Solution of single/simultaneous differential equations of first or higher order.

ICL Analogue Simulation package.

Texts
Scheid, F. Numerical Analysis (McGraw-Hill 1968)

References

(ii) ChE312 Reaction Engineering — T. F. Wall

Hours One and a half hours a week for half a year

Examination To be advised

Content
Design and operation of chemical reactors for homogeneous and heterogeneous reacting systems. Elementary reaction kinetics leading to interpretation of experimental data needed to design batch and continuous reactors. Effect of heat of reaction and changes of temperature and pressure on design, use of catalysts and residence time estimation.

Text
Levenspiel, O. Chemical Reaction Engineering (2nd ed. Wiley 1972)
(iii) **ChE313 Transport Principles** — K. L. Smith  
*Hours* One and a half hours per week for one year  
*Examination* To be advised  

**Content**  
Heat and mass transfer in unsteady state conditions, transport theory for momentum, heat and mass transfer in laminar and turbulent flow conditions. Boundary layer theory. The course stresses the application of mathematics to the solution of engineering problems. Analogies between heat mass and momentum transfer.

**Text**  

(iv) **ChE314 Process Control** — W. G. Kirchner  
*Hours* One and a half hours a week for half a year  
*Examination* To be advised  

**Content**  
Introduction to process dynamics, the well stirred vessel, treatment of experimental data, Laplace Transform Applications. Block diagram rotation, open loop and closed loop systems, the transfer function application and limitations, Control modes. Stability of closed loop system, elementary rio locus., Bode diagram. Feed forward. Control, cascade control with applications to control of temperature, flow pressure and composition.

**Text**  

(v) **ChE322 Particulate Systems** — J. Roberts/I. McC. Stewart  
*Hours* One and a half hours per week  
*Examination* To be advised  

**Content**  
Definition of size and shape of solid particles, laws of breakage, analytical description of size distributions, matrix description of breakage and classification operations, crushing and grinding equipment, separation of solids; partition curves; pressure and flow of granular material. Drying operations, movement of moisture in solids; drying systems, drying equipment; design methods. Furnace and kiln analysis by heat and mass balance on well-stirred and parallel flow reactors. Size and solids separation in gas or liquids; action of gravitational and centrifugal fields, design and performance of separation and pollution control equipment under these conditions — settling chambers, gas and liquid cyclones, centrifuges; flocculation, hindered settling, sludge thickening; Flow through fixed beds-Fluidisation-Filtration-analytical and design methods. Agitation and mixing-scale-up and shape considerations; Evaporation and crystallisation. Dust and gas removal for environmental control.

**Text**  

**References**  
Kuni & Levenspiel *Fluidization Engineering* (Wiley 1968)  
Perry, J. H. *Chemical Engineers' Handbook* (McGraw-Hill 1964)

(vi) **ChE331 Process Economics** — B. D. Henry  
*Hours* One and a half hours a week for half a year  
*Examination* To be advised  

**Content**  
2. *Cost estimation procedures* — cost indices — six tenths rule and economy of scale.  
4. *Depreciation* — Purpose of depreciation studies in process costs— types and requirements of depreciation methods — taxation allowances in process plant and equipment — economic life — depletion.  
5. *Project profitability* — Concept of equivalence and discounted cash flows — methods for measuring project profitability including rate of return, payout time, interest rate of return (DCF) net present value, annual cost and capitalised cost — continuous discounting.  
6. *Economic Balances* — General considerations for economic balance — brief introduction to optimisation — Economic balances applied to selected operations, i.e. mass transfer, cyclic operation, yield and recovery operation.  
7. *Feasibility studies* — selected examples.
Text
Peters, M. S. & Timmerhaus, K. Plant Design and Economics for Chemical Engineers (McGraw-Hill 1968)

Reference
Buchanan & Sinclair Costs and Economics of the Australian Chemical and Process Industries (2nd ed. Wests 1967)

(vii) ChE412 Radiant Heat Transfer --- I. McC. Stewart

Hours One and a half hours a week for half a year

Examination As prescribed by the Head of the Department

Content

Text
Hottel, H. C. & Sarofim, A. C. Radiative Transfer (McGraw-Hill 1968)

(viii) ChE413 Selected Topics in Heat and Mass Transfer --- I. McC. Stewart/K. L. Smith

Hours One and a half hours a week for half a year

Examination As prescribed by the Head of the Department

Content
Special Topics from:
Analytical and finite difference methods for mass and heat transfer in packed beds. Break through curves. Application to regenerators, blast furnaces and solid-bed absorbers and ion-exchange equipment.
Separation problems arising from bubble and droplet coalescence.
Heat and mass Transfer with reaction in porous and ash-coated particles.
More advanced gas radiation studies.
Gas radiation problems, scatter.

Text To be advised.

References
Astarita, G. Mass Transfer with Chemical Reaction (Elsevier 1967)

523700 Civil Engineering IIIM

Prerequisites Mathematics HA and Mathematics IIC (including Topic E) and Civil Engineering IIIM.

Hours Seven lecture hours and four tutorial and laboratory hours per week

Examination As prescribed by the Head of the Department of Civil Engineering.

Content
Topics CE414A and CE324, and any two of the other four topics.

(i) CE324 Soil Mechanics
(ii) CE414A Structural Analysis II
(iii) CE415A Structural Analysis — Continua
(iv) CE415B Structural Analysis — Plasticity
(v) CE434A Fluid Mechanics — Theoretical Hydrodynamics
(vi) CE434B Fluid Mechanics — Open Channel Flow

(i) 523102 CE324 Soil Mechanics

Prerequisite CE212 Mechanics of Solids I

Corequisite CE332 Fluid Mechanics II

Hours One and a half lecture hours and one and a half laboratory hours per week

Examination To be advised

Content
Index properties, classification of soils: permeability, capillarity, seepage and flow nets; stresses in soils; settlement and consolidation; compaction, shear strength and failure criteria; stability of retaining walls.
(ii) 524103 CE414A Structural Analysis II — P. W. Kleeman

**Prerequisites**
CE313 Structural Analysis & Design I and Mathematics IIB.

**Hours**
One and a half lecture hours and one and a half tutorial hours per week

**Examination**
One paper of three hours duration

**Content**
Matrix displacement method of analysis, stability of frames, dynamic behaviour of beams and frames, influence lines in indeterminate structures, non-uniplanar bending and torsion.

**References**
Bresler, B., Lin, T. Y. & Scalzi, J. B. *Design of Steel Structures* (Wiley 1968)
Coates, R. C., Coutie, M. G. & Kong, F. K. *Structural Analysis* (Nelson 1972)
Livesley, R. K. *Matrix Methods of Structural Analysis* (Pergamon 1964)

(iii) 524005 CE415A Structural Analysis — Continua — P. W. Kleeman

**Corequisite**
CE414 Structural Analysis and Design II

**Hours**
One and a half hours per week

**Examination**
To be advised

**Content**

(iv) 524006 CE415B Structural Analysis — Plasticity — P. W. Kleeman

**Corequisite**
CE414 Structural Analysis and Design II

**Hours**
One and a half hours per week

**Examination**
To be advised

**Content**
The non linear behaviour of beam columns. The stability of partially yielded frames from elastic-plastic analyses. Linear programming techniques in frame analysis and minimum weight design.

(v) 524020 CE434A Fluid Mechanics — Theoretical Hydrodynamics — F. M. Henderson

**Prerequisite**
CE332 Fluid Mechanics II

**Hours**
One and a half hours per week

**Examination**
To be advised

**Content**
General treatment of stresses and rates of strain in a moving fluid, derivation of the Navier-Stokes equations, the vorticity equation; Kelvin's circulation theorem, the generation and diffusion of vorticity, with engineering applications. Irrotational flow theory in two and three dimensions, with engineering applications.

(vi) 524021 CE434B Fluid Mechanics — Open Channel Flow — F. M. Henderson

**Prerequisite**
CE332 Fluid Mechanics II

**Hours**
One and a half hours per week

**Examination**
To be advised

**Content**
Numerical methods for the solution of unsteady non-uniform flow problems in irregular channels. The equations of unsteady flow, the method of characteristics, with engineering applications, e.g., the dam break problem. Theories of flood wave movement and techniques for its prediction. Sediment transport, river channel formation and stability.
Henderson, F. M. *Open Channel Flow* (Collier-Macmillan 1966)

**References**

Davis, C. V. & Sorenson

Morris, H. M. *Applied Hydraulics in Engineering* (Ronald Press 1963)

Rouse, H. *Engineering Hydraulics* (Wiley 1951)


Valentine, H. R. *Applied Hydrodynamics* (Butterworths 1967)

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543500  Industrial Engineering I

**Prerequisites**  
Nil

**Hours**  
Six lecture hours per week

**Examination**  
Progressive assessment

**Content**

(i) ME381  Methods Engineering  
(ii) ME382  Production Engineering  
(iii) ME383  Quality Engineering  
(iv) ME384  Design for Production

---

543501  ME381  Methods Engineering  — G. D. Butler

**Prerequisites**  
Mathematics I and ME222 Process Technology, ME223 Mechanical Technology

**Hours**  
One and a half hours per week

**Examination**  
Progressive assessment

**Content**


**Text**

Niebel, B. W. *Motion and Time Study* (Irwin 1972)

**References**


Barnes, R. M. *Motion and Time Study* (Wiley 1968)

Krick, E. V. *Methods Engineering* (Wiley 1966)


---

543502  ME383  Quality Engineering  — D. S. R. Karamchetty

**Prerequisites**  
Mathematics I and ME222 Process Technology, ME223 Mechanical Technology

**Hours**  
One and a half hours per week

**Examination**  
Progressive assessment

**Content**


**Text**


**References**

American Society of Tool & Manufacturing Engineers

Duncan, A. J. *Quality Control and Industrial Statistics* (Irwin 1965)
Grant, E. I.  Statistical Quality Control (McGraw-Hill 1964)
Kirkpatrick, E. G.  Quality Control for Managers and Engineers
      (Wiley 1970)
Maynard, H. B. (ed.) Industrial Engineering Handbook (McGraw-
      Hill 1971)

(iv) 543503  ME384 Design for Production — J. W. Hayes

Hours  One and a half hours per week

Examination  Progressive assessment

Content
The application of economics, methods engineering, ergonomics and
mechanical engineering to the development and design of a product.
Its production (particularly in quantity), distribution and marketing.
Operation methods: metrology, tools, jigs and fixtures, assembly and
inspection procedures. Plant facilities.

Text  No prescribed text

References
American Society of Tool & Manufacturing Engineers
American Society of Tool & Manufacturing Engineers
Principles of Jig and Tool Design (E.U.P. 1968)
Design for Production (Irwin 1963)

533900  Communications and Automatic Control

(i) 533213  EE341 Automatic Control — G. C. Goodwin
Prerequisites  Mathematics II Topics C, D and E
Hours  Three hours of lectures, tutorials and laboratory work per week for the first half of the year

Examination  Progressive assessment and final examination

Content
Mathematical models of systems and components: linear differential
equations, block diagrams, Laplace transforms, state-space formulation.
Transient response: characteristic roots, transition matrix, system
stability. Forced response: transfer functions, impulse and step responses, input-output stability, steady-state behaviour, Feedback and
compensation: effects of feedback on characteristic roots, root-locus
techniques, Nyquist stability criteria, series and feedback compensation.

Text  Nil

References
Desoer, C. A.  Notes for a Second Course on Linear Systems
      (Van Nostrand Reinhold 1970)
Gupta, S. C. & Hasdorff, L.  Fundamentals of Automatic Control (Wiley
      1970)
Ogata, K.  Modern Control Engineering (Prentice-Hall 1969)
Raven, F. H.  Automatic Control Engineering (McGraw-Hill 1968)

(ii) 533210  EE342 Automatic Control — K. L. Hitz
Prerequisite  EE341 Automatic Control
Hours  Three hours of lectures, tutorials and laboratory work per week for the second half of the year

Examination  Progressive assessment and final examination
Content

Text
No prescribed text

References
As for EE341 Automatic Control

(iii) 534115 EE442 Modern Control (Not offered in 1975)

(iv) 534116 EE444 Communication Systems — J. B. Moore

Prerequisite
EE331 Circuits

Hours
Three hours per week for the first half of the year

Examination
Progressive assessment and final examination

Content
Introduction to the common forms of analog modulation, as well as pulse modulation systems including pulse code modulation. Performance in the presence of noise is considered.

Text

533901 Digital Computers and Automatic Control

Prerequisites
Mathematics IA and Mathematics IC (including Topics C, D and E)

Hours
Six hours of lectures, tutorials and practical work per week

Examination
Progressive assessment and final examination

Content
(i) EE341 Automatic Control
(ii) EE342 Automatic Control
(iii) EE361 Computer Structure: Machine and Assembly Languages
(iv) EE362 Logical Design and Switching Theory

(i) 533213 EE341 Automatic Control — G. C. Goodwin
See page 111.

(ii) 533210 EE342 Automatic Control — K. L. Hitz
See page 112.

(iii) 533211 EE361 Computer Structure: Machine and Assembly Languages — K. K. Saluja

Prerequisite
Mathematics I

Hours
Three hours of lectures and practical work per week for the first half of the year

Examination
Progressive assessment and final examination

Content
Basic computer elements and peripherals, representation and organization of information, number systems and arithmetic, logical operations. Hardware components, processor structure, addressing modes and instruction set, machine-language programming, subroutines, traps and interrupts, use of the stack. Assembly: pseudo-ops, macros, recursion and re-entrancy, relocation, linking and loading. System software: assemblers, linkers, loaders, dumpers, interpreters, simulators, compilers. Lectures will be supplemented with practical assignments using the PDP-11 computer.

Text
No prescribed text

References
Stone, H. S. Introduction to Computer Organization and Data Structures (McGraw-Hill 1972)

(iv) 533212 EE362 Logical Design and Switching Theory — K. K. Saluja

Prerequisite
Mathematics I

Hours
Three hours of lectures, tutorials and practical work per week for the second half of the year

Examination
Progressive assessment and final examination
Deterministic Models
production systems. Assemblies of A. W. Roberts
K. L. Hitz

Codes, error checking and correcting.

of digital computers,
techniques, threshold logic.

Hill, S. F. 
Kohavi, Z. 
Lewin, D.

Sifrerlen, T. P. & Vartanian, V. 

Digital Electronics with Engineering Application (Prentice-Hall 1970)

553900 Mechanical Engineering IIIC

Prerequisites Mathematics IIIC and Mathematics IIC (including Topics E, F and H)

Hours Six hours per week

Examination Progressive assessment

Content
Students enrolling in this subject may choose one of the following alternatives (a), (b), (c) or (d). However it is not anticipated that all four alternatives will be available each year.

(a) (i) ME361 Automatic Control
(ii) ME401 Systems Analysis
(iii) ME402 Systems Planning, Organisation and Control
(x) ME487 Operations Research -- Deterministic Models
(b) (iii) ME402 Systems Planning, Organisation and Control
(x) ME487 Operations Research -- Deterministic Models
(xi) ME488 Operations Research -- Probabilistic Models
(xii) ME489 Operations Research -- Applications in Industry
(c) (iii) ME402 Systems Planning, Organisation and Control
(iv) ME403 Resources Planning and Allocation
(v) ME404 Mathematical Programming
(x) ME488 Operations Research -- Probabilistic Models
(d) (i) ME361 Automatic Control
(vi) ME434 Advanced Kinematics and Dynamics of Machines
(ix) ME449 Reliability Analysis for Mechanical Systems

AND EITHER
(vii) ME446 Introduction to Plastic Analysis
OR
(viii) ME448 Introduction to Photomechanics

(i) 543204 ME361 Automatic Control — K. L. Hitz

Hours One and a half hours per week

Examination Progressive assessment

Content

Text Nil

References Desoer, C. A. Notes for a Second Course in Linear Systems (Van Nostrand-Reinhold 1970)


(ii) 544451 ME401 Systems Analysis — A. W. Roberts

Prerequisite ME361 Automatic Control

Hours One and a half hours per week

Examination Progressive assessment

Content
An introduction to systems concepts. Mathematical modelling and some probability concepts. Deterministic and probabilistic models, stochastic models.

Text
Nil

References
Busacker & Saaty  *Finite Graphs and Networks* (McGraw-Hill 1965)
Haberman, C.  *Engineering Systems Analysis* (Merril 1965)
Hall, A.  *A Methodology for Systems Engineering* (Van Nostrand 1962)

(iii) 544452 ME402 Systems Planning, Organization and Control —  A. Roberts/G. D. Butler
Prerequisites  Mathematics HIC and ME 361 Automatic Control
Hours  One and a half hours per week
Examination  Progressive assessment

Content

Text
Nil

References
National Academy Science  
Zimmerman, E. W.  *World Resources and Industries* (New York, Harper 1951)

(iv) 544421 ME403 Resources Planning and Allocation —  K. L. Hitz
Prerequisite  ME361 Automatic Control
Hours  One and a half hours per week
Examination  Progressive assessment

Content
Types of resources, Resources availability, approach and classification. Analysis and projection for world, national and corporate levels of operation. Tactical and strategic problems, conservation of resources. Generation of resources. Capital and technological resources. The planning, organisation and control of resources, with particular emphasis on long-range planning. The need at levels for a resources policy. Optimal use of resources allocation. The importance of mineral resources to Australia. Prediction of resources. Notions of corporate planning with special reference to the steel industry.

Text
Nil

References
National Academy Science  
Zimmerman, E. W.  *World Resources and Industries* (New York, Harper 1951)

(v) 544417 ME404 Mathematical Programming —  K. L. Hitz
Hours  One a half hours per week
Examination  Progressive assessment

References
National Academy Science  
Zimmerman, E. W.  *World Resources and Industries* (New York, Harper 1951)

92
Content

Introduction to the solution of static optimisation problems. Dynamic programming; computational refinements of the basic algorithm. Linear programming; the Simplex algorithm and its revised form; duality theory; sensitivity analysis; decomposition algorithms. Transportation and assignment problems.

Texts

Gass, S. I.  

Nemhauser, G. L.  
*Introduction to Dynamic Programming* (Wiley 1966)

References

Bellman, R. E. & Dreyfus, S. E.  

Kunzi, H. P., Krelle, W. & Oettli, W.  
*Non-Linear Programming* (Blaisdell 1966)

Macmillan, C.  
*Mathematical Programming* (Wiley 1970)

Taha, H. A.  
*Operations Research* (Macmillan 1971)

Note

This subject is identical with the first part of ME581G.

(vi) 544419  ME342 Advanced Kinematics and Dynamics of Machines — E. Betz

*Prerequisite*  
ME333 Dynamics of Machines

*Hours*  
One and a half hours per week

*Examination*  
Progressive assessment

Content

Dynamic Motion Analysis: energy distribution method, equivalent mass-and-force method, the rate-of-change-of-energy method. Advanced Kinematics of the Plane Motion: the inflection circle, Euler-Savary equation, Bobillier’s construction, Hartmann’s construction. Introduction to synthesis: graphical and analytical methods.

Text

Hirschhorn, J.  
*Kinematics and Dynamics of Plane Motion* (McGraw-Hill 1962)

References

Hall, A. S.  
*Kinematics and Linkage Design* (Prentice-Hall 1960)

Holowenko, A. R.  
*Dynamics of Machines* (Wiley 1955)

(vii) 544415  ME446 Introduction to Plastic Analysis — E. Betz

*Prerequisites*  
ME342 Properties of Materials and ME343 Mechanics of Solids

*Hours*  
One and a half hours per week

*Examination*  
Progressive assessment

Content


Applications where there exists: (i) no elastic-plastic interface; (ii) an elastic-plastic interface.


Text

Nil

References

Ford, H.  
*Advanced Mechanics of Materials* (1st ed. Longmans 1963)

Hill, R.  
*Plasticity* (Oxford 1950)

Prager, W.  
*Introduction to Plasticity* (Addison-Wesley 1959)

(viii) 544416  ME448 Introduction to Photomechanics — E. Betz

*Prerequisites*  
ME342 Properties of Materials, and ME343 Mechanics of Solids

*Hours*  
One and a half hours per week

*Examination*  
Progressive assessment

Content


Model analysis for two and three dimension problems which may involve static, dynamic or thermal loading conditions.

Calibration of material and solution of disc problem.

Text

Nil
References
Dally, J. W. & Riley, W. F. "Experimental Stress Analysis" (McGraw-Hill 1965)
Durelli, A. J. & Riley, W. F. "Introduction to Photo-Mechanics" (Prentice-Hall 1965)
Frocht, M. M. "Photoelasticity Vols. I & II" (Wiley 1945 & 1948)

(x) 544418 ME449 Reliability Analysis for Mechanical Systems
A. J. Chambers/A. W. Roberts

Hours
One and half hours per week

Examination
Progressive assessment

Content

Text

References
Haviland, R. P. "Engineering Reliability and Long Life Design" (Van Nostrand 1964)

(x) 544842 ME488 Operations Research — Probabilistic Models
G. D. Butler

Hours
One and a half hours per week

Examination
Progressive assessment

Content
Statistical decision theory; forecasting, methods moving average, exponentially smoothed average. Inventory control theory. Fixed order quantity; fixed order cycle systems; production—inventory systems. Queueing theory; simple queue, multiserver queues. Queues in series. Transients in queues; simulation of systems. Applications.

Text
Nil

References

(xii) 544843 ME489 Operations Research — Applications in Industry
G. D. Butler

Hours
One and a half hours per week

Examination
Progressive assessment

Content
The case study approach to industrial cases. The application of operations research to industrial problems.

Text
Nil
Physics IIIA

**Prerequisites**
Physics II, Mathematics IIA, or Mathematics IIB (including Topics C, E, G and H or B or D).

**Hours**
Four lecture hours and eight laboratory hours per week

**Examination**
Three papers of three hours during laboratory and regular assignment work.

**Content**
Physics IIIA deals primarily with the more basic and fundamental aspects of Physics treated at third year level and covers the areas of classical and quantum physics which are essential to an understanding of both advanced pure physics and also the many applications of physics.

The course can be broadly summarized under the headings of Classical Physics and Modern or Quantum Physics. A sub-section, Electronics, treats electron device physics and the use of these devices in electronic circuit design.

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

**Modern Physics**
Quantum mechanics, atomic and molecular physics, statistical physics, solid state physics, nuclear physics, electronics.

**Laboratory**
The laboratory course is intended to parallel the lecture course in overall content, having at least one experiment available in each topic listed above, although students are not expected to carry out all the experiments available.
664300 Mathematics/Physics IV

Prerequisites
Mathematics IIIA and Physics IIA and such additional work as is required for combined honours students by the Department of Mathematics.

A student desiring admission to this subject must apply in writing to the Dean of the Faculty of Mathematics before 7th December of the preceding year.

Hours
As prescribed by the Heads of the Departments of Mathematics and Physics.

Examination
Each student shall present a minor thesis in Mathematics, written with physical applications in view, and complete a major project in Physics, which will be experimental. Examinations will be held on the Mathematics and Physics topics.

Content
The student shall also complete four topics from Mathematics IV, chosen for their application to Physics. He must also attend selected topics in Physics IV.

664200 Mathematics/Psychology IV

Prerequisites
Mathematics IIIA and Psychology IIIA.

A student desiring admission to this subject must apply in writing to the Dean of the Faculty of Mathematics before 7th December of the preceding year.

Hours
As prescribed by the Heads of Departments of Mathematics and Psychology.

Examination
As prescribed by the Heads of Departments of Mathematics and Psychology.

Content
Four Mathematics topics chosen from the Part IV Mathematics topics. (see page 46)

Psychological Measurement (see below).

(i) Psychological Measurement — J. A. Keats

Prerequisites
Nil

Hours
One and a half hours per week

Examination
As prescribed by the Head of Department of Psychology

Content
The series is introduced by lectures on the logic of measurement and its application to psychological phenomena after which each student is required to present at least one paper on one of the more recently developed psychological scaling methods.

Text
References
Atkinson, R. C. (ed.) Studies in Mathematical Psychology
(California Stanford University Press 1964)

Campbell, N. R. Foundations of Science: The Philosophy of Theory and Experiment (New York, Dover 1957)

Coombs, Clyde H. A Theory of Data (John Wiley 1964)

Lord, F. M. & Novick, M. R. Statistical Theories of Mental Test Scores (Addison-Wesley 1968)

Ross, S. Logical Foundations of Psychological Measurements (Aarhus Stiftsbogtrykkerie A-S, Denmark 1964)

Torgerson, W. S. Theory and Methods of Scaling (John Wiley 1958)
1. Students have received approval to enrol in the following non-mathematics subjects in the past.

<table>
<thead>
<tr>
<th>PART I</th>
<th>PART II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounting I</td>
<td>Biology IIA &amp; IIB</td>
</tr>
<tr>
<td>Biology I</td>
<td>Chemistry II</td>
</tr>
<tr>
<td>Chemistry I</td>
<td>Economics IIA</td>
</tr>
<tr>
<td>Classical</td>
<td>Economics IIB</td>
</tr>
<tr>
<td>Civilisation I</td>
<td>Education II</td>
</tr>
<tr>
<td>Economic History</td>
<td>English IIA</td>
</tr>
<tr>
<td>Microeconomics</td>
<td>Geology II</td>
</tr>
<tr>
<td>Engineering I</td>
<td>History IIA &amp; IIB</td>
</tr>
<tr>
<td>English I</td>
<td>Philosophy IIA</td>
</tr>
<tr>
<td>French I</td>
<td>Physics IIA</td>
</tr>
<tr>
<td>Geography I</td>
<td>Psychology IIA</td>
</tr>
</tbody>
</table>

2. Students transferring to the Faculty of Mathematics in the past have been granted standing in the following non-mathematics subjects, completed while enrolled in other Faculties.

<table>
<thead>
<tr>
<th>PART I</th>
<th>PART II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounting I</td>
<td>Economics IIA</td>
</tr>
<tr>
<td>Chemistry I</td>
<td>Education IIA</td>
</tr>
<tr>
<td>Economics I</td>
<td>Geography IIA</td>
</tr>
<tr>
<td>Engineering I</td>
<td>History IIA</td>
</tr>
<tr>
<td>English I</td>
<td>Philosophy IIA</td>
</tr>
<tr>
<td>French I</td>
<td>Physics IIA</td>
</tr>
<tr>
<td>Geography I</td>
<td>Psychology IIA</td>
</tr>
</tbody>
</table>

3. Enrolment in the following subjects is restricted as indicated below

**Accounting I** — Students who include this subject in their course as a Part I subject are advised to discuss with the Dean the possibility of including Accounting IIA or Accounting IIB in their Part II subjects.

**Economics IIA** — Students should study Macroeconomics and Money and Banking. They should also include the Part II Mathematics Topic H, Probability and Statistics, in their course.

* A student who passes both Microeconomics and Economic History I may be credited with one Part I subject towards the degree of Bachelor of Mathematics.

**Economics IIB** — This subject would not normally be included in the Bachelor of Mathematics course. However, if permission is given to include this subject then the content should be discussed with the Dean.

A student may not include both Physics IA and Physics IB in his course.

A student may not include both Engineering I and Civil Engineering IM in his course.

4. Permission will normally be given for the inclusion in a student’s course of subjects which are prerequisites or corequisites of subjects appearing in the schedule.
REQUIREMENTS FOR THE DIPLOMA IN COMPUTER SCIENCE

1. In these requirements, unless the contrary intention appears, “the Faculty Board” means the Faculty Board of the Faculty of Mathematics and “the Board” means the Board of Studies established to supervise the course of the Diploma in Computer Science.

2. An applicant for registration as a candidate for the diploma shall:
   (i) have satisfied all the requirements for admission to a degree in the University of Newcastle, or
   (ii) have satisfied all the requirements for admission to a degree in another university approved for this purpose by the Board, or
   (iii) hold other qualifications approved for this purpose by the Senate on the recommendations of the Board and the Faculty Board.

3. The Board may require a candidate to complete additional work and/or examinations if, in its opinion, he has not reached the assumed standard of attainment on which the content of any of the subjects is based.

4. An applicant for registration as a candidate for the diploma may be granted standing on conditions to be determined by the Board of Studies.

5. (a) To complete a subject qualifying towards the diploma, a candidate shall attend such lectures, tutorials, seminars and laboratory classes, and submit such written work as the Board may require.
   (b) To pass a subject, a candidate shall complete the subject and pass such examinations as the Board may require.

6. (a) Before enrolling in a subject, a candidate shall have passed in any prerequisite subject or subjects specified in the Schedule of Subjects.
   (b) A candidate shall not enrol in a subject unless he is concurrently enrolled in, or has completed, any corequisite subject or subjects specified, in the Schedule of Subjects.

7. The Board shall approve a programme of studies for each candidate. This programme may be varied only with the approval of the Board.

8. (a) A candidate may withdraw from a subject in which he has enrolled, only by notifying the Secretary to the University in writing.
   (b) A candidate who withdraws from a subject in which he has enrolled shall be deemed to have failed unless he has obtained the written permission of the Dean of the Faculty of Mathematics to withdraw without penalty; the Dean shall consult with the Board before granting such permission.

9. In order to qualify for the diploma, a candidate shall, in not less than two years of part-time or one year of full-time study, complete satisfactorily a course of studies, comprising 12 units of work chosen from the Schedule of Subjects appended to these requirements provided that the subjects passed:
   (a) shall include all of the subjects in Group I, unless, in order to satisfy provisions of sub-section (c) of this clause, the Board has prescribed for the candidate concerned an alternative subject or subjects for one or more of the subjects in this group;
   (b) shall not include more than two subjects from Group III;
   (c) shall not include a subject which, in the opinion of the Board, substantially overlaps the content of a course completed or work presented for another degree or diploma; and
   (d) shall be those prescribed in the programme approved by the Board.

10. The Diploma shall be awarded in two grades, namely:
    Diploma in Computer Science with merit,
    Diploma in Computer Science.

11. In order to provide for exceptional circumstances arising in particular cases, the Senate, on the recommendation of the Faculty Board, may relax any requirements.
### SCHEDULE OF SUBJECTS FOR THE DIPLOMA IN COMPUTER SCIENCE

#### Group I — Core Subjects

<table>
<thead>
<tr>
<th>Subject</th>
<th>Units</th>
<th>Prerequisite</th>
<th>Corequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programming &amp; Algorithms</td>
<td>1</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Data Structures &amp; Programming</td>
<td>1</td>
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#### Group II — Electives

Subjects or part of subjects offered in other courses and deemed by the Board to be of interest to computer scientists.

The number of units to be assigned to these subjects will be determined by the Board.

#### Group III — Other Subjects

Subjects approved by the Board for an individual course but not included in Group I or Group II.

As specified in other courses.

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1. This prerequisite may be relaxed with consent of the Dean.
2. It is intended that eventually subjects will be listed under Group II.

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### DESCRIPTION OF SUBJECTS

#### 660101 Programming and Algorithms — A. J. Guttmann

**Prerequisites**

Nil

**Hours**

Two lecture hours and one tutorial hour per week for the first half of the year.

**Examination**

One paper of three hours duration

**Content**

Boolean algebra, propositional logic, binary and other number systems, representation of numbers and instructions. Flow charts, description of machine code, assemblers, etc. Introduction to FORTRAN, ALGOL, and the conversational language BASIC. Use of higher level languages to solve problems of a non-numerical nature. Programming techniques, efficient programming, evaluation of expressions, sources of error. Program development, diagnostics, testing, etc. Nature of algorithms and heuristics. Analysis of algorithms. Program structure, procedures, subroutines, scope of variables. Recursion. Graphs, trees and the Travelling Salesman Problem.

**References**

- Knuth, Donald E. *The Art of Computer Programming*
  - Vol. I — Fundamental Algorithms
  - Vol. II — Semi-numerical Algorithms
- International Computers Ltd.
  - *Algo Programming Manual*
- Blatt, J. M. *Introduction to Fortran IV Programming* (Goodyear Publishing Co. 1967)
- Day, A. C. *Fortran Techniques: with Special Reference to Non-numerical Applications* (Cambridge University Press 1972)
- Kreitzberg, C. B. & Shneiderman, B. *The Elements of FORTRAN Style* (Harcourt, Brace Jovanovich 1972)

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#### 660102 Data Structures and Programming — D. L. S. McElwain

**Prerequisites**

Programming and Algorithms
Hours
Two lecture hours and one tutorial hour per week for the second half of the year.

Examination
One paper of two hours duration

Content
Introduction to data structures: lists, strings, arrays, trees, graphs, searching and sorting; list processing.
Higher level programming languages: Syntax and semantics, Backus normal form, Polish notation. Declarations, storage allocation, subroutines and linkage. Compilation, interpretation, and translation. Study and comparison of data structures in several languages, e.g. ALGOL 60, ALGOL 68, COBOL, FORTRAN, LISP, etc.

References
Day, A. C. Fortran Techniques: with Special Reference to Non-numerical Applications (Cambridge University Press 1972)
Galler, B. A. & Perlis, A. J. A View of Programming Languages (Addison-Wesley 1970)
Knuth, Donald E. The Art of Computer Programming
Vol. I — Fundamental Algorithms
Vol. II — Semi-numerical Algorithms
Sammet, Jean E. Programming Languages: History and Fundamentals (Prentice-Hall 1969)

EE362 Logical Design and Switching Theory — K. K. Saluja
Prerequisite
Mathematics I

Hours
Three hours of lectures, tutorials and practical work per week for the second half of the year.

Examination
Progressive assessment and final examination.

Content
Boolean algebra, combinational logic, logical circuits, minimization techniques, threshold logic. Data representation, binary arithmetic, codes, error checking and correcting. Sequential logic, flip-flops, state diagrams, state reduction, races and hazards. Logic subsystems: registers, adders, counters, converters, coders, etc. Basic architecture of digital computers.

References
Kohavi Switching and Finite Automata Theory (McGraw-Hill 1970)
Sifferlen, T. P. & Vartanian, V. Digital Electronics with Engineering Applications (Prentice-Hall 1970)
660103 Numerical Analysis — W. Summerfield

Prerequisite Mathematics II Topic F or Dean’s permission.
Corequisites Programming and Algorithms
Hours One lecture hour and one tutorial hour per week for three terms.
Examination One paper of two hours duration.

Content

Text
Nil

References
Brent, R. P. Algorithms for Minimization without Derivatives (Prentice-Hall 1972)
Forsythe, G. & Moler, C. B. Computer Solution of Linear Algebraic Systems (Prentice-Hall 1967)
Ralston, A. A First Course in Numerical Analysis (McGraw-Hill 1965)

410103 Commercial Programming — I. R. Beaman

Prerequisites Nil
Hours Two lecture hours per week
Examination Two papers of three hours duration.

Content
Basic concepts of file handling and file maintenance, including file creation and processing.
Flow charting; file merging and updating of transactions; tape blocking and buffering. General run types including editing, searching and sorting. Direct access versus serial; random or sequential organisation. Rerun techniques; verifying program accuracy; table lookup; program documentation and use of test data.
COBOL as a business data processing and file organisation language. Extensive practical work in COBOL, including case studies.

Texts
Farina, M. V. Watters, J. L. Cobol Simplified (Prentice-Hall 1968)

References
Clifton, H. D. Cobol Programming (Heinemann 1970)

GROUP II ELECTIVES

OFFERED BY THE DEPARTMENT OF MATHEMATICS

Mathematical Logic — Mathematics III Topic O, see page 36
Operations Research — Mathematics III Topic U, see page 41
Topic in Applied Probability
  e.g. Information Theory — Mathematics III Topic Y, see page 43
Graph Theory — Mathematics IV see page 61

OFFERED BY THE DEPARTMENT OF ELECTRICAL ENGINEERING

533213 EE341 Automatic Control — G. C. Goodwin

Prerequisites Part II Mathematics topics C, D and E.
Hours Three hours of lectures, tutorials and laboratory work per week for the first half of the year.
Examination Progressive assessment and final examination

Content
Mathematical models of systems and components: linear differential equations, block diagrams, Laplace transforms, state-space formulation.

Text References
Dessoer, C. A. Notes for a Second Course on Linear Systems (Van Nostrand Reinhold 1970)
Ogata, K. Modern Control Engineering (Prentice-Hall 1969)

533210 EE341 Automatic Control — K. L. Hitz
Prerequisite EE341 Automatic Control
Hours Three hours of lectures, tutorials and laboratory work per week for the second half of the year.
Examination Progressive assessment and final examination
Text References Nil

534113 EE425 Digital Electronics — A. Cantoni
Prerequisites EE421 Electronics, EE423L Electronics, EE332 Circuits.
Hours Three hours of lectures, tutorials and laboratory work per week for the second half of the year.
Examination Progressive assessment and final examination


Text References Nil

References
Kohonen, T. Digital Circuits and Devices (Prentice-Hall 1972)
Malmstadt, H. V. & Enke, C. G. Digital Electronics for Scientists (New York, Benjamin Inc. 1969)
Mano, M. Computer Logic Design (Prentice-Hall 1972)
Sifferlen, T. P. & Vartanian, V. Digital Electronics with Engineering Applications (Prentice-Hall 1970)
Examination
Progressive assessment and final examination

Content

Text
Hansen, P. B. Operating Systems Principles (Prentice-Hall 1973)

References

534125 EE464 Compilers, Assemblers and Interpreters — P. J. Moylan

Prerequisite
EE361 Computer Structure: Machine and Assembly Languages

Hours
Three hours per week for the second half of the year

Examination
Progressive assessment and final examination

Content
The design of assemblers. Theory of grammars, parsing techniques, construction of compilers, including an introduction to optimisation methods. Construction of interpreters. Translator-writing systems and string manipulation languages.

Text
Gries, D. Compiler Construction for Digital Computers (Wiley 1971)

References
Stone, H. S. Introduction to Computer Organisation and Data Structures (McGraw-Hill 1972)

530100 EE516 Computer-aided Analysis of Power Systems — Not offered in 1975

530108 EE565 Pattern Recognition — D. J. H. Moore

Prerequisite
Mathematics IIIB

Hours
Three hours of lectures, tutorials and laboratory work per week for the second half of the year

Examination
Progressive assessment and final examination

Content
Use of the computer in pattern recognising systems. Theory of trainable pattern-classifying systems; Fourier-optical methods. Machines that learn with and without a teacher. Current research results obtained in the department will be included.

Text
Nil

References
Nilsson, J. Learning Machines (McGraw-Hill 1965)
Sebestyen, G. Decision-making Processes in Pattern Recognition (Macmillan 1962)
Uhr, L. Pattern Recognition (Wiley 1966)

530119 EE566 Automata and Computing Machines — Not offered in 1975

530125 EE567 Computer Process Control — Not offered in 1975

530121 EE568 Advanced Computer Architecture — A. Cantoni

Prerequisites
EE361 Computer Structure: Machine and Assembly Languages; EE463 Computer Operating Systems

Hours
Three hours of lectures, tutorials and seminars per week

Examination
Progressive assessment and final examination

Content

Text
Nil

References
Foster, C. C. Computer Architecture (Van Nostrand 1970)
Hilfle, J. K. Basic Machine Principles (Macdonald 1972)
S30122  EE569 Formal Languages and Automata — P. J. Moylan

Prerequisite  Mathematics I
Corequisite  EE464 Compilers, Assemblers and Interpreters; complements this course but is not mandatory.
Hours  Three hours per week
Examination  Progressive assessment and final examination

Content
Languages and Grammars. Properties of regular, context-free and context-sensitive grammars. Relationship between automata and formal languages.

Text
Hopcroft, J. E. & Ullman, J. D. Formal Languages and their Relation to Automata (Addison-Wesley 1969)

OFFERED BY THE DEPARTMENT OF MECHANICAL ENGINEERING

Details of these subjects will be found where indicated below.

ME402 Systems Planning, Organization and Control — see page 92
ME404 Mathematical Programming — see page 93
ME487 Operations Research — Deterministic Models — see page 96
ME488 Operations Research — Probabilistic Models — see page 97
ME489 Operations Research — Applications in Industry — see page 97
MES02G Operations Research and Decision Theory — see below
MES81G Mathematical Programming — see page 117

540119  MES81G Mathematical Programming — K. L. Hitz

Prerequisites  Nil
Hours  Three hours per week
Examination  Progressive assessment

Content
A survey of methods for the solution of static, deterministic optimisation problems.
Linear programming, the simplex algorithm and its revised form duality theory; sensitivity analysis; decomposition algorithms transportation and assignment problems.
Linear programming in integers; cutting plane algorithms branch-and-bound methods; implicit enumeration algorithms for binary integer programmes.
Network, scheduling and other combinatorial problems.
Introduction to the theory of convex nonlinear programmes; the Kuhn-Tucker theorem; applications to quadratic programming and geometric programming.
Dynamic programming methods.

Texts
Geoffrion, A. M. (ed.) Perspectives Optimisation (Addison-Wesley 1972)
Nemhauser, G. L. Introduction to Dynamic Programming (Wiley 1966)

References
Hadley, G. Linear Programming (Addison-Wesley, World Student Series 1969)
Künzi, H. P., Krelle, W. & Oettli, W. Nonlinear Programming (Blaisdell 1966)
Luenberger, D. G. Introduction to Linear and Nonlinear Programming (Addison-Wesley 1973)
Taha, H. A. Operations Research (Macmillan 1971)
GROUP III — SUBJECTS

Listed below are a number of subjects which the Board regards as Development of models as an aid in decision making. Mathematical suitable for Group III. This list is not, however, intended to be exhaustive and other subjects will be considered.

OFFERED BY THE DEPARTMENT OF MATHEMATICS

Details of these subjects will be found where indicated below.

- Probability and Statistics — Mathematics III Topic R, see page 39
- Asymptotic Methods in Analysis — Mathematics IV, see page 61
- Random and Restricted Walks — Mathematics IV, see page 62
- Signal Detection — Mathematics IV, see page 53
- Stochastic Processes — Mathematics IV, see page 52
- Combinatorial Designs — Mathematics IV, see page 60
- Combinatorics — Mathematics IV, see page 56
- Population Dynamics — Mathematics IV, see page 49

OFFERED BY THE DEPARTMENT OF COMMERCE

Details of the following will be found in the Economics and Commerce Faculty Handbook.

- 416104 Accounting and Financial Studies

OFFERED BY THE DEPARTMENT OF ELECTRICAL ENGINEERING

Details of the following will be found in the Engineering Faculty Handbook.

- 533102 EE321 Electronics
- 533202 EE322 Electronics
- 533207 EE323L Electronics Laboratory
- 534108 EE421 Electronics
- 534126 EE423L Electronics Laboratory
- 534116 EE444 Communication Systems
- 534127 EE445 Communication Systems

1 Not offered in 1975.

OFFERED BY THE DEPARTMENT OF MECHANICAL ENGINEERING

Details of the following will be found in the Engineering Faculty Handbook.

- 544418 ME449 Reliability Analysis for Mechanical Systems
- 540101 ME503G Design of Experiments for Engineering Research

743300 Physics III (Electronics Section)

Hours 20 lecture hours and 20 hours of laboratory work

Prerequisite Physics II

Content
A course covering the principles and operation of semiconductor devices, including linear and digital integrated circuits.
REQUIREMENTS FOR THE DEGREE OF
MASTER OF MATHEMATICS

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

2. A person may register for the degree of Master of Mathematics if—
   (a) he is a graduate or graduand of the University of Newcastle or other approved University with Honours in the subject to be studied for that degree; or
   (b) he is a graduate or graduand of the University of Newcastle or other approved University; or
   (c) in exceptional cases he produces evidence of such academic and professional attainments as may be approved by the Senate, on the recommendation of the Faculty Board.

3. In the case of applicants desiring to register under provision 2(b), and (c), the Faculty Board may require the candidates to carry out such work and sit for such examinations as the Board may determine before registration as a candidate for the degree of Master of Mathematics is confirmed.

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

5. An applicant approved by the Faculty Board 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.

6. (i) Every candidate for the degree shall be required to submit a thesis embodying the results of research carried out by him during his candidature, to take such examination and to perform such other work as may be prescribed by the Faculty Board. The candidate may submit also for examination any work he has published, whether or not such work is related to the thesis.
   (ii) The research and other work as provided in paragraph 6(i) shall be conducted under the direction of a supervisor appointed by the Faculty Board or under such conditions as the Faculty Board may determine.
   (iii) A part-time candidate shall, except in special circumstances—
      i. conduct the major proportion of his research in the University; and
      ii. take part in research seminars within the Department in which he is working.

(iv) Every candidate shall submit annually a report on his work to his supervisor for transmission to the Higher Degree Committee.

(v) Every candidate shall submit three copies of the thesis as provided under paragraph 6(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.

(vi) 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 (1968) the University may issue the thesis in whole or in part in photostat or microfilm or other copying medium.

7. 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 a qualification deemed by the Faculty Board to be equivalent or who has had previous research experience, this period may, with the approval of the Faculty Board, be reduced by up to three terms.

8. For each candidate there shall be two examiners appointed by the Senate, one of whom shall be an external examiner.

9. A candidate who fails to satisfy the examiners may be permitted to resubmit his thesis in an amended form. Such a resubmission must take place within twelve months from the date on which the candidate is advised of the result of the first examination. No further resubmission shall be permitted.

*A separate sheet on the preparation and binding of higher degree thesis is available on application.
REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

1. The degree of Doctor of Philosophy may be awarded by the Council on the recommendation of the Senate to a candidate who has satisfied the following requirements.

2. A candidate for registration for the degree of Doctor of Philosophy shall:—
   (i) have satisfied all of the requirements for admission to the degree of master or the degree of bachelor with first or second class honours in the University of Newcastle or a degree from another University recognised by the Senate as having equivalent standing;
   or
   (ii) have satisfied all of the requirements for admission to the degree of bachelor with third class honours or without honours in the University of Newcastle or a degree from another University recognised by the Senate as having equivalent standing, and have achieved by subsequent work and study a standard recognised by the Senate as equivalent to at least second class honours;
   or
   (iii) in exceptional cases submit such other evidence of general and professional qualifications as may be approved by the Senate.

3. The Senate may require a candidate, before he is permitted to register, to undergo such examination or carry out such work as it may prescribe.

4. A candidate for registration for a course of study leading to the degree of Ph.D. shall:—
   (i) apply 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 or research leading to the Ph.D. degree and that the Department is willing to undertake the responsibility of supervising the work of the candidate.

5. Before being admitted to candidature, an applicant shall satisfy the Senate that he can devote sufficient time to his advanced study and research.

6. Subsequent to registration, the candidate shall pursue a course of advanced study and research for at least nine academic terms, save that any candidate who before registration was engaged upon research to the satisfaction of the Senate, may be exempted from three academic terms.

7. 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.

8. 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.

9. 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.

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

11. On completing his course of study every candidate shall 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 or in a language approved by the Senate and reach a satisfactory standard of literary presentation.

12. The thesis shall 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.

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

14. 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.

15. The candidate shall give in writing three 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 and that the thesis is fit for examination.

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. 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 (1968) the University may issue the thesis in whole or in part in photostat or microfilm or other copying medium.

19. 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.

20. The Senate shall appoint three examiners of whom at least two shall not be members of the teaching staff of the University.

21. The examiners may require the candidate to answer, viva voce or in writing, any questions concerning the subject of his thesis or work.

22. The result of the examination shall be in accordance with the decision of a majority of the examiners.

23. A candidate permitted to re-submit his thesis for examination shall do so within a period of twelve months from the date on which he is advised of the result of the first examination.

**Requirements for the Degree of Doctor of Science**

1. The degree of Doctor of Science may be awarded by the Council, on the recommendation of the Senate, for an original contribution or contributions of distinguished merit adding to the knowledge or understanding of any branch of learning with which the Faculty is concerned.

2. An applicant for registration for the degree of Doctor of Science shall hold a degree of the University of Newcastle or a degree from another University recognised by the Senate as being equivalent or shall have been admitted to the status of such a degree.

3. The degree shall be awarded on published work although additional unpublished work may also be considered.

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

5. An applicant for registration for the degree shall submit in writing to the Secretary a statement of his academic qualifications together with:
   (a) four copies of the work, published or unpublished, which he desires to submit; and
   (b) a Statutory Declaration indicating those sections of the work, if any, which have been previously submitted for a degree or diploma in any other University.

6. The Senate shall appoint three examiners of whom at least two shall not be members of the teaching staff of the University.

7. The examiners may require the candidate to answer, viva voce or in writing, any questions concerning his work.

8. The result of the examination shall be in accordance with the decision of a majority of the examiners.

*In these requirements, the term "published work" shall mean printed in a periodical or as a pamphlet or as a book readily available to the public. The examiners are given discretion to disregard any of the work submitted if, in their opinion, the work has not been so available for criticism.
RESEARCH IN THE
DEPARTMENT OF MATHEMATICS

Algebra
Mr R. F. Berghout is pursuing some topics in ring theory and ring-like categories, making use of the theory of radicals, and is also engaged in the extension of this theory to additive categories.

Associate Professor W. Brysley is working on some problems occurring in the laws defining certain varieties of groups, the subsequent lattice of sub-varieties of given varieties, and the location of generating critical groups for varieties of groups.

Basic Biological Forces
Dr E. R. Smith is studying the role of Van der Waals and related forces in the stabilisation of biological arrays and colloids.

Chemical Kinetics
Dr D. L. S. McElwain is working on the mathematical modelling of non-equilibrium phenomena in gases, using the Master Equation approach. A stochastic theory of the dissociation of diatomic gases and exchange reactions is being investigated.

Combinatorial Theory and Operations Research
Associate Professor W. D. Wallis is carrying out research on various parts of graph theory, including graph factorisation. He is also working on rostering and scheduling problems.

Dr R. J. Vaughan is interested in the application of optimisation methods to industrial production problems.

Professor R. W. Robinson is applying combinatorics to the counting of various structures, such as graphs and search trees.

Differential Equations
Dr J. G. Couper has been working on the geometric theory of autonomous systems of ordinary differential equations.

Differential Geometry
Dr P. K. Smrz is working on application of the theory of continuous groups and fibre bundles to studies of the mathematical properties of the space-time continuum, especially in relation to the theory of interacting fields.

Dynamic Oceanography
Dr W. Summerfield is interested in the interactions of the various oceanic motions with continental boundaries. He is also studying the various river and lake systems on the N.S.W. coastline.

Environmental and Urban Studies
Dr R. J. Vaughan is investigating mathematical models in urban geography.

Associate Professor W. D. Wallis is interested in mathematical models in urban geography.

Dr R. W. Gibberd is studying models of urban structure and urban development. He is also interested in urban sociology, voting patterns and urban demographic models.

Fluid Mechanics
Dr W. T. F. Lau is concerned with potential flow and viscous flow problems.

Functional Analysis
Dr J. R. Giles is involved in determining properties of Banach spaces which can be derived from relations between the points of the space and their support functionals. In particular, he is examining differentiability properties of the norm. He is also working on the development of the theory of the numerical range of operators on locally convex spaces, and of elements of locally m-convex algebras.

Dr V. Ficker and Mr C. J. Ashman are working in measure theory, particularly in some problems on classes of null sets.

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

Mr Berghout, together with Mrs Frost, is working on Greek algebra. Mrs Frost is currently translating into English some of Euclid’s as yet untranslated works.

Information Theory
Professor R. G. Keats is continuing to work in co-operation with research scientists at the Weapons Research Establishment who are active in the study of signal processing. This work, which is supported by a grant from the Department of Defence, involves the study of non-linear systems with stochastic inputs.

Mathematical Logic
Professor R. W. Robinson is studying structures of the recursively enumerable degrees and the degrees below 0’.

Number Theory
Dr T. K. Sheng studies the structure of humanly manageable numbers, application of dispersive and explosive linear operators, distribution of algebraic numbers in the complex plane, and functions defined on rational numbers.
Numerical Analysis and Computing
Dr A. J. Guttman is interested in methods of function approximation, particularly from the viewpoint of using a linear differential equation representation. He is also interested in the analysis of theoretical and experimental data.

Statistical Mechanics
Dr A. J. Guttman is working on the theory of equilibrium critical phenomena. He is particularly interested in the analysis of power series expansions which are frequently used to study systems exhibiting phase transitions.

Dr E. R. Smith is working on the theory of non-homogeneous systems and the theory of polar liquids.

Dr W. P. Wood is investigating the dynamical behaviour of long chain molecules in solution.

Dr R. W. Gibberd is interested in most aspects of statistical mechanics.

Dr C. A. Croxton is working on the statistical mechanics of liquids and liquid interfaces.

Statistics
Associate Professor W. D. Wallis is working on the theory and application of Room square designs.

Transportation Problems
Dr R. J. Vaughan is continuing his work in the application of mathematics to traffic engineering, traffic accidents and transportation planning.
Important Dates 1975

Applications for Re-enrolment due Jan 3
Applications for Admission due Jan 17
Applications for residence in Edwards Hall due Feb 7
New students attend to enrol Feb 21 & Feb 24
Last day to withdraw from first half year subjects April 21
Confirmation of Enrolment forms due June 13
Last day to withdraw from full year subjects July 7
Last day to withdraw from second half year subjects Sept 15
First closing date for Applications for Admission 1976 Nov 1
Annual examinations begin Nov 8
THE FACULTY HANDBOOKS contain

Academic Staff Lists
Degree Requirements
Syllabuses of Subjects
Texts and References

CONSULT THE CALENDAR for

Academic Dress
Annual Report
By-laws
Council
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Officers and Former Officers of the University
Prizes and Scholarships
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University of Newcastle Act, 1964-1970

Contents and Index to Contents

The contents of this Supplement are in the order in which events occur, for example, admission, enrolment, examinations, etc. The Index to Contents below is in alphabetic order for ease of reference.

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January

1 Wednesday
Public Holiday — New Year's Day

3 Friday
Last day for return of Re-Enrolment Forms — Continuing Students

13 Monday
Deferred Examinations begin

17 Friday
Closing date for Applications for Admission from persons attempting 1974 Australian secondary or tertiary examinations (including N.S.W. Higher School Certificate)

24 Friday
Deferred Examinations end

27 Monday
Public Holiday — Australia Day

February

7 Friday
Closing date for applications for residence in Edwards Hall

21 Friday &
New students attend the University in person to have enrolment approved

24 Monday
Final date for completion of Re-enrolment

25 Tuesday

March

3 Monday
First Term begins

21 Friday
Graduation Day

28 Friday
Good Friday — Easter Recess commences

April

2 Wednesday
Lectures resume

21 Monday
Last day for withdrawal without academic penalty from 1st half year subjects

25 Friday
Public Holiday — Anzac Day

May

10 Saturday
First Term ends
June
2 Monday Second Term begins
13 Friday Last day for return of Confirmation of Enrolment forms
16 Monday Public Holiday — Queen’s Birthday

July
7 Monday Last day for withdrawal without academic penalty from courses in all faculties, except half year Engineering subjects.

August
16 Saturday Second Term ends

September
8 Monday Third Term begins
15 Monday Last day for withdrawal without academic penalty from 2nd half year subjects

October
6 Monday Public Holiday — Eight Hour Day
31 Friday Lectures and other classes cease

November
1 Saturday First closing date for Applications for Admission 1976
8 Saturday Third Term ends — Annual Examinations begin
29 Saturday Annual Examinations end

1976

January
19 Monday Deferred Examinations begin
30 Friday Deferred Examinations end

March
1 Monday First Term begins

Administrative Staff

Vice-Chancellor and Principal
Professor J. J. Auchmuty, CBE, MA, PhD, HonLLD(Dublin), HonDLitt(Sydney), FAHA, MRIA, FRHistS (To 31 December 1974)
Professor D. W. George, BSc, BE, PhD(Sydney), FIEE, FIEAust, AAIP (From 1 January 1975)

Vice-Principal and Deputy Vice-Chancellor
Professor A. D. Tweedie, MA(New Zealand)

Deputy Vice-Chancellor
Professor E. O. Hall, MSc(New Zealand), PhD(Cambridge), FInstP, MAustIMM, FIM(Lond.), FAIP, FRSA

Personal Assistant to Vice-Chancellor
A. Nell Emanuel, BA(New South Wales)

Secretary to Vice-Chancellor
Nancy A. Perkins

Educational Services and Research
H. Maddox, BA, PhD(London)

Bursar’s Division

Bursar
L. W. Harris, FASA, ABIA, MRIPA

Assistant Bursars
L. J. Caldwell, BCom, AASA(S), ACIS
J. M. Falconer, AASA(S), ABIA
G. W. Walker, AASA


---

**Secretary's Division**

**Secretary**

P. D. Alexander, BA, DipEd(Sydney)

**Faculty Secretariat**

J. S. Boydell, MA(Cambridge) (*Assistant Secretary*)
R. J. Archer, BSc, BEcon, DipEd(Queensland)
D. E. Brock, BA(New England) (*Seconded to Education*)
F. C. Hawkins, BCom
Linda S. Wheeler, BA

**Student Administration**

P. H. Farley, BA(New South Wales), MA(Macquarie) (*Assistant Secretary*)
Glennie Jones, BA(New South Wales) (*Examinations*)
R. A. Gibbs, BA, DipEd(New South Wales)
G. J. Martin, BCom

**Publicity and Publications**

J. W. Armstrong, BA
E. Joan Balc, BA(New South Wales)

**Statistics**

D. L. Farmer, BSc, DipEd(Sydney)

**E.D.P. Development**

D. S. Dunlop
A. Hall

---

**Planner's Division**

**University Planner**

Vacant

**Deputy Planner**

D. D. Morris, BArch, DipLD(New South Wales), ASTC, FRAIA, AAILA (*Acting Planner*)

---

**Staff Architect**

W. J. Crook, BArch(New South Wales), ARAIA

**Assistant Staff Architect**

A. Lee, ASTC, ARAIA

**Staff Engineer**

M. E. Edmonds, DipMEE(Queensland), MIEAust

**Assistant to Staff Engineer**

J. D. O'Donohue

**University Counselling Service**

**Senior Student Counsellor**

A. P. T. Loftus, BA(Melbourne), MA, MAPsS

**Student Counsellors**

Anne H. Furner, BA, DipAppPsych, MAPsS
D. R. Martin, BA, DipEd(Sydney), MAPsS, ABPsS (*Temporary Appointment*)

**Overseas Student Service**

**Overseas Student Advisor**

Robin Loftus, BA(Adelaide)

**Amenities Office**

**Amenities Officer**

H. Bradford

**Careers and Student Employment Office**

**Careers Officer**

H. Floyer, BSc(Sydney)

**Computer Centre**

**Director**

J. A. Lambert, BSc(Sydney), MSc(New South Wales), FBCS, MACS
The University of Newcastle

The University of Newcastle began its existence as the Newcastle University College of the University of New South Wales and by the University of Newcastle Act of 1964, became an autonomous institution on 1st January, 1965.


Originally the University was established on a site at Tighes Hill. In 1960 an area of some 200 acres was acquired at Shortland and building commenced in 1964. Courses in all faculties are now given on the Shortland Campus.

The University is governed by a Council of twenty-four members. The Chancellor, who acts as chairman, is chosen either within the twenty-four members or from outside, the size of the Council being increased to twenty-five in the latter instance. The Council comprises representatives of the University staff, Convocation, the students, the New South Wales Legislative Council and Legislative Assembly; nominees of the Governor; the Vice-Chancellor and four co-opted members.

The present Chancellor of the University is the Honourable Sir Alister McMullin, KCMB, HonDLitt. The Vice-Chancellor and Principal is the chief executive officer of the University. The Foundation Vice-Chancellor of the University, Professor J. J. Auchmuty, CBE, MA, PhD(Dublin), FAHA, MRIA, FRHistS, retires at the end of 1974 and will be succeeded by Professor D. W. George, BSc, BE, PhD (Sydney), FIEE, FIEAust, AAIP.

The principal academic body in the University is the Senate comprising the Vice-Chancellor, Professors, a representative of each of the Faculty Boards, representatives of the students and certain other ex officio members. Teaching and research in each Faculty are supervised by a Faculty Board consisting principally of the permanent academic and teaching staff of the Departments in the Faculty and representatives of the students. A number of Boards of Studies have also been established, each board having the task of integrating or supervising activities in a particular area of interest.

The University is financed by grants from the Australian Government.
The following Table summarises the courses that are now available. For full details refer to the appropriate Faculty Handbook.

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Departments</th>
<th>Degrees</th>
<th>Full-time</th>
<th>Part-time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied Science</td>
<td>Metallurgy</td>
<td>BMet</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>BSc(Met)</td>
<td>2</td>
<td>plus 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or BSc(Arch)</td>
<td>2</td>
<td>or 3</td>
</tr>
<tr>
<td>Architecture</td>
<td>Architecture</td>
<td>BSc(Arch)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>or BArch</td>
<td>2</td>
<td>or 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(entry qual. is BSc (Arch) or equivalent)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>arts</td>
<td>Classics</td>
<td>BA</td>
<td>3</td>
<td>or 5½</td>
</tr>
<tr>
<td></td>
<td>Creative Arts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Economics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>English</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>French</td>
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<tr>
<td></td>
<td>Geography</td>
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<tr>
<td></td>
<td>German</td>
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<td></td>
<td>History</td>
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<td></td>
<td>Linguistics</td>
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<tr>
<td></td>
<td>Mathematics</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Philosophy</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Psychology</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economics and</td>
<td>Commerce</td>
<td>BCom</td>
<td>3</td>
<td>or 5½</td>
</tr>
<tr>
<td>Commerce</td>
<td>Economics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Legal Studies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineering</td>
<td>Chemical</td>
<td>BE</td>
<td>4</td>
<td>or 6</td>
</tr>
<tr>
<td></td>
<td>Civil (includes Surveying)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electrical (includes Computer)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mechanical (includes Industrial and Naval Architecture)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chemical Engineering</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Geology</td>
<td></td>
<td></td>
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<td></td>
<td>Physics</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Psychology</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mathematics</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Approval has been given for the development at the University of a Medical course. Information about this development will be available on request from the Student Administration Office after September 1975. The Medical course is expected to commence in 1978.

1 *Honours* --- additional 1 year full-time or 2 years part-time.

2 The final year may be taken over 2 part-time years.

Admission

Persons seeking admission to undergraduate courses at the University must

- satisfy matriculation requirements or have other acceptable qualifications, and
- follow the correct application procedures by the closing dates set out below.

Where the number of persons seeking entry to a Faculty exceeds the number for whom places are available it may also be necessary to secure a place in competition with other applicants.

Matriculation

Set out below is information from the By-laws relating to matriculation.

1. **Matriculation Requirements in Terms of the Present New South Wales Higher School Certificate Examination**

A candidate for matriculation must

(a) have passed in the New South Wales Higher School Certificate Examination or the University of Sydney Matriculation Examination in at least five recognised matriculation subjects, one of which shall be English and any three of which shall be passed at least at second level; and
have attained in that examination the aggregate of marks prescribed by the Senate from time to time and calculated in the manner determined by the Senate.

The recognised matriculation subjects are:

<table>
<thead>
<tr>
<th>Subject</th>
<th>English</th>
<th>Greek</th>
<th>Chinese</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics</td>
<td>Latin</td>
<td>Japanese</td>
<td></td>
</tr>
<tr>
<td>Science</td>
<td>French</td>
<td>Hebrew</td>
<td></td>
</tr>
<tr>
<td>Agriculture</td>
<td>German</td>
<td>Dutch</td>
<td></td>
</tr>
<tr>
<td>Modern History</td>
<td>Italian</td>
<td>Art</td>
<td></td>
</tr>
<tr>
<td>Ancient History</td>
<td>Bahasa Indonesia</td>
<td>Music</td>
<td></td>
</tr>
<tr>
<td>Geography</td>
<td>Spanish</td>
<td>Industrial</td>
<td></td>
</tr>
<tr>
<td>Economics</td>
<td>Russian</td>
<td>Arts</td>
<td></td>
</tr>
</tbody>
</table>

Mathematics and Science, both passed as full courses, together shall count as three subjects, but otherwise, each counts as one subject.

The qualification for matriculation must be obtained at one examination.

Faculty Assumed Knowledge

Although prerequisites are not prescribed, lectures in the following faculties, courses or subjects will be given on the assumption that students will have studied for the New South Wales Higher School Certificate the subjects listed below to the level indicated:

<table>
<thead>
<tr>
<th>Faculty or Subject</th>
<th>Assumed Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied Science</td>
<td>Second level Short Course Mathematics and Science including Physics and Chemistry options</td>
</tr>
<tr>
<td>Architecture</td>
<td>Second level Short Course Mathematics and Science</td>
</tr>
<tr>
<td>Arts</td>
<td>Second level Short Course Mathematics and Science</td>
</tr>
<tr>
<td>Economics I</td>
<td>Second level Short Course Mathematics</td>
</tr>
<tr>
<td>French I</td>
<td>Second level English</td>
</tr>
<tr>
<td>German I</td>
<td>Second level German</td>
</tr>
<tr>
<td>Economics &amp; Commerce</td>
<td>Second level Short Course Mathematics</td>
</tr>
<tr>
<td>Engineering</td>
<td>Second level Short Course Mathematics and Science including Physics and Chemistry options</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Second level Short Course Mathematics</td>
</tr>
<tr>
<td>Science</td>
<td>Second level Short Course Mathematics</td>
</tr>
</tbody>
</table>


Revised matriculation requirements will have effect from July, 1976. Details are available from the Secretary to the University.

3. Other Requirements

Persons who have not satisfied the ordinary matriculation requirements (above) may on application be considered for admission provided they are able to satisfy the University that they have reached a standard of education sufficient for them to pursue the proposed course. Detailed documentary evidence of all qualifications must be submitted with the Application for Admission 1973.

Application Procedure

Persons seeking admission in 1975 are required to lodge an Application for Admission 1975 by the appropriate closing date listed below. Application forms and information about courses available at the University may be obtained from the Student Administration Office, Ground Floor, Arts/Administration Building at the University at Shortland. The office is open from 9 a.m. to 12.30 p.m. and 1.30 p.m. to 5 p.m. Application materials are also available on request by mail to

The Secretary,
The University of Newcastle, N.S.W. 2308.

For full information about courses, please consult the appropriate Faculty Handbook available from the University Cashier at a cost of $1.00 or $1.20 plus postage for an article weighing between 250 and 500 grams if sent to an address in Australia.

Closing Dates

1. Applicants who are attempting Australian* secondary or tertiary examinations in 1974 (including the 1974 N.S.W. Higher School Certificate Examination) as soon as possible after the results are known but not later than 5 p.m. on Friday, 17 January 1975.

2. All other applicants

as soon as possible but not later than 5 p.m. on Friday, 1 November 1974.

No guarantee can be given that applications received after the prescribed dates will be considered.

Applications sent by post should be addressed to

The Secretary,
The University of Newcastle, N.S.W. 2308

* Persons resident outside Australia whose examination results will not be available by 1 November 1974 will not be considered for admission in 1975. They may enquire in September 1975 for admission in 1976.
University of Sydney Matriculation Examination

Applicants attempting to gain a matriculation qualification at the 1975 University of Sydney Matriculation Examination must nevertheless lodge an application for admission on or before 17 January 1975 indicating their intention to take the examination, the subjects and levels to be attempted, and must advise The Secretary of their results as soon as they are known.

Documentary Evidence

Where an application is based on completion of secondary education outside New South Wales or where studies have been undertaken at a tertiary institution documentary evidence confirming all qualifications must be submitted. Documents should list all subjects attempted and give full grade information including failures or withdrawals. Legible photocopies of documents are acceptable. Documents in foreign languages must be accompanied by certified translations into English.

Applicants are advised to assemble all required documents well in advance as applications submitted without required documents cannot be considered.

Syllabus Information

Where subjects have been passed at other tertiary institutions a brief extract from the institution’s calendar or handbook describing the syllabus content should be submitted.

Selection

It will be appreciated that the University needs to regulate enrolments to ensure that the number of persons admitted does not exceed the number for whom places are available. If selection is necessary it will be based on academic merit. In the past the University has been able to admit all qualified applicants, except in the Faculty of Architecture where some restrictions have been necessary.

Result of Application

All applicants will be advised by mail of the result of their application.

Deferment of Admission

The University does not grant deferments of admission. Persons who are unable to accept an offer of admission should reapply when they are in a position to undertake university studies.

Enrolment

Persons offered admission will be given instructions of the procedure to be followed to complete enrolment. All students should possess a copy of their Faculty Handbook. Before proceeding to enrolment they should have read carefully those sections of the Handbook relating to the programme for their degree, the degree requirements and, where a choice of subjects is available, should have decided on the subjects they would like to include in their programme.

Attendance Status

In accordance with the By-laws, the University defines attendance status as follows:

A Full-Time Student is a student who enrols in more than half the subjects of a normal first year course and such a student remains classified as a full-time student until the written approval of the Dean of the Faculty is given that he be re-classified as a part-time student. This re-classification would be exceptional.

A Part-Time Student is either one who enrols in half or less than half of the subjects of a normal first year course or one who enrols in a part-time course. In subsequent years, the enrolment as a part-time student requires the approval of the Dean of the Faculty.

Note

The Australian Government for the purposes of the Tertiary Education Assistance Scheme normally defines a full-time student as one who enrols in 75% or more of a usual first year course.

University Skills Assessment

As part of its service to students, the University Counselling Service holds a voluntary half-day session in which a variety of skills relevant to university work, such as Reading Speed, Note-Taking, Study Skills, etc., are tested. Attendance is voluntary and the results are held in confidence in the Counselling Service. In 1975 it is intended to hold the University Skills Assessment during orientation week. Many students derive benefit from later discussing their results with a Counsellor. Some students are later invited (on the basis of a weak result) to participate in a course designed to overcome their particular difficulty.

After Enrolment

At the back of this supplement is a list of people who may be consulted for information on a wide range of matters.
The attention of students is also drawn to the following University requirements affecting continued enrolment.

Change of Address

Students are responsible for notifying the Student Administration Office in writing of any change in their address. A Change of Address form should be used and is available from the Student Administration Office.

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

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

Change of Name

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

Change of Programme

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

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

Withdrawal without Academic Penalty

Approval to withdraw from a course or a subject is not automatic. It should be noted that a student is regarded as having failed in a subject if he enrols in it and does not pass the annual examinations — that is not sitting for the examination is regarded as not passing the examination (unless withdrawal without penalty has been approved).

Withdrawal from a subject takes effect from the date of receipt of written notification. Unless the Dean of the Faculty grants permission to withdraw without penalty, a student who withdraws after the dates shown below will be deemed to have failed in the subject or subjects.

<table>
<thead>
<tr>
<th>Dates</th>
<th>Full Year Subjects</th>
<th>First Half-year Subjects</th>
<th>Second Half-year Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Withdrawal Dates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sixth Monday in Second Term</td>
<td>Eighth Monday in First Term</td>
<td>Second Monday in Third Term</td>
<td></td>
</tr>
</tbody>
</table>

Confirmation of Enrolment

In May each year the University mails to all students a form Confirmation of Enrolment which also serves as the application to sit for examinations. This form must be checked carefully, signed and returned by all students (including non-degree students and postgraduate students not taking formal subjects) to confirm that they are actively pursuing subjects for which they are enrolled and that the information on University records is correct and complete. Arrangements may not be made to examine students who do not return the form as it will be assumed that they have discontinued their studies.

Attendance at Classes

Students are expected to be regular and punctual in attendance at all classes in the course or subject in which they are enrolled.

All applications for exemption from attendance at lectures or practical classes must be made in writing to the Head of the appropriate Department. If term examinations have been missed this fact should be noted in the application.

In the case of illness or of absence for some other unavoidable cause a student may be excused by the Head of the appropriate Department for non-attendance at classes.

Applications for exemption from re-attendance at classes, either for lectures or practical work, may only be approved on the recommendation of the Head of the appropriate Department. The granting of an exemption from attendance does not carry with it any waiver of the General Services Charge. Where a student has attended less than 80 per cent. of the possible classes, he may be refused permission to sit for the annual examination in that subject.

General Conduct

In accepting membership of the University the student undertakes to observe the by-laws and other requirements of the University.

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

Members of the academic staff of the University, senior administration officers, and other persons authorised for the purpose have authority, and it is their duty, to check and report on disorderly or improper conduct occurring in the University.
Notices

Official University notices are displayed on the notice boards and students are expected to be acquainted with the contents of those announcements which concern them.

Examinations

A notice board has been placed on the wall opposite the entrance to the Main Lecture Theatre (B01) for the specific purpose of displaying examination timetables and other notices about examinations.

Student Matters Generally

The main notice board is the display point for notices concerning enrolment matters, scholarships, University rules and travel concessions, etc. This notice board is located on the first floor at the top of the main staircase in the Arts/Administration building.

Examinations

Examinations and other exercises may be held in any subject from time to time. In the assessment of a student’s progress in a university course, consideration will be given to laboratory work and class exercises and to any term or other tests conducted throughout the year. The results of such examinations and class work may be incorporated with those of the annual examinations.

Annual Examinations

The annual examinations take place in November. Timetables showing the time and place at which individual examinations will be held will be posted on the examinations notice board near the Main Lecture Theatre.

Misreading of the timetable will not under any circumstances be an acceptable excuse for failure to attend an examination.

A student who, because of religious convictions, would prefer not to sit for an examination on a particular day or particular day of the week should indicate this in writing when lodging his Confirmation of Enrolment. While the University cannot guarantee to meet such requests it will be willing to co-operate where possible.

Examinations are conducted in accordance with the following rules and procedure:

(a) Candidates are required to obey any instruction given by a Supervisor for the proper conduct of the examination.

(b) Candidates are expected to be in their places in the examination room not less than ten minutes before the time for commencement of the examination.

(c) No bag, writing paper, blotting paper, manuscript or book, other than a specified aid, is to be brought into the examination room.

(d) No candidate shall be admitted to an examination after thirty minutes from the time for the commencement of the examination.

(e) No candidate shall be permitted to leave the examination room before the expiry of thirty minutes from the commencement of the examination.

(f) No candidate shall be re-admitted to the examination room after he has left it unless during the full period of his absence he has been under approved supervision.

(g) A candidate shall not by any improper means obtain or endeavour to obtain assistance in his work, give or endeavour to give assistance to any other candidate, or commit any breach of good order.

(h) Smoking is not permitted during the course of an examination.

(i) A candidate who commits any infringement of the rules governing examinations is liable to disqualification at the particular examination and if detected at the time, to immediate expulsion from the examination room, and is liable to such further penalty as may be determined.

After completion of the written annual examination papers, a student may be called upon by an examiner to complete further written, practical or oral tests as part of the annual examination.

No student is eligible to attend the annual examination in any subject if any portion of charges due by him is outstanding by the end of the third week of third term.

Examination Results

Each student will be advised by mail of his examination results. A set of examination results will be offered to the newspapers for publication. No results will be given by telephone.

Examination results may be reviewed for a charge of $8.00 per subject, which is refundable in the event of an error being discovered. Applications for review must be submitted on the appropriate form together with the prescribed review charge by 15 January 1975.

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

Special Examinations

Special examinations may be granted according to the conditions contained in By-Law 5.9.3 which states:
5. When a candidate is prevented by illness or by any other serious cause from presenting himself for the annual examination the appropriate Faculty Board may order a special examination for that candidate in the subject or subjects in which he was unable to present himself. The result of a special examination may be graded.

6. When a candidate's studies during the academic year have been gravely hampered by illness or other serious cause, the appropriate Faculty Board upon application being made to the Secretary to the University before the commencing date of the examination supported by medical or other proper evidence may direct the examiners to take the circumstances into account in determining whether or not a special examination should be provided for the candidate in any subject in which he does not pass at the annual examination.

7. When a candidate at the annual examination is to a substantial degree affected by illness during the course of an examination in any subject the appropriate Faculty Board, upon application being made to the Secretary to the University within three days after such examination or within such further period as the Vice-Chancellor may consider reasonable in the circumstances supported by medical or other proper evidence, may direct the examiners in that subject to take the circumstances into account if the candidate does not pass therein in determining whether or not a special examination or test should be provided for him: provided that no such application shall be considered unless the candidate either during or immediately after such examination reports to the supervisor in charge the circumstances relied on in the application.

Deferred Examinations

The Boards of the Faculties of Applied Science, Architecture, Engineering, and Mathematics may grant deferred examinations. Such examinations, if granted, will be held in January-February and results will be published in the same manner as for the annual examinations. When reviewing the examination results Faculty Boards take into consideration any circumstances such as illness or personal problems which may have seriously affected a student’s work during the year or during the examinations. Any student who considers that his work has been affected in this way or who is unable to attend for any examination and who wishes to apply for special consideration should write to the Secretary explaining the circumstances and, in the case of illness, enclosing a medical certificate.

If a student is affected by illness during an examination he must report to the supervisor in charge of the examination and then apply to the Secretary as soon as possible after the examination (see By-law 5.9.3.7 above).

Academic Progress Requirements

General

The University has enacted certain By-laws relating to continuation in a subject or a course. They are set out below.

Procedure

It is the responsibility of a student who does not satisfy any of the academic progress requirements to take action as required by the By-laws.

Students who become liable for exclusion from a course after failure at Annual Examinations will be informed accordingly by mail after the release of examination results. They will also be advised of the procedure to be followed if they wish to show cause.

A student who wishes to re-enrol in a subject which he has failed more than once is required to show cause why he should be allowed to re-enrol in the subject and must submit a show cause statement with his re-enrolment form.

Students who are liable for exclusion from a subject or course must lodge their show cause statement and completed re-enrolment form with the Student Administration Office or before Friday, 3 January 1975.

With regard to continuation in a course, under By-law 5.4.1.2 Faculty Boards have determined policy to regulate the academic progress of students, particularly in relation to the first year or first two stages of enrolment, and students should refer to their Faculty Handbook for this information. The relevant By-laws are set out below:

By-laws

By-law 5.4.1 — Unsatisfactory Progress

1. The Head of a Department in any Faculty may determine that a student taking a subject or course offered by the Department shall be excluded from any examination for which the Department is responsible for any or all of the following reasons:

   (a) unsatisfactory attendance at lectures;

   (b) failure to complete laboratory work;

   (c) failure to complete written work or other assignments; or

   (d) failure to complete field work.
2. The Faculty Board may review the academic progress of any student enrolled in the Faculty concerned who fails in, or is absent from, or is excluded under section 1 of this By-law from any examination and may determine:—

(a) that the student be excluded from further study in a subject;
(b) that the student may enrol in that Faculty only in such subject or subjects as the Faculty Board shall specify; or
(c) that the case be referred to the Admissions Committee if, in the opinion of the Faculty Board, the student should be excluded from a degree course, from the Faculty or from the University.

3. The Admissions Committee, in considering a referral under subsection (c) of section 2 and after giving the student an opportunity to be heard, may determine:—

(a) that the student be excluded from a degree course or from the Faculty;
(b) that the student shall be permitted to continue his course, subject to such conditions as the Admissions Committee may determine: or
(c) that the case be referred to the Vice-Chancellor with the recommendation that the student be excluded from the University.

4. The Vice-Chancellor may, on the recommendation of the Admissions Committee exclude from the University any student whose academic record in the opinion of the Vice-Chancellor and the Admissions Committee demonstrates the student’s lack of fitness to pursue University studies.

By-law 5.4.2 — Show Cause

1. 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 the annual examination counts for the purposes of this By-law as one examination.

2. (1) A full-time student shall show cause why he should be allowed to continue a course if all subjects of the first year of his course are not completed by the end of his second year of attendance.

(2) A student admitted to a course at the University following a record of failure at another university shall show cause, notwithstanding any other provision in this By-law, why he should be allowed to continue in that course if he is unsuccessful in the annual examinations in his first year of attendance at the University.

4. A student required to show cause shall have his application considered by the Admissions Committee which shall determine whether the cause shown is adequate to justify the student's being permitted to continue his course or to re-enrol as the case may be.

By-law 5.4.3 — Re-Enrolment

1. Any student who has been excluded from a faculty shall not be allowed to enrol in another faculty without the permission of the Faculty Board concerned.

2. Any student excluded from a degree course or from a faculty or from the University may apply after two academic years to the Admissions Committee for re-admission to any such faculty or to the University. If the Admissions Committee is satisfied that the condition or circumstances of any such student have so changed that there is reasonable probability that he will make satisfactory progress in his studies it may authorise the re-admission of that student under such conditions as it may determine.

By-law 5.4.4 — Appeal Against Exclusion

1. A student who is refused permission to enrol under the provisions of section 1 of By-law 5.4.3. may appeal to the Senate.

2. A student who has been excluded from any degree course or from a faculty or from the University may appeal to the Council.

Degree Requirements

The student is responsible for informing himself as to, and for complying with, University requirements, especially the requirements relating to admission and to the award of the degree to which he is proceeding.

For details of degree requirements reference should be made to the appropriate Faculty Handbook.

Leave of Absence

A student who does not wish to re-enrol for any period up to three years should apply for leave of absence. Leave of absence is normally granted to those students who have passed the equivalent of half the
first year course and are in good standing. Applications should be submitted before the end of first term in the first year for which leave of absence is sought. Leave of absence will not be granted for more than three years and will not be granted retrospectively.

Any student who does not enrol for a period of two years and does not obtain leave of absence, must apply for re-admission to the University when he wishes to resume his studies.

**Re-enrolment in Undergraduate Courses**

Re-enrolment materials will be mailed to all undergraduate students early in November. Those who wish to re-enrol in 1975 and who are eligible to do so (see academic progress requirements page 23) should complete the re-enrolment form as soon as possible after the release of the 1974 Annual Examination results, and forward it to The Secretary, University of Newcastle, N.S.W. 2308.

Re-enrolment forms are due 3 January 1975 except in the case of a student who is required to take a special or deferred examination in which case the re-enrolment form must be submitted within seven days of the release of those examination results.

Submission of re-enrolment forms after the due date will render the student liable to a late lodgement charge of $14.00.

Students who, for good reasons, are unable to submit their Re-enrolment Forms by the due date, may apply for an extension of time. The request, with details of reasons for the extension must reach the Secretary by the due date if the late lodgement charge is to be avoided.

The By-laws provide that no enrolment will be accepted after 31 March without the approval of the Secretary which shall be given only in exceptional circumstances.

**Approval of Re-enrolment**

When the re-enrolment programme has been approved, a form Authority to Complete Enrolment will be mailed to the student showing charges payable. Students are required to complete enrolment by payment of all charges due by 25 February 1975 otherwise late charges become payable.

The following time schedule summarises the steps involved in re-enrolment without payment of a late charge.

**1974**

Nov. Re-enrolment forms mailed to students.

Mid Dec. Examination results mailed to students.

Feb. 25 Last date for lodging with Cashier the Authority to Complete Enrolment and charges due.

Mar. 3 Term One commences.

**Re-admission after Absence**

A person who has been enrolled previously at the University of Newcastle, but not enrolled in 1974, is required to lodge an Application for Re-admission if further undergraduate enrolment is desired. Applications are available from the Student Administration Office and close on 17 January 1975.

**Non-Degree Students**

A person who is qualified to matriculate may apply for enrolment as a non-degree student in a subject or subjects. Persons enrolled as non-degree students are expected to comply with normal university requirements. Permission to enrol as a non-degree student is granted for one year at a time and a new application is required each year. Persons seeking non-degree enrolment should lodge the Application for Admission by the closing date (1 November 1974).

**Postgraduate Courses**

Postgraduate courses are offered in each of the Faculties of the University. They include—
- postgraduate diploma courses
- higher degrees by coursework
- research master and doctoral degrees.

**Postgraduate Diplomas**

The following postgraduate diploma courses will be offered in 1975:

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts</td>
<td>Diploma in Education</td>
</tr>
<tr>
<td>Economics &amp; Commerce</td>
<td>Diploma in Business Studies</td>
</tr>
<tr>
<td>Engineering</td>
<td>Diploma in Industrial Engineering</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Diploma in Computer Science</td>
</tr>
<tr>
<td>Science</td>
<td>Diploma in Psychology*</td>
</tr>
</tbody>
</table>

Application Procedure

Persons wishing to enrol for a postgraduate diploma should complete the appropriate application for registration and lodge it with all required documents with the Student Administration Office not later than Friday 17 January 1975.

For further information about a particular course please consult the appropriate Faculty handbook.

Higher Degrees by Coursework

Higher degrees by coursework are offered in the following faculties:

- Architecture — Bachelor of Architecture
- Arts — Bachelor of Educational Studies
- Economics & Commerce — Master of Commerce (in Economics)
- Engineering — Master of Engineering Science in Chemical, Civil, Electrical and Mechanical Engineering

Persons wishing to register for one of the above awards must lodge the Application to Register form with all required documents with the Student Administration Office not later than Friday, 17 January 1975.

Research Higher Degrees

The following research higher degrees are available:

- Master of Architecture (MArch)
- Master of Arts (MA)
- Master of Education (MEd)
- Master of Engineering (ME)
- Master of Mathematics (MMath)
- Master of Science (MSc)
- Doctor of Philosophy (PhD)

The By-laws also provide for the conferring of higher doctoral degrees.

Applications for registration for a research higher degree, together with all required documents, must be lodged on the prescribed form with the Student Administration Office at least one full month before the beginning of the term in which registration is to commence. Applications received after the due date may be considered for the following term.

Confirmation of Enrolment

In May each year the University forwards to all students a form Confirmation of Enrolment which contains details of a candidate’s registration and any formal subjects for which he has enrolled. This form must be checked carefully, signed and returned by the due date to confirm active enrolment for the course listed.

Change of Address

Students are required to notify the University of any changes in their address for correspondence, and must make arrangements for mail to be forwarded to them during short absences.

Variations to Programmes

Any requests for variations to postgraduate programmes must be submitted through the Student Administration Office for approval.

Re-enrolment of Postgraduate Students

All postgraduate and higher degree students who are eligible to continue their enrolment will be sent re-enrolment materials and details of the procedure to be followed to re-enrol.

Ownership of Students Work

Unless other arrangements have been agreed upon the University reserves the right to retain at its own discretion the original or one copy of any drawings, models, designs, plans and specifications, essays, theses, or other work executed by students as part of their courses, or submitted for any award or competition conducted by the University.

Charges

Charges are determined by the University Council and are subject to alteration without notice. The due date for payment of charges for 1975 is 25 February, 1975.

Enrolment is completed by lodging with the Cashier the approved form Authority to Complete Enrolment with a remittance to cover all charges due or evidence that a sponsor will meet these charges.

The By-laws provide that enrolment will not be accepted after 31 March 1975 without the Secretary's written approval which will be given only in exceptional circumstances.

Payment of Charges

The Union Entrance charge and General Services charge must be paid in full at the time of enrolment.

Payment by mail is encouraged. Money Orders should be made payable at the Newcastle University Post Office, New South Wales 2308. The Cashier's Office is located on the first floor of the Arts/Administration Building, and is open during term from 9 a.m. to 4:30 p.m. and during vacation periods from 9 a.m. to 12:30 p.m. and 1:30 p.m. to 4:30 p.m.
Scholarship Holders and Sponsored Students

Students holding scholarships or receiving other forms of financial assistance must lodge with the Cashier their Authority to Complete Enrolment together with warrants or other forms of documentary evidence that charges will be paid by sponsors. The University looks to sponsors to provide a separate voucher, warrant or letter for each student sponsored.

Charges

1. General Services Charge
   (a) Students Proceeding to a Degree or Diploma
      All students must pay a General Services charge of $63.00 per annum. In addition, students joining Newcastle University Union for the first time, are required to pay an amount of $10.00. These charges must be paid in full by the prescribed date.
   (b) Non-Degree Students
      Non-degree students must pay a Union charge of $34.00 per annum. This fee must be paid in full by the prescribed date. Non-degree students are not required to pay the General Services charge or the Union Entrance charge.

2. Late Enrolment and Re-enrolment Charges
   (a) Late re-enrolment charge where a continuing student does not lodge a re-enrolment form with the Student Administration office by 3 January 1975
      $14
   (b) Late enrolment charge where a student does not lodge the Authority to Complete Enrolment form with the Cashier by 25 February 1975
      $14
   (c) Late payment charge where an application to sit for examination is accepted after closing date
      $6
   (d) Late payment charge if General Services charge is not paid by 25 February 1975
      $8
   (e) Additional amount payable if General Services charge is not paid within an extended time after 25 February 1975
      $6

3. Other Charges
   (a) Examination under special supervision, per paper
      $10
   (b) Review of examination results, per subject
      $8
   (c) Statement of matriculation status for non-members of the University
      $8
   (d) Academic statements in excess of six per annum
      15c a copy
   (e) Replacement of student identity cards
      50c each

Higher Degree Candidates

General Services Charge

Higher Degree candidates are required to pay the General Services charge and Union Entrance charge, if applicable. Where the enrolment for a Higher Degree candidate is effective from First or Second Term, the General Services charge covers a period of registration from the first day of the term to the Friday immediately preceding the first day of First Term in the following academic year. Where a Higher Degree candidate enrols on or after the first day of Third Term, the General Services charge paid will cover liability to the end of the long vacation following the next academic year.

Tertiary Education Assistance Scheme

Under this scheme the Australian Government provides a living allowance and other allowances to students who are undertaking tertiary study for the first time and who
   * are permanent residents of Australia
   * enrol as full-time students
   * enrol in approved courses
   * qualify for a living allowance on a means test.

Information and application forms may be obtained from the Regional Director, Department of Education, 323 Castlereagh Street, Sydney, (Telephone 02/20929). Postal address Box 596, Post Office, Haymarket 2000.

Teacher Education Scholarships

The N.S.W. Department of Education each year offers a large number of Scholarships to persons wishing to enter the teaching profession.

Information and application forms may be obtained from the Teacher Education Scholarship Branch, N.S.W. Department of Education, Blackfriars Street, Chippendale, N.S.W. 2008.
General Information

Identity Cards
Each student wishing to obtain a travel concession, to borrow a book from the Library or to confirm his membership of the Newcastle University Union is required to produce on demand his identity card. Identity cards will be issued to students at the Student Administration Office and should be available soon after the commencement of First Term. The student will be required to produce his enrolment receipt issued by the cashier before an identity card will be issued to him.

Loss of Identity Card
If a student loses his identity card he should pay to the University Cashier the sum of 50 cents and present the receipt to the Student Administration Office for the purpose of obtaining a replacement card.

Return of Identity Card
Each student who during the academic year withdraws completely from his course will be required to hand his Identity Card to the Student Administration Office before leaving the University.

Travel Concessions
The various transport authorities provide fare concessions for certain classes of students. Application forms for these concessions may be obtained at the Student Administration Office.

The Student’s Identity Card has to be produced each time a concession is required.

Bus Concessions are available to:
(a) students under 18 years of age irrespective of whether they are employed or receive income or remuneration.
(b) students who are 18 but under 30 years of age and who are not in employment nor in receipt of any income or remuneration.

Note
Income or remuneration includes allowances paid to Colombo Plan students, Public Service trainees, etc. but does not include allowances paid under the Tertiary Education Assistance Scheme, or to holders of Teacher Education Scholarships or Bursaries granted by the State Bursary Endowment Board.

(c) Concessions are not available to students who are 30 years of age or over; or to married women or ordained clergymen.

Train
(a) Periodical tickets are available during term to full-time students not in employment nor in receipt of any remuneration.
(b) Daily concession fare tickets are available to part-time students, whether employed or otherwise, for the purpose of travelling to and from classes held in connection with their course of instruction.
(c) Vacation travel concessions are available to students qualifying under (a) above.

Aircraft
Concession fares for travel overseas, inter-state and intra-state are available under the conditions ruling for the various operating companies.

Lost Property
Inquiries regarding lost property should be directed to the Attendant (Patrol) between 9 a.m. and 5 p.m. Monday to Friday at the Attendants’ Office in the north-eastern corner of the lowest floor of the Auchmuty Library building.

The Auchmuty Library
The Library, totalling approximately 275,000 volumes and made up of monographs, pamphlets, serials, microform sets and audiovisual materials, exists to acquire, preserve and make available for use all research and learning materials needed by the staff and students of the University. The seating capacity of the Library in 1975 will be approximately 1,000.

There is an almost complete freedom of access to the collections, and students are encouraged and aided to learn how to use, as soon as possible, the Library and its contents. On his first visit to the Library the student is provided with a brochure outlining the Library’s resources, its services, such as the copying service, its special facilities, such as the microprint reading room, and its procedure for borrowing.

Hours of Opening
During academic year
Monday — Friday 8.30 a.m. to 10.00 p.m.
(long vacations excepted)
Saturday and Public Holidays (except for Easter Weekend, Friday-Tuesday inclusive, and Anzac Day, when the Library is closed)

Saturday and Public Holidays (all vacations excepted)

Sunday

1.00 p.m. to 5.00 p.m.

(all vacations excepted)

During long vacation

Monday, Wednesday, Friday

9.00 a.m. to 5.00 p.m.

Tuesday, Thursday

9.00 a.m. to 7.00 p.m.

Amenities Office

The Amenities Office is located in the temporary building adjacent to the Mathematics/Classrooms building. Students are assisted in the following fields:

Sport

The Amenities Officer, liaison officer for all sporting matters between the Sports Union, the University and outside sporting organisations, assists student sporting clubs at club level and with Inter-varsity contests.

Sporting Facilities

Administration of all campus sporting facilities, which at present include four squash courts, four tennis courts, two ovals and an outside basketball court, is the responsibility of the Amenities Officer and his staff.

Auchmuty Sports Centre

The sports centre provides for the following activities: Basketball, Volleyball, Badminton, Weight training, Gymnastics and other associated sporting activities.

Non-competitive Pastimes and Diversions

Classes in Bridge, Pottery, Keep Fit, Leatherwork, Yoga, Jazz Ballet and Ballroom Dancing are arranged for students and staff.

Student Accommodation

The Student Accommodation Service maintains a register of rooms, flats and private board available in Newcastle, and will deal with any accommodation problem which students may encounter while attending the University.

Amenities Officer

The Personal Accident Insurance Scheme is administered by the Amenities Officer on behalf of the Sports Union and the Students' Representative Council.

Amenities Officer — H. Bradford

Activities Organiser — S. D. Barwick

Careers and Student Employment Office

The Careers and Student Employment Office (then the Appointments Office) was established in 1971 primarily to help students obtain information about careers and to assist graduating students to find employment. It is located in the temporary building adjacent to the Mathematics/Classrooms building.

Careers Counselling

All new students are invited to consult the Careers and Student Employment Office at some time during their first year at the University. Follow up consultations during second and third years may serve to bring the student to a state of mind where he or she feels confident that his or her chosen career is suitable and within the realms of possibility. The Careers and Student Employment Office would hope to have available or to obtain information for the student in order to avoid after graduation. Students in the last year of degree, who may need help in finding suitable employment upon graduation, should consult the Careers and Student Employment Office during the July-September period prior to the final examinations.

Careers Library

1. A section of the Careers Library contains books, periodicals, articles, etc. giving general information about the various professional occupations.

2. Information is being assembled about the manpower requirements of numerous employers — types of graduates needed, educational qualifications for appointment, experience gained, prospects etc.

3. Professional associations are being approached to supply information about the activities of their bodies, conditions of membership and application forms.
Employer Interviews

Some employers have representatives come to the University for the purpose of giving students first hand information about the kinds of graduates recruited, job involvement, salaries, prospects etc. Students make appointments to interview the representatives singly or in small groups.

Employment Vacancies

Some Government Departments inform the University on a regular basis of vacancies within their organizations, other employers only as specific vacancies occur.

The ‘Positions Vacant’ columns of a major local newspaper are always on hand.

The Careers and Appointments Service, University of Sydney has indicated that where a Newcastle University student proves that he is a bona-fide student, he may obtain copies of the “Notices of Vacancies” prepared by that Service, upon payment of the current nominal fee.

Casual and Part-time Employment

Unfortunately, it is a fact of life that some students do not have enough money to sustain them during University studies, and have to supplement their financial resources by part-time or casual work. Students may call at the Careers and Student Employment Office at the commencement of each year and complete a card indicating their needs. As opportunities are notified to the Careers and Student Employment Office, appropriate students are informed.

Industrial Experience and Vacation Employment

The Careers and Student Employment Office will provide administrative assistance to the Faculties seeking professional vacation employment for their students. Vacation employment will be sought for those students seeking employment for financial reasons.

Graduate Careers Directory

The Graduate Careers Council of Australia prepares a Directory in three parts for distribution each year to graduating students. The Directory provides general background information on the types of appointments that will be available with a large number of employer organisations in the ensuing year. The Careers and Student Employment Office arranges distribution of this Directory; a few spare copies are available to undergraduates upon request.

All students are invited to consult and use the resources of the Careers and Student Employment Office; this service is free.

Career Officer — H, Fleyer, BEc(Sydney)
Residential fees for 1975 have not been determined at the time of printing but as a guide the 1974 residential fees were: Term 1 (11 weeks $286); Term 2 (10 weeks) $260; Term 3 (12 weeks) $312. These fees entitle a member to a bed/study room and its maintenance including fresh linen and 16 meals a week, being breakfast and dinner each day and lunch on Saturday and Sunday.

Residence application forms for 1975 may be obtained from and should be returned to the Warden, Edwards Hall, The University of Newcastle, N.S.W. 2308, by 7 February 1975. Applications received after this date will not necessarily be considered.

Warden — M. W. Blackmore, BSc, PhD(Queen’s Belfast), ARIC, ARACI, AFCIA

University Counselling Service

The University Counselling Service is located in the Administration building (entrance at N.W. end). The Service is divided into three major divisions — Personal Counselling; Study Skills Training; Research; with some inevitable overlap between the sections. Apart from individual counselling, courses in an increasing number of areas are held for groups of students.

Student Counsellors assist students — past, present and future — in a wide variety of matters, all contacts with a counsellor being regarded as completely confidential. Most students, whatever their academic level, at one time or another need help in dealing with difficulties which arise during the course of their university lives, and at this University approximately one third of students utilise the Counselling Service.

A student should not wait for a major problem before consulting a counsellor. Many worries take only a few minutes to clear up, and frequently the counsellor’s function is simply to direct a student to the right source of information.

Students who are worried about inadequate study methods, personal difficulties, choice of courses or career planning are invited to arrange an appointment with a student counsellor, Counsellors are available for evening appointments.

Study at the University Level

The University Counselling Service published a brief but comprehensive book on this subject in 1967 and a revised edition in 1969. Although produced specifically for students of this University, it is widely used in other tertiary institutions. It may be purchased from the University Cashier at 40 cents per copy.

Senior Student Counsellor — A. P. T. Loftus, BA(Melbourne), MA, MAPsS

Student Counsellors
— Anne H. Furner, BA, DipAppPsych, MAPsS
— D. R. Martin, BA, DipEd(Sydney), MAPsS, ABPsS (Temporary Appointment

Secretary — Joy Hoesli

Overseas Students Service

The Overseas Student Advisor is on campus solely to help overseas students with any problems which may arise. Because of her specialized knowledge, she may be able to give direct assistance, may refer the student to someone in an appropriate field, (e.g., legal, health, insurance, etc.) or she may speak at the student’s request and on his behalf with government officers, staff members or others.

Any discussion with the Overseas Student Advisor is completely confidential. She may be contacted either through the University Counselling Service or in the University Union.

Overseas Student Advisor — Robin Loftus, BA(Adelaide)

Student Loan Fund

The Council of the University has established a Student Loan Fund which is managed by a committee consisting of the Deputy Chairman of Senate, the Bursar and the Vice-Principal (Chairman). This loan is now supplemented by government grant.

Loans may be made to an undergraduate where the committee is of the opinion that his academic performance is of sufficient merit and his financial circumstances warrant a loan.

The total loan to any one undergraduate shall not normally exceed $600 at any one time and an undergraduate granted a loan is required to enter into an agreement. In special circumstances the Committee may grant a loan to a student other than an undergraduate.

Repayment must commence not later than twelve months after graduation or if the borrower fails or withdraws from his course or on demand as required by the University. No interest is charged while the borrower is an undergraduate but interest at a rate not less than 5% per annum on the balance owing from time to time is charged from the date of graduation or the date on which an undergraduate fails or withdraws from a course.
Any student wishing to seek assistance from the Fund may apply in person to the Vice-Principal or through the President of the Students' Representative Council or his nominee.

**University Health Service**

Pending the establishment of a Health Centre, an interim service located in the Union, functions during term time. The medical officer, Dr. John Raschke, attends each Tuesday and Thursday morning and qualified nurses are on duty on the other days. The service, which is free, is essentially diagnostic and does not undertake continuing treatments.

**University Student Legal Referral Service**

Members of the Department of Legal Studies conduct a Student Legal Referral Service for students with problems of a legal nature. Students are given, without liability, free legal advice and are advised how and where they may obtain legal aid and representation.

The times that the Service operates are shown on the Legal Studies Notice Board.

**University Co-operative Bookshop Ltd**

The University Co-operative Bookshop, located in the Union building, supplies text and reference books and caters for a wide range of general reading. On payment of $5, refundable on request, students become shareholders and receive a yearly rebate on all purchases.

**The Citizen Military Force's Unit**

The University of Newcastle Company, the Citizen Military Force's Unit affiliated with the University, was formed in 1957 as a Sub-Unit of the University of Technology Regiment which is now called The University of New South Wales Regiment. Its function is to train graduates and undergraduates for commissioned rank in the C.M.F. and the training, designed with this in view, is done on an Infantry basis and consists of:

(a) An Annual Camp for three weeks in February
(b) An optional camp of fourteen days in December
(c) Two weekend bivouacs a year
(d) Parades on Friday nights of two hours duration
(e) Weekend day parades

The training programme is designed to fit in with vacations, examinations, and deferred examinations and there is practically no commitment in third term. Leave is available from activities where a good reason exists.

Enlistment in the Company is voluntary and is open to all graduates or undergraduates who are 17 years of age or over. The current strength of the Company is 100.

**Benefits**

Members of the University of Newcastle Company are eligible for the following benefits:

- An opportunity to reach commissioned rank in 2-3 years.
- Tax-free pay for all training undertaken.
- Refund of travelling expenses.
- Opportunities for attendance at Regular Army Courses and short time attachments to Army units in Malaysia or New Guinea.
- Free meals and accommodation at camps and bivouacs.
- Free Uniforms.

Enquiries should be made at the Training Depot, King Street, Newcastle West.

**Officer Commanding** — Capt. P. Groves

**Full-time Staff** — WO2 M. Grovenor
S/Sgt P. Toohey

**Other Facilities**

Newcastle University Post Office and branches of the Commonwealth Bank and the Bank of New South Wales are available on the campus.
University Organisations

Newcastle University Students' Association

Membership

All students proceeding to a degree or a diploma are members of the Students' Association.

Included in the General Services charge, is $10.75 subscription to the Newcastle University Students' Association (N.U.S.A.). You are all financial members of this Association and have every right — and a duty to yourselves — to take part in the running of the Association and the administration of its collective assets.

Students' Representative Council

Each year, the Students' Association elects a number of students (27 at present) to the Students' Representative Council. This Council's purpose is:

1. to work for student welfare: in matters both academic and social, both internal and external to the University community. The S.R.C. has been instrumental in the formation of the Food Co-Op.; the installation of a Pharmacy on campus; the provision of medical services; the provision of automatic insurance cover for students; and other welfare schemes.

The S.R.C. is also responsible for printing various student publications such as Opus, the student newspaper, the Orientation Handbook, Nimrod, the annual literary magazine, and the weekly Bulletin of N.U.S.A. activities.

2. to implement student association policy on matters academic, political or administrative. N.U.S.A. policy is decided at official lunchtime meetings where all students may attend and vote.

3. to give money and other aid to the various clubs and societies, including religious, political and social groupings on campus;

4. when needed, to act as the students' voice in submissions to the University administration, the mass media, and various government departments;

With its various committees, for example, the Welfare and Education Committees, and its officers such as the Education Campaign Director, the Services Officer and so on, N.U.S.A. attempts to facilitate as many expressions of cultural activity as possible, as well as organizing action to effect student policy on environment, aboriginal rights, apartheid and so on.

Each year, the Association organizes, with some help, Orientation week and early in July, Autonomy Day, which is the equivalent of Commenc. Foundation Day, or similar activities at other universities.

Australian Union of Students

As the Students' Association is a constituent member of the Australian Union of Students, students of the University may take part in the activities of this body. Some of these activities which affect students more directly are the several intervarsity cultural festivals, travel to New Zealand and many countries in Asia, village schemes in Papua/New Guinea, raising money for aboriginal scholarships the World University Service, national campaigns on education, and the national student newspaper, National 'U'.

The Association, by way of general student meetings, ad hoc committees, and its officers, pursues policy on a wide variety of social, political, educational and welfare activities both internal to the campus and affecting our society as a whole. Frequently, controversial issues are raised and discussed. The ultimate decision on what your Association does, and how your money is spent, depends on all of you. The executive officers of your association are not there to decide policy, but to carry out your decisions.

It is more important than ever that new students help run the association. At the moment too few students do much of the work, and as the older students leave, the new ones must fill the gap or the association will collapse as a functioning unit. How can you help? Come to the general student meetings and vote; vote also in the S.R.C. elections and stand for positions that interest you. In general, try not to be apathetic or disinterested.

President — G. Chilvers
Secretary — G. Wicks

Newcastle University Union

Objects

The objects of the Union are to provide a common meeting ground and social centre for men and women who are members of the University; to promote the education and the intellectual culture of its members by debates and otherwise and generally, to secure the cooperation of University men and women in furthering the interests of the University.

Facilities

The Union maintains a fine building on the campus and facilities provided include a complete range of catering services (a liquor licence has been approved), recreational and common room areas, a reading room, rooms for meetings and functions of all kinds, for 16 m.m film projection, for T.V., and for music practice. A games complex on the lower level provides billiards, table tennis, chess, and music listening outlets. A Student Counsellor, the Overseas
The Board of Management, elected each April, conducts the affairs of the Union. Membership consists of:

two members appointed by the Council of the University

ten members of the Union (at least two of whom must be graduates) elected by the members of the Union

two members of the Union who are members of the Students' Representative Council

one member of the Union who is a committee member of the Sports Union

one representative of the staff of the Union elected by the Union Staff and

the Secretary Manager of the Union.

President — R. B. Griffiths
Secretary Manager — W. V. Bridgwater

The University of Newcastle Sports Union

The Sports Union/Amenities office is located in the temporary building adjacent to the Mathematics/Classrooms building. The Sports Union is the student organisation responsible for the promotion and control of sporting activities within the University. Students interested in participating in any sport should contact the Amenities Officer or one of the Sports Union Executive.

Membership

The annual income of the Sports Union is derived from a portion of the General Services charge, payment of which entitles a student to membership of the Sports Union. Associate membership is available to staff and graduates on payment of a special charge.

Affiliated Clubs

Athletics, Australian Rules, Badminton, Men's and Women's Basketball, Canoeing, Cricket, Fencing, Golf, Men's and Women's Hockey, Mountaineering, Netball, Men's and Women's Rowing, Rugby Union, Rugby League, Sailing, Skiing, Soccer, Softball, Squash, Surfing, Swimming, Table Tennis, Tae Kwon-Do, Tennis, Underwater, Volleyball.

Inter-Varsity and Inter-Faculty Contests

Inter-varisty contests are hosted by a different university each year. Clubs participating are subsidised by the Sports Union. Inter-Faculty contests stimulate friendly rivalry and encourage higher sport participation.

Blues & Colours

For outstanding individual performances in sport, Blues and Sporting Colours are awarded.

Sports Union Committee

Each club is represented on the Sports Union Committee. The Executive Committee consists of the President, Vice-President, Honorary Secretary, Treasurer, a University Council representative, two General Committee delegates and the Amenities Officer.

President — B. P. O'Shea, BCom
Secretary — P. Huat, BA
Treasurer — I. R. Beaman, BSc (New South Wales), DipIndEng
Amenities Officer — H. Bradford

Convocation

Convocation provides an opportunity for graduates to maintain a positive interest and influence in University affairs. It has the right to discuss and to pronounce an opinion on any matter relating to the University, and to communicate directly with the Council or Senate of its own volition or at the request of either body. Convocation elects five members of the University Council.

Public meetings at which topics of interest are discussed are conducted by Convocation as well as general meetings. Convocation is controlled through a Standing Committee consisting of a Chairman, who is called the Warden of Convocation; the Immediate Past Warden, who is the Deputy Chairman; twelve members who are members of Convocation elected by Convocation; and members of Council elected by Convocation who are not already members of the Standing Committee.
Membership is automatic for graduates of this University, and for those graduates of the University of New England and of the University of New South Wales who spent at least three years as students of Newcastle University College; for present and past members of the University Council; and for present full time members of the academic staff and graduate permanent members of the administrative, library and technical staff.

Council may admit as members of Convocation upon payment of $10

(a) graduates of other universities who are resident in the Hunter Valley or North Coast areas; and
(b) such other university graduates as the Council may approve.

Warden — Professor K. R. Dutton, MA(Sydney), DU(Paris), MACE

Secretary — E. J. Buckman, BSc(New South Wales), MEngSc, ASTC, MIEAust

Treasurer — G. Mitchell, BCom

Immediate Past Warden — W. G. Derkenne, LLB(Sydney), BA

Standing Committee Members

J. W. Armstrong, BA
A. J. Chambers, BE(New South Wales), ME, PhD(Stanford), GradIEAust
Nina L. Cornelius, BMath
E. Gwen Hamilton, BA(New South Wales), ALAA
Katalin Heiner, BCom
Carmen J. Johanson, MA
J. A. Lambert, BSc(Sydney), MSc(New South Wales), FBCS, MACS
Barbara J. Lord, BSc(Sydney), BA
P. A. Marquet, BA(Sydney), AASA, ALCM, STSD
G. Mitchell, BCom
F. O. J. Purdue, CBE, HonDSc
B. W. Relf, BA

Standing Committee and University Council Members

C. B. Belcher, MSc(New South Wales), ASTC, FRACI, FIM(Lond.)
E. J. Buckman, BSc(New South Wales), MEngSc, ASTC, MIEAust
C. J. A. Cornelius, BCom
W. G. Derkenne, LLB(Sydney), BA
K. H. White, MB, BS(Sydney), BA; DCP(Lond.), FRCPA
Where to Obtain Information

Locations of Officers and Amenities

A = Arts/Administration building
LG = Lower ground floor
G = Ground floor
1 = First floor
M = Temporary building adjacent to Mathematics/Classrooms building
S = Social Sciences Building

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If you have any problems about your course you should generally seek the advice of the academic staff, particularly the Dean or Sub-Dean. The list below indicates other officers or amenities who may be consulted about appropriate problems. The location of these officers or amenities is given on the reverse of this page.

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