THE UNIVERSITY OF NEW SOUTH WALES

FACULTY of ENGINEERING HANDBOOK

1963

THE UNIVERSITY OF NEW SOUTH WALES

FACULTY OF ENGINEERING

HANDBOOK
1963

Postal Address:
THE UNIVERSITY OF NEW SOUTH WALES
P.O. Box 1, Kensington
Telephone: 663-0351

Foreword

This is the second edition of the Faculty of Engineering Handbook, and constitutes our programme for 1963. The 1962 edition was not as widely circulated as the staff wished and it appears that some students were unaware that the Handbook existed. Perhaps each engineering student reading this will see that his friends possess one.

Not a year passes without some notable event occurring in the history of the Faculty. In the present year, we are due to occupy the new buildings of the Electrical and Mechanical Schools. The plans for the new Civil Engineering School should also be completed so that construction can start as soon as possible in the next triennium 1964-1966.

The Institute for Highway and Traffic Research will also be officially opened early in the year. The Institute's buildings are on the sub-campus at King Street, Randwick, and accommodate the Schools of Highway and Traffic Engineering.

In common with all the staff of the Faculty, I look forward to meeting the new freshmen, and wish them every success with their studies and pleasure in their stay at the University.

A. H. WILLIS,
Dean,
Faculty of Engineering.

TABLE OF CONTENTS

Page

Calendar of Dates 5

Staff, Faculty of Engineering 7

General Information —

- Locations of Schools 13
- The Academic Year 14
- Undergraduate Courses 14
- Faculty of Applied Science 17
- Higher Degrees and Graduate Courses 20
- Matriculation Requirements 20
- Enrolment Procedure 24
- Common First Year Rules 25
- Restriction upon Students Re-enrolling 26
- Fees 27
- Scholarships and Cadetships 29

Outlines of Undergraduate Courses —

- School of Civil Engineering 33
- School of Electrical Engineering 46
- School of Mechanical Engineering 55
- Department of Industrial Engineering 68

Text and Reference Books —

- School of Civil Engineering 76
- School of Electrical Engineering 81
- School of Mechanical Engineering 88
- Department of Industrial Engineering 94

Calendar of Dates

1963

First Term	March 4th to May 11th.
Second Term	May 27th to August 3rd.
Third Term	August 26th to November 2nd.
Annual Examinations (24 week courses)	September 21st to October 5th
Annual Examinations (30 week courses)	November 9th to 30th.

February —		
Monday	18	Enrolment Week commences for new First Year students.
Monday	25	Enrolment Week commences for students re-enrolling.
March —		
Monday	4	Public Holiday.
Tuesday	5	First Term lectures commence.
Friday	29	Last day for acceptance of enrolments.
		Conferring of Degrees—Wollongong University College.
April —		
Friday	5	Conferring of Degrees — Newcastle University College.
Friday to Monday	12 to 15	Easter Holidays.
Friday	19	Conferring of Degrees — First ceremony.
Wednesday	24	Conferring of Degrees—Second ceremony.
Thursday	25	Anzac Day — Public Holiday.
May —		
Wednesday	1	Conferring of Degrees—Third ceremony.
Saturday	11	First Term ends.
Monday to Saturday	13 to 25	Vacation (2 weeks).
Monday	27	Second Term commences.
June —		
Monday	10	Queen's Birthday — Public Holiday.
Saturday	29	Last day for acceptance of applications for examinations — 24 week courses.

August —

Friday	2	Last day for acceptance of applications for examinations — 30 week courses.
Saturday	3	Second Term ends.
Monday to Saturday	5 to 24	Vacation (3 weeks).
Monday	26	Third Term commences.

September —

Saturday	21	Annual examinations commence — 24 week courses.

October —

Saturday	5	Annual examinations end — 24 week courses.
Monday	7	Six Hour Day — Public Holiday.
Monday to Friday	7 to 11	One week Survey Camp.
Monday to Friday	7 to 18	Two week Survey Camp.
Monday	14	Industrial training begins — students attending one week Survey Camp.
Monday to Friday	14 to 18	One week Geology Excursion.
Monday	21	Industrial training begins — students attending Geology Excursion or two week Survey Camp.

November —

Saturday	2	Lectures cease.
Saturday	9	Annual Examinations begin — 30 week courses.
Saturday	30	Annual examinations end — 30 week courses.

1964

January —

Tuesday to Saturday	28 to 8 February	Deferred examinations (all courses).

February —

Monday	17	Enrolment Week commences for new First Year students.
Monday	24	Enrolment Week commences for students re-enrolling.

March —

Monday	2	First Term lectures commence.

Faculty of Engineering

Dean
Professor A. H. Willis
Chairman
Associate Professor J. F. D. Wood

SCHOOL OF CIVIL ENGINEERING

Professor Civil Engineering and Head of School
C. H. MUNRO, B.E. (Syd.), F.R.S.A., F.R.S.H., M.I.E.Aust.
Professor of Civil Engineering
F. S. SHAW, B.E. (W. Aust.), B.Sc. (Oxon.), D. Eng. (Melb.).

Department Of Civil Engineering Practice

Senior Lecturers
L. V. O'NEILL, B.E. (Syd.), A.M.I.E.Aust.
P. W. S. RYAN, M.E., A.S.T.C., D.I.C., M.I.E.Aust.

Department Of Concrete Technology

Senior Lecturer
G. B. WELCH, B.E. (Syd.), M.E., A.M.I.E.Aust.
Lecturers
P. E. ELLEN, B.E. (N.Z.), A.M.I.C.E., M.A.S.C.E., A.M.N.Z.I.E.
A. W. MANTON-HALL, B.E., M.Tech., A.M.I.E.Aust.
B. J. F. PATTEN, B.E. (Syd.), A.M.I.E.Aust.

Department Of Hydrology

Senior Lecturer
C. J. WIESNER, B.Sc. (Adel.), F.R.Met.S.
Lecturers
J. R. BURTON, B.E. (Syd.), A.M.I.E.Aust.
E. M. LAURENSON, B.E., A.M.I.E.Aust.
J. R. LEARMONTH, B.E. (Syd.).
D. H. PILGRIM, B.E., A.M.I.E.Aust.

Department Of Materials

Associate Professor
A. J. CARMICHAEL, B.E., Ph.D., A.S.T.C., A.M.I.E.Aust., A.M.I.Mech.E.
Senior Lecturer
E. M. KITCHEN, B.E.(Syd.).
Lecturers
L. CRIDLAND, B.E., A.S.T.C.
I. J. SOMERVAILLE, B.E., A.S.T.C., A.M.I.E.Aust.

Department Of Soil Mechanics

Senior Lecturers

G. C. Y. HU, B.Sc. (Canton), M.Sc., Ph.D. (Birm.), Dip. T.P. (Lond.), A.M.T.P.I., A.M.I.Mun.E.

A. F. S. NETTLETON, B.Sc., B.E. (Syd.), M.E., D.I.C., A.M.I.E.Aust.

K. K. WATSON, B.E. (Syd.), M.E., A.M.I.E.Aust.

Lecturer

A. G. DOUGLAS, M.E., A.M.I.E.Aust.

Department Of Structures

Associate Professor

A. S. HALL, B.Sc. (Eng.) (Lond.), D.I.C., A.M.I.E.Aust., M.Am.Soc.C.E.

Senior Lecturers

F. E. ARCHER, B.Sc., B.E. (Syd.), A.M.I.E.Aust.

P. S. BALINT, Dipl.Eng. (Budapest), M.E., A.M.I.E.Aust.

H. J. BRETTLE, B.E. (Syd.), Ph.D., A.S.T.C., D.I.C.

J. L. JENKINS, B.E. (Syd.), M.E., D.I.C., A.S.T.C.

R. W. WOODHEAD, B.E. (Syd.), M.E., M.Am.Soc.C.E.

Lecturers

L. S. EDWARDS, B.C.E. (Melb.), B.Ec. (Syd.), A.R.M.T.C., A.M.I.E.Aust.

H. K. FISCHER, Dipl.Ing. (Hanover), A.M.S.E.

R. A. FRISCH-FAY, Dipl.Eng. (Budapest), M.E., A.M.I.E.Aust.

P. B. JONES, B.E. (Syd.), A.M.I.E.Aust

W. M. NEWMAN, B.Sc. (Lond.), D.I.C., A.M.I.Struc.E., A.M.I.E.Aust.

Department Of Surveying

Senior Lecturer and Acting Head of Department

S. ARMSTRONG, B.Sc. (Tech.) (Manc.), Ph.D. (Sheff.), A.M.I.C.E.

Senior Lecturers

P. V. ANGUS-LEPPAN, B.Sc. (Eng.) (Rand.), Ph.D., Dip.T.P. (Natal), M.I.L.S. (Natal), L.S.A., Assoc.I.S.Aust.

D. C. O'CONNOR, B.E. (Syd.), M.Sc. (I.T.C., Delft), M.E., L.S. (N.S.W.), M.I.S.Aust.

P. RICHARDUS, Grad.Geod.Eng. (Delft), M.E.

Lecturers

G. G. BENNETT, M.Surv. (Melb.), L.S. (N.S.W.), M.I.S.Aust.

A. P. H. WERNER, Dipl.Ing. (Bonn), A.M.I.E.Aust., M.I.S.Aust.

Water Research Laboratory, Manly Vale

Associate Professor

H. R. VALLENTINE B.E. (Syd.), M.S. (Iowa), A.S.T.C., A.M.I.E.Aust.

Senior Lecturer

R. T. HATTERSLEY, M.E., A.S.T.C., A.M.I.E.Aust.

Lecturers

C. R. DUDGEON, B.E.

T. R. FIETZ, B.E., A.M.I.E.Aust.

D. N. FOSTER, B.E. (Syd.).
G. S. HARRIS, M.E. (N.Z.), A.M.N.Z.I.E.
D. T. HOWELL, B.E. (Syd.).
I. R. WOOD, B.E. (N.Z.), M.E.

SCHOOL OF ELECTRICAL ENGINEERING

Professor of Electrical Engineering and Head of School

R. E. VOWELS, M.E. (Adel.), M.Am.I.E.E., A.M.I.E.Aust., A.M.I.E.E.

Professor of Electrical Engineering

C. B. SPEEDY, B.E. (Hons.) (N.Z.), Ph.D. (Syd.), A.M.I.E.E., A.A.I.E.E.

Associate Professor

G. C. DEWSNAP, M.E.E. (Melb.), A.M.I.E.Aust.

Associate Professor

R. M. HUEY, B.Sc., B.E. (Syd.), M.I.E.Aust.

Senior Lecturers

A. P. BLAKE, B.Sc., B.E. (Syd.), A.M.I.E.Aust.
R. H. J. CLARKE, B.E., A.S.T.C., A.M.I.E.Aust.
G. W. DONALDSON, B.E. (Qld.), M.A., B.Sc. (Oxon.), A.M.I.E.Aust.
A. DUNWORTH, B.Sc., Ph.D. (Manc.), Grad.Inst.P.
C. F. GILBERT, M.Sc. (Durh.), A.M.I.E.E.
H. HARRISON, B.Sc., B.E. (Syd.), M.E., A.M.I.E.Aust.
C. H. MILLER, B.E. (Tas.), D.Phil. (Oxon.), A.M.I.E.Aust.
E. L. MORTIMER, B.Sc. (Eng.) (Lond.), A.M.I.E.E.
G. J. PARKER, B.Sc., B.E. (Syd.), M.E., A.M.I.E.Aust.
C. A. STAPLETON, B.Sc., B.E. (Syd.), A.M.I.E.Aust.
H. E. J. SYMES, D.Sc. (Eng.) (Rand.), A.M.I.E.E., M.(S.A.)I.E.E., A.M.I.C.M. & E.E.(S.A.).

Lecturers

P. T. BASON, B.E., Grad.I.E.Aust.
R. F. BROWN, B.E. (Liv.), A.M.I.E.E.
D. J. COLE, B.E.E. (Melb.), A.M.I.E.Aust.
B. R. GODDARD, B.Sc., B.E. (Syd.), A.M.I.E.Aust., M.I.R.E.Aust.
H. HARRISON, B.Sc., B.E. (Syd.), M.E., A.M.I.E.Aust.
L. C. HILL, B.E.
H. L. HUMPHRIES, B.Sc., B.E., B.Ec. (Syd.).
G. J. JOHNSON, M.Sc. (Syd.), A.Inst.P., A.M.I.E.E.
F. LEWIN, B.Sc., B.E. (Syd.).
O. PAWLOFF, Dipl.Ing. (Berlin), A.M.I.E.Aust.
C. A. STAPLETON, B.Sc., B.E. (Syd.), A.M.I.E.Aust.
K. E. TAIT, B.E. (Hons.), B.Sc. (N.Z.), A.M.I.E.Aust.

Senior Demonstrator

T. L. HOOPER, B.Sc. (Syd.), M.Sc., A.M.I.R.E. (Aust.), M.I.R.E. (Am.).

Demonstrator

K. N. STANTON, M.E.

Teaching Fellows

H. R. CHINN, B.E., M.I.R.E. (Am.).
S. G. LOO, B.E.
J. YANG, B.Sc. (Iowa).

SCHOOL OF HIGHWAY ENGINEERING

Professor of Highway Engineering and Head of School

D. F. ORCHARD, B.Sc., Ph.D. (Lond.), D.I.C., A.C.G.I., M.I.E.Aust., M.Inst.T., A.M.I.C.E., A.M.I.Struc.E., A.M.I.Mun.E.

Senior Lecturers

W. H. COGILL, M.Sc. (Cape T. and Cantab.).
D. A. CUMMING, M.A. (Oxon.), A.M.I.C.E., A.M.I.E.Aust.
L. C. SPENCER, B.E., A.M.I.E.Aust.

Lecturer

D. G. TIERNEY, B.E. (N.Z.), A.M.N.Z.I.E.

SCHOOL OF MECHANICAL ENGINEERING

Professor of Mechanical Engineering and Head of School

A. H. WILLIS, B.Sc. (Eng.), Ph.D. (Lond.), M.I.Mech.E., A.M.I.E.Aust., Mem.A.S.A.E., Wh.Sc.

Professor of Mechanical Engineering

C. F. KETTLEBOROUGH, B.E., Ph.D. (Sheff.), A.M.I.Mech.E.

Nuffield Professor of Mechanical Engineering

R. A. A. BRYANT, M.E., A.S.T.C., AM.I.E.Aust., A.M.I.Mech.E., A.F.R.Ae.S.

Associate Professor

J. HIRSCHHORN, Dipl.Ing., Dr.Tech.Sc. (Vienna), M.I.E.Aust., M.Soc. Sigma Xi (U.S.A.).

Associate Professor of Mechanical Engineering

J. F D. WOOD, B.Sc., B.E. (Syd.), M.I.E.Aust.

Senior Lecturers

P. S. BARNA, M.E. (Syd.). A.M.I.E.Aust., A.M.I.Mech.E., A.F.R.Ae.S.
H. A. BORCHARDT, Dipl.Ing. (E.T.H. Zurich), M.E., A.M.I.E.Aust.
A. J. CARROLL B.E. (Syd.), A.M.I.E.Aust.
R. E. CORBETT, D.I.C., A.S.T.C., A.M.I.E.Aust., A.M.I.Mech.E.
G. de VAHL DAVIS, B.E. (Syd.), Ph.D. (Cantab.), A.M.I.E.Aust.
J. N. HOOL, B.E. (Syd.), D.Phil. (Oxon.), A.S.T.C., A.M.I.Mech.E., A.M.I.E.Aust.
J. MUNRO, B.E. (Syd.), M.I.Mar. E. (Lond.).
C. M. SAPSFORD, B.Sc. (Eng.) (Lond.), M.E., A.M.I.E.Aust., A.M.I.Mech.E.
R. J. TUFT, A.S.T.C., A.M.I.E.Aust., M.R.I.N.A.
K. WEISS, Dipl.Ing. (Vienna), M.E., A.M.I.E.Aust.

Lecturers

L. H. BAKER, B.E., A.S.T.C.
G. BOWDITCH, A.S.T.C.

R. A. V. BYRON, B.E. (Syd.), A.F.R.Ae.S., M.I.A.S., A.M.I.E.Aust.
N. COOKE, B.Sc. (Lond.), A.S.T.C., A.M.I.Prod.E.
H. S. CRADDOCK, B.E. (Syd.).
J. Y. HARRISON, B.E. (Syd.), A.M.I.E.Aust.
E. C. HIND, M.E., A.S.T.C., A.M.I.E.Aust.
A. K. JAMES, A.S.T.C.
R. T. B. McKENZIE, A.R.T.C. (Glas.), A.M.I.Mech.E.
D. J. S. MUDGE, B.Sc. (Lond.), Wh.Sc., A.M.I.Mech.E.
J. O. MUIZNIEKS, Dipl.Ing. (Latvia), Dr.Ing.Aer. (Rome).
B. OSMAN, B.E. (Adel.), F.S.A.S.M., A.M.I.E.Aust.
R. G. ROBERTSON, M.A. (Oxon.), A.F.R.Ae.S., A.M.I.Mech.E.
C. SAMONOV, Dipl.Ing. (Vienna), A.M.I.E.Aust.
J. J. SPILLMAN, B.E., M.Eng.Sc. (W.Aust.).
R. C. P. WALTERS, A.S.T.C., A.M.I.E.Aust.
H. E. WULFF, Dipl.Ing. (Cologne T.H.).

Associate Lecturer

L. A. BENEDICT, B.A., B.Sc. (Philadelphia).

Teaching Fellows

A. CHODA, B.E. (Syd.).
G. SAIVA, B.E.
J. W. WININGS, B.Sc. (Northwestern).
S. P. WOODBURY, B.E.

Department Of Industrial Engineering

Associate Professor of Industrial Engineering

N. A. HILL, B.E., B.Sc. (Syd.), S.M. (M.I.T.), A.M.I.E.Aust., A.M.I.Mech.E.

Senior Lecturers

A. F. ALLEN, B.E., A.S.T.C., A.M.I.E.Aust., A.M.I.Prod.E.
A. D. KNOTT, B.Sc., B.E. (Tas.), M.A. (Oxon.), A.M.I.E.Aust.
E. R. TICHAUER, Dipl.Ing., Dr. Tech.Sc. (Albertinae), A.M.I.E.Aust., R.P.E. (Qld.), M.A.I.I.E. (U.S.A.).

Lecturers

G. BENNETT, B.A. (Syd.), A.S.T.C., A.M.I.Prod.E.
J. F. C. CLOSE, B.E., B.Sc. (Syd.), A.M.I.E.Aust., A.M.I.E.E.
H. SELINGER, Dipl.Ing. (Berlin), A.M.I.Prod.E., A.M.I.E.Aust.
R. A. WILLIAMS, B.E., A.S.T.C.

SCHOOL OF NUCLEAR ENGINEERING

Professor of Nuclear Engineering and Head of School

J. J. THOMPSON, B.E., Ph.D. (Syd.).

Senior Lecturer

D. W. WILLIAMS, B.Sc., Ph.D. (Wales).

Lecturer

O. O. C. A. BILS, Dipl.Ing. (Berl.).

SCHOOL OF TRAFFIC ENGINEERING

Professor of Traffic Engineering and Head of School

W. R. BLUNDEN, B.Sc., B.E. (Syd.), A.M.I.E.Aust., A.Inst.P., A.M.I.T.E. (U.S.A.), M.I.T. (Lond.).

Senior Lecturers

R. D. MUNRO, B.Sc. (W. Aust.), B.A. (Melb.).

H. J. A. TURNER, B.Sc. (Lond.), M.E., A.R.C.S., A.M.I.E.E.

Lecturer

J. I. TINDALL, B.E. (Qld.).

General Information

LOCATIONS OF SCHOOLS AND LABORATORIES OF THE FACULTY OF ENGINEERING

The Schools and Laboratories of the Faculty of Engineering, the servicing schools and the administrative divisions are located as follows:

(i) Broadway

The Schools of Mechanical, Electrical and Civil Engineering and the Broadway branch of the library. Also located here is the Broadway branch of the Students' Amenities Office.

(ii) Kensington

The buildings at present under construction at Kensington for the Schools of Mechanical and Electrical Engineering are nearing completion, and it is anticipated that those Schools will be moving to Kensington early in 1963.

Already at Kensington are the School of Nuclear Engineering, the Department of Industrial Engineering, some research laboratories of the Schools of Mechanical and Electrical Engineering, the servicing Schools of Physics, Architecture, Mathematics, Mining Engineering and Applied Geology, Metallurgy, Chemistry and Biological Sciences, together with the Schools of the Faculty of Arts which provide the Humanities and Social Science subjects for engineering students. In addition to the teaching schools, the Library, the Examinations Branch, the Admissions Office, the Union, the Students' Union, the Student Amenities Office and the Student Counselling service are also located at Kensington.

(iii) Randwick

During 1962 the Schools of Highway and Traffic Engineering moved to new buildings on the site of the old Tramway Depot at King Street, Randwick.

(iv) Manly Vale

The Water Research Laboratory of the School of Civil Engineering.

(v) Suburban Centres

Instruction in certain subjects of the early stages of engineering courses is provided by University staff at Granville Technical College, William Street, Granville.

THE ACADEMIC YEAR

The Academic Year is divided into three terms each of ten weeks. The first term normally commences on the first Monday in March*. There is a two-week vacation between first and second terms, and a three-week vacation between second and third terms. In certain years of full-time engineering courses, lectures cease in the fourth week of the third term and examinations for these years are conducted in the fifth and sixth weeks of third term. Where lectures extend over the full three terms the examinations are conducted over a three-week period, which commences one week after the end of lectures.

UNDERGRADUATE COURSES

The Faculty of Engineering consists of the Schools of Civil Engineering, Electrical Engineering, and Mechanical Engineering with its associated Department of Industrial Engineering, and the Schools of Highway Engineering, Nuclear Engineering, and Traffic Engineering, the three last named Schools offering graduate courses only. The Schools of Civil, Electrical and Mechanical Engineering offer full-time courses leading to the degrees of Bachelor of Engineering and Bachelor of Surveying, and part-time courses leading to the degrees of Bachelor of Science (Technology) and Bachelor of Surveying.

Full-time Courses

Full-time courses of four years duration are offered in Civil, Electrical, Mechanical and Industrial Engineering leading to the degree of Bachelor of Engineering (pass or honours). Candidates for honours take additional work in the third and fourth years. A four-year full-time course in Surveying is offered by the School of Civil Engineering leading to the degree of Bachelor of Surveying at pass and honours levels. Candidates for honours in Surveying take additional work in fourth year.

Common first year: There is a common first year syllabus in Physics, Mathematics, Chemistry and Engineering for all courses in the Faculty, making it possible for students to transfer from one course to another at the end of their first year without loss of standing. This first year is also equivalent to the first two stages of the part-time Engineering courses which lead to the degree of Bachelor of Science (Technology). Transfer to certain courses in the Faculties of Science and Applied Science without loss of standing is also possible at the end of the first year.

Rules relating to the operation of these common first year subjects in the Faculties of Engineering, Science, Medicine and Applied Science are set out later in this handbook.

* In 1963, Monday 4th March is a public holiday. Lectures commence Tuesday 5th March.

Conditions for award of degrees of B.Sc. and B.E.: Subject to their being recommended by the Dean of the Faculty of Engineering and accepted by the Dean of the Faculty of Science, students in the Civil, Electrical, Mechanical and Industrial Engineering full-time courses may qualify for the two degrees of B.Sc. and B.E. by completing a course of five years of full-time study in accordance with the following provisions:—

A student shall have attended the prescribed course of study and satisfied the examiners in

(i) the first year of the course of the Faculty of Engineering;

(ii) the second year of the courses for the degree of Bachelor of Engineering in Civil, Electrical, Mechanical or Industrial Engineering; provided that students in Civil, Mechanical or Industrial Engineering shall have taken the Mathematics and Physics subjects prescribed for second year of the Electrical Engineering course.

(iii) two Group III Science subjects, together with the appropriate Humanities (see Science Course Regulations set out in the University Calendar);

(iv) the third and fourth years of the courses for the degree of Bachelor of Engineering in Civil, Electrical, Mechanical or Industrial Engineering.

The degree of B.Sc. may be awarded on the completion of the requirements of (i), (ii) and (iii) above.

Introduction of revised courses and consequent exemptions: The introduction of common first year subjects in 1961 led to the extensive revision of existing full-time engineering courses and the course outlines set out later in this section incorporate these revisions. In 1961 the first three years of these revised courses were introduced in the Schools of Civil and Mechanical Engineering and the first two years in the School of Electrical Engineering. In 1963 all years of the new courses will be offered in all Schools.

The following exemptions in humanities subjects apply to students who have completed part of the superseded engineering courses:

(i) Students who have completed years 1 and 2 of the superseded B.E. course, which included G10 English and G20 History, will be exempted from 50.011 English included in the second year and 51.011 History and 52.011 Philosophy included as alternatives in the third year of the new courses outlined below.

(ii) Students who have completed year 1 of the superseded B.E. course which included G10 English will be exempted from 50.011 English in the second year of the new courses set out below.

Industrial training requirements: All full-time engineering courses incorporate periods of industrial training. In all of these courses, except Electrical Engineering, the periods occupy the latter half of the third term and the long vacations between second and third years, and between third and fourth years. In the second and third years of these courses, students finish lectures at the end of the fourth week of the third term, take their examinations in the fifth and sixth weeks, attend the survey camp (where required) in the seventh week (surveying students in their seventh and eighth weeks) and then commence their industrial training. In Electrical Engineering students must undertake ten weeks of industrial training at the end of second year (a thirty-week year), and a minimum of eighteen weeks at the end of the third year (a twenty-four-week year). Students are strongly recommended to gain further industrial experience in those long vacations where such training is not already prescribed.

The staff of the University will assist students to obtain this employment either as sponsored students or as trainees employed on a temporary basis. Private students (i.e., those not already committed to an employer under the terms of a scholarship or bond) may make their own arrangements for industrial training, but the employment and training must be of a standard approved by the University.

Part-time Courses

Since 1961 the Schools of the Faculty have offered six-year part-time courses in a variety of engineering fields leading to the degree of Bachelor of Science (Technology). Courses for this degree are offered in Civil, Electrical, Industrial and Mechanical Engineering and in Naval Architecture and Aeronautical Engineering (these last two being offered by the School of Mechanical Engineering).

The award of the degree of B.Sc. (Tech.) is recognised by the Institution of Engineers, Australia, as giving complete exemption from the examinations required for admission to the grade of Associate Member.

These new courses replace the courses which the University has offered since 1951 on behalf of the Department of Technical Education leading to its A.S.T.C. diploma award. They also replace the associated part-time degree courses in Engineering which have led to the degree of Bachelor of Engineering.

Students who have elected to continue in the diploma course and subsequently complete the requirements within the period allowed (see below), or those who have been awarded the A.S.T.C. diploma, may be given advanced standing in a course leading to the B.Sc. (Tech.) or to the B.E. degree. Permission to meet the requirements of either degree by further study should be obtained from the Head of the appropriate School.

Any student continuing in a part-time B.E. or Diploma course who fails to maintain normal progress will be required to transfer to the appropriate B.Sc. (Tech.) course with advanced standing. For a student to make "normal progress" he shall have completed:

(i) all subjects up to and including Stage I by the end of 1961;
(ii) all subjects up to and including Stage II by the end of 1962;
(iii) all subjects up to and including Stage III by the end of 1963;
(iv) all subjects up to and including Stage IV by the end of 1964;
(v) all subjects up to and including Stage V by the end of 1965.

A student completing the B.Sc. (Tech.) degree course and wishing to qualify for the corresponding B.E. degree may, on the recommendation of the Head of the School, transfer to the corresponding full-time B.E. course provided he does not take out the B.Sc. (Tech.) degree. Further, provided he continues as a registered student on transfer from one course to the other, he may retain any concession granted in the B.Sc. (Tech.) degree course.

Holders of the B.Sc. (Tech.) degree are eligible to proceed to the degree of Master of Engineering or Master of Technology subject to the conditions for the award of these degrees set out in Section III of the University Calendar.

Courses leading to the B.Sc. (Tech.) award are basically part-time and require the prescribed industrial experience to be gained concurrently with the course of study (a minimum of three years of suitable engineering experience is required). Students transferring from full-time courses must, therefore, also satisfy these industrial experience requirements before being admitted to the degree of B.Sc. (Tech.).

For students who are able to combine some full-time attendance with part-time attendance, the B.Sc. (Tech.) courses are offered over five years, requiring full-time attendance in the third and fourth years.

The School of Civil Engineering offers a part-time course in Surveying of seven years duration for the degree of Bachelor of Surveying.

FACULTY OF APPLIED SCIENCE

The Faculty of Applied Science offers courses to students desiring a career in a specialised technology with an engineering element. These courses are as follows:—

Chemical Engineering
Ceramic Engineering

Textile Engineering
Mining Engineering
Metallurgy

Entrance to these courses is conditional upon Engineering 1 being taken as the elective subject in the common first year and on transference to the Faculty of Applied Science before second year. The above courses lead to a B.Sc. (pass or honours) after four years full-time study, except Mining Engineering which awards a B.E. (pass or honours). Entrance can be made to the course in Mining Engineering after the second year of courses in Mechanical, Electrical and Civil Engineering without a loss in standing of subjects completed. The courses in Chemical Engineering and Mining Engineering have full professional recognition in Australia.

The Schools of Chemical Engineering, Chemical Technology and Metallurgy offer a six year part-time course leading to a B.Sc. (Tech.). Entrance to these courses can be made after the second stage part-time or the common full-time first year, and after the fourth stage part-time for Mining Engineering. In all cases the requirements for the degree B.Sc. (Tech.) demand three years approved concurrent industrial training.

The degree of B.Sc. (pass or honours) and the B.Sc. (Tech.) in Chemical Engineering and the B.E. (pass or honours) in Mining Engineering are recognised by the Institution of Engineers of Australia for exemption from the Associate Membership examinations.

Metallurgy

Metallurgy deals with the nature, production, properties and uses of metals. Its special importance today is associated with the demands for better materials for aircraft, rockets, nuclear reactors and the like.

The School of Metallurgy is located at Kensington and has departments both in Newcastle and Wollongong. It has excellent facilities for teaching and research. Emphasis in these courses is on the application of science to technological problems and in this respect there is a close relationship between metallurgy and engineering.

Information on the Metallurgy courses and on opportunities for post-graduate work for engineering graduates in the School of Metallurgy may be obtained from the University Calendar, or from Professor Hugh Muir at the School of Metallurgy.

Ceramic Engineering

Ceramics are inorganic, non-metallic materials which usually require the use of high temperatures in their processing. Products of the industry include glass, refractories, bricks, tiles, pipes,

abrasives, cement, plaster, nuclear ceramics, whitewares, enamels and electric insulators, dielectrics and magnetic materials. The ceramic engineer is concerned with the relationship between the atomic and crystal structure of materials and their chemical, physical and engineering properties, as well as the methods of their manufacture and fabrication into useful shapes.

Graduates in Ceramic Engineering take positions in the fields of research and development, production control, product evaluation and technical service.

Mining Engineering

The aim of the training is to give students a thorough foundation in Mining Engineering and so permit them to enter coal mining, metalliferous mining or the petroleum industry, and to be employed in any of the phases of these industries ranging from exploration to production.

During the undergraduate course, students will spend portion of the long vacations obtaining practical experience in mining. Mining companies prepare programmes so that the students obtain a comprehensive experience in many aspects of the profession. This experience is important and it is related to the academic training received in the School. Practical experience in mining, gained as a student, can contribute to the experience record of mining engineers when making application for a statutory certificate of competency from one of the Australian State Government Departments of Mines.

The School of Mining Engineering and Applied Geology offers, at Broken Hill, a part-time course in Mining Engineering leading to the Degree of Bachelor of Science (Technology).

Chemical Engineering

Chemical Engineering is the application of the principles of the physical sciences, together with the principles of economics and human relations to fields in which matter undergoes a change in state, energy content or composition. The chemical engineer is generally responsible for the design, construction and operation of plant and equipment used in the chemical processing industries.

Textile Engineering

The textile industry, being a manufacturing one, depends on many types of machinery and engineering services to produce its products. In order to cope with technological problems in production, quality control and research, a competent textile engineer must have a good understanding of the fundamental sciences and extensive theoretical and practical knowledge of the applied textile and engineering sciences.

There are many challenging and lucrative positions for textile engineers in industry and research. These require active and intelligent young graduates whose knowledge of Science and Engineering is urgently needed in the rapidly expanding field of textile technology.

HIGHER DEGREES AND GRADUATE COURSES

Research Degrees

The higher degrees of Master of Engineering and of Doctor of Philosophy are awarded on the presentation of a thesis, satisfactory to the examiners, which embodies the results of an original investigation or design. Candidates for these degrees must possess a bachelor's degree in an appropriate field and meet the conditions governing the award of these degrees. The full conditions are set out in the University Calendar.

The degree of Doctor of Science is also awarded for a contribution of distinguished merit in the field of engineering.

Courses of Study for Graduate Awards

In addition to the research degrees listed above, the Faculty offers courses of instruction at the graduate level leading to the award of the degree of Master of Technology or a graduate diploma.

Courses for the Degree of Master of Technology

Concrete Structures, Structural Analysis, Hydraulics and Hydrology, Public Health Engineering (offered by the School of Civil Engineering); Electrical Engineering; Traffic Engineering; Highway Engineering; Nuclear Engineering; Machine Design (offered by School of Mechanical Engineering).

Courses for Graduate Diplomas

Highway Engineering and Industrial Engineering.

Full details of all these courses are given in the section on post-graduate study in the University Calendar.

Special Courses

Short, intensive graduate and special courses are provided throughout each year designed to keep practising engineers in touch with the latest developments in their various fields. The programmes of such courses for 1963 are published separately.

MATRICULATION REQUIREMENTS

Candidates may qualify for entry to undergraduate courses by complying with the matriculation requirements set out below at the Leaving Certificate Examination held by the Department of Educa-

tion or the Matriculation Examination conducted by the University of Sydney.

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

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

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

New Requirements

(To operate from 1st January, 1961)

1. (i) A candidate for any first degree of the University must satisfy the conditions for admission set out hereunder before entering upon the prescribed course for a degree. Compliance with these conditions does not in itself entitle a student to enter upon a course.

   (ii) A candidate who has satisfactorily met the conditions for admission and has been accepted by the University shall be classed as a "matriculated student" of the University after enrolment.

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

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

   A. English.

   B. Latin, Greek, French, German, Italian, Hebrew, Chinese, Japanese, Russian, Dutch, Geography, Ancient History, Modern History, Economics.

   C. Mathematics I, Mathematics II, Mathematics III**.

   D. Agriculture, Applied Mathematics, General Mathematics**, Biology, Botany, Chemistry, Physics, Geology, Physics and Chemistry, Physiology, Zoology.

---

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

** *Provisional* matriculation status may be granted to candidates who pass in General Mathematics at the 1962 Leaving Certificate Examination, the subject General Mathematics in this case being regarded as a Group C subject. This is a special concession and will not apply in subsequent years.

E. Accountancy, Art, Descriptive Geometry and Drawing, Music, Theory and Practice of Music.

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

I. either—

(a) the five subjects include English and at least one subject from each of Groups B and C, but do not include more than one subject from Group E, except that candidates may qualify for admission to the Faculty of Arts only, by passing in one subject from Group D in lieu of the subject from Group C;

or—

(b) the five subjects include English, and at least one subject from either Group B or Group C, but do not include more than one subject from Group E, and provided further that the five passes include either one first class Honours and two A's or two Honours of which one is first class;

and—

II. (a) neither Physics nor Chemistry is offered with the combined subject Physics and Chemistry;

(b) neither Botany nor Zoology is offered with Biology;

(c) neither Botany nor Zoology nor Biology is offered with Physiology;

(d) neither Mathematics I nor Mathematics II nor Mathematics III is offered with General Mathematics;

(e) neither Mathematics I nor Mathematics II is offered with Mathematics III;

(f) Mathematics I or Mathematics II may be counted as an approved subject only if the candidate presented himself for examination in both Mathematics I and Mathematics II;

(g) Theory and Practice of Music is accepted only in cases where the pass was obtained at an examination in 1946 or subsequent years;

(h) Ancient History is accepted only in cases where the pass was obtained at an examination held in 1945 or subsequent years; and, further, both Modern History and Ancient History may be offered as qualifying subjects at the examinations held at the end of 1951 and subsequent years;

(i) Agriculture is accepted only in cases where the pass was obtained at an examination held in 1945 or subsequent years;

(j) Economics is accepted only in cases where the pass was obtained at an examination held in 1947 or subsequent years;

(k) Descriptive Geometry and Drawing is accepted only in cases where the pass was obtained at an examination held in 1954 or subsequent years.

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

Old Requirements

(Current to March, 1964)

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

I. Applicants for entry to undergraduate courses leading to a degree may satisfy entrance requirements by passing the New South Wales Leaving Certificate Examination or the University of Sydney Matriculation Examination in at least five subjects at one examination*, of which one must be English and one other must be Mathematics I, or Mathematics II, or Mathematics III**, three other subjects being chosen from the following groups, at least one of the three being from Group A:—

Group A.—Latin, French, Greek, German, Italian, Hebrew, Chinese, Japanese, Russian, Dutch, Geology, Geography, Agriculture, Economics, Modern History, Ancient History, Combined Physics and Chemistry, Physics, Chemistry, Physiology, Biology, Botany or Zoology.

**Group B.—Applied Mathematics, Music, Theory and Practice of Music, General Mathematics, Mathematics I, Mathematics II, Mathematics III, or Descriptive Geometry and Drawing.

---

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

** *Provisional* matriculation status may be granted to candidates who pass in General Mathematics at the 1962 Leaving Certificate Examination. This is a special concession and will not apply in subsequent years.

II. Candidates who have presented themselves for the Leaving Certificate Examination or the University of Sydney Matriculation Examination in five or six subjects selected in accordance with the requirements prescribed in I and who have passed in English and a Mathematics and two other of the subjects may be granted admission provided that they have been awarded A passes or passes with Honours in at least three of these four subjects.

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

ENROLMENT PROCEDURE FOR UNDERGRADUATE COURSES

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

First Enrolment — Students seeking to enrol in 1963 with the University for the first time should note the following:—

1. Preliminary applications for enrolment must be made where possible in person to the Student Enrolment Bureau, 1st Floor, Building F, Kensington, as soon as the results of the Leaving Certificate Examination are published, but not later than January 25th. Country residents should write to the Registrar, P.O. Box 1, Kensington, for a form on which to make their preliminary application. This form should be returned not later than January 25th.
2. *First Year repeats:* First Year students who failed in all subjects at the 1962 Annual Examinations, who were not given any deferred examinations and who are not liable to be excluded, must attend the Student Enrolment Bureau between the date of publication of the Leaving Certificate results and January 25th if they wish to re-enrol.
3. Enrolment Week for new students begins February 18th. Each applicant will be given an appointment for a time in that week, when he will report to the Enrolment Bureau to complete his enrolment*.
4. *Late Enrolments:* In special circumstances the University may accept late enrolments made before March 31st. Late application should be made in person to the Admissions Office, Main Building, Kensington, as early in the first term as possible. Students enrolling late will normally be required to pay late fees in accordance with the details set out in the section on fees.

* Applicants who cannot keep their appointment should attend at the Enrolment Bureau on Thursday, 28th February, between 2 p.m. and 5 p.m. or 6 p.m. and 8 p.m. Students enrolling on this Thursday will incur a late fee of £1.

5. Fees should be paid on the enrolment day, as new students will not be issued with a timetable (which is their authority to attend classes) until fees have been paid.

Complete details of the enrolment requirements are contained in the booklet "Enrolment Procedure for New Students" which may be obtained at the Enrolment Bureau when making application to enrol.

Re-enrolment Procedure — Students re-enrolling in courses in the Faculty of Engineering should do so through the appropriate School. Each School will advise its students of the procedure to be followed. Re-enrolment arrangements must be completed during the prescribed enrolment week, immediately prior to the beginning of first term, in accordance with the timetable set out in the booklet "Enrolment Procedure for Students Re-enrolling". Enrolment forms for students re-enrolling will be available at the enrolment centre during enrolment week.

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

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

While course details must be completed during Enrolment Week, fees may be paid without penalty by re-enrolling students up to the end of the second week of term. For details of fee requirements, including late fee provisions, see under Fees.

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

Student Registration Card

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

RULES RELATING TO COMMON FIRST YEAR SUBJECTS IN THE FACULTIES OF APPLIED SCIENCE, SCIENCE, ENGINEERING AND MEDICINE

1. Each student intending to follow any course leading to the degree of Bachelor in any of the Faculties of Science, Applied Science, Medicine or Engineering must have satisfied the examiners in the subjects of 1.001 Physics I, 2.001 Chemistry I, 10.001 Mathematics I, and in a fourth subject (elective) chosen from

5.001 Engineering I, 7.511 Geology I, 12.011 Psychology I or 17.001 General Biology, before progressing further in his course, except that progression may be permitted with outstanding subjects if Faculty regulations permit.

2. Notwithstanding Faculty regulations to the contrary, full-time students will be required to complete the four subjects of Rule (1) in not more than two years' study and part-time students in not more than four years' study.

The re-enrolment of students who have not complied with this rule shall be subject to the General Regulations governing re-enrolment.

3. At enrolment, each student to whom Rule 1 applies will be required to nominate and apply for admission to the course which he desires to follow.

Although application for transfer from one course to another within these Faculties may be made at any time students are advised that such transfers are most readily effected prior to re-enrolment in the second year of full-time courses and the third stage of part-time courses.

All such transfers will be subject to the regulations of relevant Faculties and the concurrence of the Professorial Board.

RESTRICTION UPON STUDENTS RE-ENROLLING

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

(i) As from January 1st, 1962, a student shall show cause why he should be allowed to repeat a subject in which he has failed more than once. (Failure in a deferred examination as well as in the annual examination counts, for the purpose of this regulation, as one failure.)

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

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

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

(iv) A student who has a record of failure in a course at another University shall be required to show cause why he should be admitted to this University.

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

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

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

FEES FOR UNDERGRADUATE COURSES*

Course Fees

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

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

(i) Full-time Course Fees (more than 15 hours' attendance per week)—£48 per term. (In those years of Engineering courses which include industrial training, students will complete their formal studies in the fourth week of third term. The fee for this short term is £24.)

* Fees quoted are current at time of publication. The Council reserves the right to alter them at any time.

(ii) Part-time Course Fee—over four hours and up to 15 hours' attendance per week—£24 per term.

(iii) Part-time Course Fee (four hours or less per week attendance) — £12 per term.

(iv) Thesis Fee—Students who have completed the final examinations, but have a thesis still outstanding, are required to pay £10 per annum (no term payment).

Other Fees

In addition to the above course fees, all registered undergraduates are required to pay:

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

Library Fee—£5—payable yearly.

University of New South Wales Students' Union—£2—payable yearly.

University of New South Wales Sports Association — £1 — payable yearly.

University Union — £6 — payable yearly.

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

Thesis Fee—£10—payable yearly by students who have completed the final examinations but still have a thesis outstanding (no term payment).

Chemistry Kit Deposit—£4 per kit.

Special Examination Fees

Deferred examination — £2 for each subject.

Examinations conducted under special circumstances — £3 for each subject.

Review of examination results—£3 for each subject.

Completion of Enrolment

All students are required to complete enrolment during the prescribed enrolment period.* Failure to do so will incur a late fee of £1.

First year students (including students repeating first year) must complete enrolment (including fee payment) before they are issued with class timetables or permitted to attend classes.

Fees should be paid during the prescribed enrolment period but will be accepted without payment of a late fee during the first two weeks of first term. Fees paid between the beginning of the third week of term and the 31st March are subject to a late fee of £3. *Fees will not be accepted (i.e. enrolment cannot*

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

be completed) after 31st March except with the express approval of the Registrar which will be given in exceptional circumstances only. Where this approval is given a late fee of £5 applies.

Payment of Fees by Term

Students who are unable to pay their fees by the year may pay by the term, in which case they are required to pay first term course fees and other fees for the year within the first two weeks of first term. Students paying under this arrangement will receive accounts from the University for second and third term course fees. These fees must be paid within the first two weeks of each term: otherwise a late fee is incurred — £3 on fees paid in the third or fourth weeks of term and £5 on fees paid in the fifth or sixth weeks.

Assisted Students

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

Extension of Time

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

SCHOLARSHIPS AND CADETSHIPS

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

Commonwealth Scholarships

Benefits include payment of all tuition fees and other compulsory fees, and living allowances (these latter being subject to a means test). The closing date for applications is 30th November in the year immediately preceding that for which the scholarship is desired. Full particulars and application forms may be obtained from the Officer-in-Charge, University Branch Office, Department of Education, University Grounds, University of Sydney (Telephone: 68-2911).

University Scholarships

The University annually awards up to fifteen scholarships tenable in degree courses to students who have matriculated at the Leaving Certificate Examination; ten scholarships to students who have completed Trade Courses (Department of Technical Education); and ten scholarships to part-time students who have taken the Qualifying and Matriculation course of the Department of Technical Education. Scholarships will be awarded in order of merit on Leaving Certificate Examination results, and only to persons who do not hold another award. Holders are exempt from course fees during the currency of the scholarship. Applications must be lodged after publication of Leaving Certificate Examination results and after the announcement of the award of Commonwealth Scholarships, but not later than 31st January, 1963.

State Bursaries and Exhibitions

A number of exhibitions and bursaries are awarded by the New South Wales Government on the results of the Leaving Certificate Examination. The award of an exhibition exempts the student from payment of fees. Bursaries are awarded subject to applicants holding an exhibition and satisfying a means test. They are tenable for the duration of one first degree course, and provide a living allowance of £65 per annum (£104 per annum if the student is living away from home), and a book allowance of £10 per annum. Bursary holders are allowed to engage in employment only when it is associated with the course, and the income from such employment must not exceed £300 per annum. Further information can be obtained from the Bursary Endowment Board, c/- Department of Education, Bridge Street, Sydney.

Joint Coal Board and Australian Coal Association (Research) Limited Scholarships

The Joint Coal Board and the Australian Coal Association (Research) Limited each offer scholarships in full-time courses in Mechanical Engineering, Electrical Engineering, Mining Engineering, Fuel Technology and Applied Geology. The value of these scholarships ranges from £350 to £600 per annum (including allowance for books and instruments). These scholarships are awarded on the understanding that students will normally hold a Commonwealth Scholarship which covers the cost of University fees. However, applicants without Commonwealth Scholarships may be given consideration. While scholarship holders are not under bond, it is expected that they will obtain employment in Coal Mining or a related industry on graduation. Applications on forms obtainable from headmasters or from the Secretary, Joint Coal Board, Box 3842, G.P.O. Sydney, must be lodged with the Board's Secretary not later than seven days after the publication of Leaving Certificate results.

Raymond E. Purves — Clyde Industries Engineering Scholarship

Clyde Industries Limited provides one scholarship annually for:—

(a) holders of the Associateship of the Sydney Technical College or the B.Sc. (Tech.) of the University of New South Wales in Mechanical Engineering or Industrial Engineering who wish to complete a one year full-time course leading to the B.E. degree with Honours. Students who obtain this degree may apply for a renewal for a further year to allow them to work for a Master's degree. This scholarship is of the value of £750 per annum, from which University fees are deducted,

or for

(b) graduates in Mechanical or Industrial Engineering who wish to undertake full-time study or research leading to the award of the degree of Master of Technology or Master of Engineering. Students whose post-graduate course is of longer duration than one year may apply for an extension of the scholarship for a second year. This scholarship is valued at £900 per annum, from which University fees are deducted.

Only one scholarship is available at any time. Application forms are available from the Registrar, and should be lodged with him, duly completed, by 25th November.

The John Heine Memorial Scholarship

This scholarship is awarded annually at the discretion of the Directors of the John Heine Memorial Foundation. It is designed to assist the recipient to undertake the final two years of the degree course in Mechanical, Electrical or Chemical Engineering, Applied Chemistry or Metallurgy, or to assist a student who has qualified for the A.S.T.C. diploma to complete the requirements for the B.E. or B.Sc. degree in these courses in two years of part-time study (three years in the case of Electrical Engineering) or in one year of full-time study. The applicant must be an employee of a member of the Metal Trades Employers' Association. The scholarship has a total value of £250, a maximum of £150 being payable to any student completing the requirements for a degree in one year of part-time study only.

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

The A.E. Goodwin Memorial Scholarship

The Directors of A. E. Goodwin Ltd. provide a scholarship each year to students who are eligible to enrol in the second year of the Mechanical Engineering degree course. The total value of the scholarship is £90, payable in three equal amounts of £30 each at the beginning of the second, third and fourth years of the course. Applications should be lodged with the Registrar by 31st January each year.

Mining and Metallurgical Bursaries Fund

Mining and Metallurgical Bursaries at the University of New South Wales, valued at £50 per annum, will be awarded by the Trustees of the Mining and Metallurgical Bursaries Fund, Melbourne. Candidates must be British subjects and have completed the first two years of the course for the degree of Bachelor of Engineering in Mining Engineering, Bachelor of Science in Applied Geology, or Bachelor of Science in Metallurgy, or have been awarded corresponding status in consideration of work done elsewhere. Candidates must lodge their applications with the Registrar on or before 31st December each year.

South Sydney Junior Rugby League Club Ltd. Scholarships

Two scholarships, each valued at £75, are available to male residents in the South Sydney area who wish to enrol in a full-time course at the University. The scholarships, tenable for one year only, will be awarded on the results of the Leaving Certificate Examination in the immediately preceding year and may not be held concurrently with any other scholarship award. The scholarship is intended to enable a student to undertake the first year of a course with the possibility (provided that his first-year performance warrants it) of obtaining a later year Commonwealth Scholarship. Applications must be lodged with the Registrar after the announcement of the award of the Commonwealth Scholarships, but not later than 31st January each year.

In addition to these scholarships made available by the University and other bodies, a number of industrial organisations and Government Departments sponsor students at the University. Such students generally have their University fees paid by the employers and are employed at cadet rates of pay during their course.

Outlines of Undergraduate Courses

SCHOOL OF CIVIL ENGINEERING

Civil engineering is broad in its scope, utilizing other specialised branches of engineering in planning, co-ordinating and constructing national works such as water supply and conservation projects, hydro-electric development, roads, railways, bridges, tunnels, large buildings, and irrigation, sewerage and harbour and river development. The civil engineer adapts the forces of nature for the use and convenience of mankind. His academic training must include a study of science and of engineering practice. He must combine this with experience and judgment and the knowledge and personality necessary to control large organisations of workers. This profession offers to a young man a considerable variety of types of work, ranging from specialised research and investigations, through routine design and construction work to higher positions which are often largely managerial and organisational in their nature.

The School of Civil Engineering offers two courses in civil engineering; a four-year full-time course leading to the degree of Bachelor of Engineering (pass or honours), and a six-year part-time course leading to the degree of Bachelor of Science (Technology)—B.Sc. (Tech). This course may also be completed in three years of part-time study and two years of full-time study. In addition the School offers a full-time and a part-time course in Surveying leading to the degree of Bachelor of Surveying (pass or honours), details of which are set out below the outlines of the Civil Engineering courses.

Recent A.S.T.C. diplomates may convert to the degrees of Bachelor of Engineering or Bachelor of Science (Technology) by courses of full-time or part-time study respectively.

CIVIL ENGINEERING—FULL-TIME COURSE

FIRST YEAR

(30 weeks day course)

		Hours per week for 3 terms lec. lab./tut.
1.001	Physics I	3 — 3
2.001	Chemistry I	3 — 3
5.001	Engineering I	3 — 3
10.001	Mathematics I	4 — 2
		13 —11

SECOND YEAR*
(24 weeks day course)

		Hours per week for 24 weeks lec. lab./tut.
1.212S	Physics II(T)	2 — 2½
5.301S	Engineering Mechanics	1½— 1
5.701S	Thermodynamics	1 — 1½
7.531S	Geology**	2 — 1
8.112S	Materials and Structures	2 — 2
8.421S	Engineering Surveying§	1½— 1½
10.022S	Mathematics	2½— 2½
50.011S	English†	3 — 0
		15½—12

THIRD YEAR*
(24 weeks day course)

		Hours per week for 24 weeks lec. lab./tut.
5.501S	Fluid Mechanics	1 — 1½
6.801S	Electrical Engineering	1½— 2½
8.122S	Structures	3 — 3
8.221S	Engineering Materials	3½— 2½
8.423S	Engineering Surveying§	1½— 1½
8.611S	Civil Engineering	2½— 0
51.011S 52.011S	History *or* Philosophy †	1½— 0
	Social Science Elective	1½— 0
		16 —11

FOURTH YEAR*—PASS COURSE
(24 weeks day course)

		Hours per week for 24 weeks lec. lab./tut.
8.132S	Structures	2 — 3
8.142S	Engineering Computations	1 — 1
8.223S	Engineering Materials	3 — 2½
8.522S	Hydraulics	1½— 1½
8.613S	Civil Engineering	4½— 0
	Minor Thesis	3 — 0
	Humanities, Advanced Elective†	3 — 0
		18 — 8

* Lectures cease at end of 4th week of third term.

** Geology excursions must be attended as part of the course.

† Terms 1 and 2 (20 weeks) only.

§ A one week survey camp must be attended in seventh week of third term.

FOURTH YEAR—HONOURS COURSE
(30 weeks day course)

		Hours per week for 24 weeks* lec. lab./tut.
8.132S	Structures	2 — 3
8.142S	Engineering Computations	1 — 1
8.522S	Hydraulics	1½— 1½
8.613S	Civil Engineering	4½— 0
8.223S	Engineering Materials	3 — 2½
10.341S	Statistics	1½— 0
	Humanities, Advanced Elective **	3 — 0
	Three Honours subjects are to be chosen from Structures, Hydraulics, Surveying and Materials	3 — 0
		19½— 8

DOUBLE DEGREE OF B.SC., B.E. IN CIVIL ENGINEERING

Full-time students in Civil Engineering may qualify for the double degree of Bachelor of Science, Bachelor of Engineering by completing the following course of study over five years.

First Year — Normal first year programme for full-time Civil Engineering as set out above.

Second Year — As set out below.

		Terms 1 & 2	Term 3 Weeks 1-4	Term 3 Weeks 5-10
1.112	Physics	8	8	8
5.301	Engineering Mechanics	2	2	2
5.701	Thermodynamics	2	2	2
7.531S	Geology	3	3	0
8.112	Materials and Structures	3	3	3
8.421S	Engineering Surveying	3	3	0
10.111	Pure Mathematics II†	5	5	5
50.011	English	2	2	2
		28	28	22

Third Year — Two appropriate third year Science subjects (see Science course regulations in the University Calendar) plus 51.011 History or 52.011 Philosophy and a Social Science Elective. In the long vacation following this year students are required to undertake a nine-week period of industrial training.

Fourth Year — Normal third year of the Civil Engineering course (less the Humanities taken in the special third year).

Fifth Year — Normal fourth year of the Civil Engineering course.

---

* In the last 6 weeks of third term 18 hours per week will be devoted to work on the thesis. In addition students will be required to attend for nine hours per week such course work as may be prescribed.

** Terms 1 and 2 (20 weeks) only.

† 10.121 Pure Mathematics II may be substituted (7 hours per week for three terms).

CIVIL ENGINEERING—PART-TIME COURSE

FIRST STAGE

(30 weeks part-time course)

		Hours per week for 30 weeks lec. lab./tut.
1.001/1	Physics I, Part I	1½— 1½
2.001/1	Chemistry I, Part I	1½— 1½
5.001/1	Engineering I, Part I	1 — 2*
10.001/1	Mathematics I, Part I	2 — 1
		6 — 6

SECOND STAGE

(30 weeks part-time course)

		Hours per week for 30 weeks lec. lab./tut.
1.001/2	Physics I, Part II	1½— 1½
2.001/2	Chemistry I, Part II	1½— 1½
5.001/2	Engineering I, Part II	2 — 1
10.001/2	Mathematics I, Part II	2 — 1
		7 — 5

THIRD STAGE

(30 weeks part-time course)

		Hours per week for 30 weeks lec. lab./tut.
1.212	Physics II(T)	1½— 1½
5.301	Engineering Mechanics II	1½— ½
8.112	Materials and Structures	1½— 1½
10.022/1	Mathematics II, Part I	1 — 1
50.011/1	English Language	1 — 0
		6½— 4½

FOURTH STAGE

(30 weeks part-time course)

		Hours per week for 30 weeks lec. lab./tut.
5.501	Fluid Mechanics	1 — 1
5.701	Thermodynamics	1 — 1
7.531	Geology	1½— ½
8.121	Structures	1½— 1½
8.421	Engineering Surveying **	1 — 0
50.011/2	English Literature	1 — 0
		7 — 4

* Terms 1 and 2 only.
Term 3 — 3 hours per week of lab./tut.

** Saturday fieldwork additional. Also, a one week survey camp must be attended in seventh week of third term.

FIFTH STAGE

(30 weeks part-time course)

		Hours per week for 30 weeks lec. lab./tut.
6.801	Electrical Engineering	1½— 1½
8.221	Engineering Materials	3 — 2
8.422	Engineering Surveying*	1 — ½
8.521	Hydraulics	1 — 1
51.011 or 52.011	History *or* Philosophy	1 — 0
		7½— 5

SIXTH STAGE

(30 weeks part-time course)

		Hours per week for 30 weeks lec. lab./tut.
8.131	Structures	2 — 2
8.141	Engineering Computations	1 — 0
8.222	Engineering Materials	1 — 1
8.611	Civil Engineering	2 — 0
8.612	Civil Engineering	1 — 0
	Social Science Elective	1 — 0
		8 — 3

CIVIL ENGINEERING — COMBINED FULL-TIME/PART-TIME COURSE

The Civil Engineering course leading to the degree of Bachelor of Science (Technology) may be completed in three years of part-time study and two years of full-time study as follows:

Stage 1 — Part-time (as for the Stage 1 of the B.Sc. (Tech.) course in Civil Engineering).

Stage 2 — Part-time (as for Stage 2 of the B.Sc. (Tech.) course in Civil Engineering).

Stage 3A — Full-time (as for Second Year of the full-time course in Civil Engineering).

Stage 4A — Full-time (as for Third Year of the full-time course in Civil Engineering).

* Saturday fieldwork additional. Also, a one week survey camp must be attended in seventh week of third term.

Stage 5A — Part-time (as set out below).

STAGE 5A
(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
8.131	Structures	2 — 2
8.141	Engineering Computations	1 — 0
8.222	Engineering Materials	1 — 1
8.521	Hydraulics	1 — 1
8.612	Civil Engineering	1 — 0
		6 — 4

CIVIL ENGINEERING—CONVERSION COURSE

(A.S.T.C. Diploma to B.Sc. (Tech.) Degree)

Recent A.S.T.C. diploma holders in Civil Engineering may qualify for the degree of Bachelor of Science (Technology) by completing the following course of study. The programme outlined is what will be required of recent diplomates. Diplomates of many years standing may be required to take additional subjects.

FIRST STAGE
(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
1.001/2	Physics I, Part 2	1½— 1½
2.001/2	Chemistry I, Part 2	1½— 1½
5.301	Engineering Mechanics	1½— ½
10.022/2	Mathematics	2 — 0
	Social Science Elective	1 — 0
		7½— 3½

SECOND STAGE
(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
1.212	Physics II(T)	1½— 1½
8.131	Structures	2 — 2
8.141	Engineering Computations	1 — 0
8.222	Engineering Materials (Soil Mechanics)*	2 — 0
8.521	Hydraulics	1 — 1
		7½— 4½

* First term only.

A.S.T.C. diplomates who completed their course in Civil Engineering in 1961 or later years and who wish to qualify for the degree of Bachelor of Engineering by full-time study may do so by completing the subjects of Stages 6 and 7 of the existing part-time Bachelor of Engineering degree course, or their equivalent, in one year.

Department of Surveying

The Department of Surveying of the School of Civil Engineering offers a full-time course, a part-time course and a special six-year trainee course leading to the degree of Bachelor of Surveying (pass and honours). Faculty approval has also recently been granted for the establishment of the Degree of Master of Surveying. From 1961 the University Degree in Surveying is recognised as the only route by which the registration of the Surveyors Registration Board of N.S.W. may be obtained. Students who are registered surveyors are granted certain exemptions, particulars of which are given below.

SURVEYING—FULL-TIME COURSE

FIRST YEAR
(30 weeks day course)

		Hours per week for 30 weeks lec. lab./tut.
1.001	Physics I	3 — 3
2.001	Chemistry I	3 — 3
5.001	Engineering I	3 — 3
10.001	Mathematics I	4 — 2
		13 —11

SECOND YEAR*
(24 weeks day course)

		Hours per week for 24 weeks lec. lab./tut.
1.212S	Physics II(T)	2 — 2½
7.531S	Geology**	2 — 1
8.421S	Engineering Surveying§	1½— 1½
8.811S	Surveying§	1 — 1
8.841S	Surveying Computations	1 — 1
8.861S	Cartography	1 — 1½
8.871S	Land Utilisation	1½— ½
10.022S	Mathematics	3 — 2
10.361S	Statistics	1½— 0
50.011S	English†	3 — 0
		17½—11

* Lectures cease at end of 4th week of 3rd term.
** Geology excursions must be attended as part of the course.
† Terms 1 and 2 (20 weeks) only.
§ A two week survey camp must be attended in third term.

THIRD YEAR*

(24 weeks day course)

		Hours per week for— 10 weeks lec. lab./tut.	14 weeks lec. lab./tut.
5.501S	Fluid Mechanics	1 — 1½	1 — 1½
8.812S	Surveying	1 — 2	1 — 0
8.241S	Soil Mechanics	1 — 1½	1 — 1½
8.821S	Geodesy§	2 — 3	1 — 3
8.831S	Astronomy§	2 — 0	2 — 2
8.842S	Surveying Computations	1½— 1½	1 — 0
8.851S	Photogrammetry	1 — 1½	2 — 3
8.611S	Civil Engineering	3 — 0	3 — 0
8.891S	Theory of Instruments	1 — 0	1 — 0
51.011S 52.011S	History *or* Philosophy †	1½— 0	1½— 0
	Social Science Elective	1½— 0	1½— 0
		16½—10½	16 —10½

FOURTH YEAR*—PASS COURSE

(24 weeks day course)

		Hours per week for 24 weeks lec. lab./tut.
7.533	Geophysics	2½— 0
8.613S	Civil Engineering	4½— 0
8.822S	Geodesy	1 — 1
8.832S	Astronomy	1½— ½
8.852S	Photogrammetry	1 — 1½
8.862S	Cartography	2 — 0
8.872S	Land Valuation	1 — 0
8.881S	Survey Laws and Regulations	1½— 0
11.411	Town Planning†	1 — 1
	Minor Thesis	3 — 0
	Humanities, Advanced Elective†	3 — 0
		21½— 4½

* Lectures cease at end of 4th week of third term.

† Terms 1 and 2 (20 weeks) only.

§ A two week survey camp must be attended in third term.

FOURTH YEAR—HONOURS COURSE

(30 weeks day course)

		Hours per week for 24 weeks* lec. lab./tut.
7.533	Geophysics	2½— 0
8.613S	Civil Engineering	4½— 0
8.822S	Geodesy	1 — 1
8.832S	Astronomy	1½— ½
8.852S	Photogrammetry	1 — 1½
8.862S	Cartography	2 — 0
8.872S	Land Valuation	1 — 0
8.881S	Survey Laws and Regulations	1½— 0
11.411	Town Planning	1 — 1
	Humanities, Advanced Elective†	3 — 0
	Two Honours subjects are to be selected from Geodesy, Surveying and Photogrammetry	3 — 0
		21½— 4½

SURVEYING—PART-TIME COURSE

FIRST STAGE

(30 weeks part-time course)

		Hours per week for 30 weeks lec. lab./tut.
1.001/1	Physics I, Part I	1½— 1½
2.001/1	Chemistry I, Part I	1½— 1½
5.001/1	Engineering I, Part I	1½— 1½
10.001/1	Mathematics I, Part I	2 — 1
		6½— 5½

SECOND STAGE

(30 weeks part-time course)

		Hours per week for 30 weeks lec. lab./tut.
1.001/2	Physics I, Part II	1½— 1½
2.001/2	Chemistry I, Part II	1½— 1½
5.001/2	Engineering I, Part II	1½— 1½
10.001/2	Mathematics I, Part II	2 — 1
		6½— 5½

* In the last 6 weeks of third term 18 hours per week will be devoted to work on the thesis. In addition students will be required to attend nine hours per week such course work as may be prescribed.

Geodesy, Surveying, Photogrammetry } 9 hours per week

† Terms 1 and 2 (20 weeks) only.

THIRD STAGE
(30 weeks part-time course)

		Hours per week for 30 weeks lec. lab./tut.
1.212	Physics II(T)	1½— 1½
8.421	Engineering Surveying*	¾— ¾
8.841	Surveying Computations	¾— ¾
8.861	Cartography	¾— 1½
10.022/1	Mathematics II, Part I	1 — 1
50.011/1	English Language	1 — 0
		5¾— 5½

FOURTH STAGE
(30 weeks part-time course)

		Hours per week for 30 weeks lec. lab./tut.
5.501	Fluid Mechanics	1 — 1
7.531	Geology	1½— ¾
8.811	Surveying**	¾— ¾
8.871	Land Utilisation	1 — ½
10.022/2	Mathematics II, Part II	1 — 1
10.361	Statistics	1 — 0
50.011/2	English Literature	1 — 0
51.011 / 52.011	History *or* Philosophy	1 — 0
		8 — 4

FIFTH STAGE
(30 weeks part-time course)

		Hours per week for— 20 weeks lec. lab./tut.	10 weeks lec. lab./tut.
8.241	Soil Mechanics	1 — 1	1 — 1
8.821	Geodesy	1½— 2½	1½— 2½
8.842	Surveying Computations**	1 — ½	1 — ½
8.862	Cartography	2 — 0	1 — 0
8.891	Theory of Instruments	1 — 0	0 — 0
	Social Science Elective	1 — 0	1 — 0
		7½— 3½	5½— 3½

* Saturday fieldwork additional. A survey camp of one week must be attended in the third term.

** A Survey camp of one week must be attended in third term.

SIXTH STAGE

(30 weeks part-time course)

		Hours per week for— 20 weeks lec. lab./tut.	10 weeks lec. lab./tut.
7.533	Geophysics	2 — 0	2 — 0
8.611	Civil Engineering	2 — 0	2 — 0
8.812	Surveying*	1 — 1	1 — 0
8.831	Astronomy	1½— ½	1½— 1½
8.851	Photogrammetry	1½— 1¾	1½— 1¾
	Humanities Advanced Elective	2 — 0	2 — 0
		9¾— 3½	9¾— 3½

SEVENTH STAGE

(30 weeks part-time course)

		Hours per week for— 20 weeks lec. lab./tut.	10 weeks lec. lab./tut.
8.613	Civil Engineering	3½— 0	3½— 0
8.822	Geodesy	1½— 0	1½— 0
8.832	Astronomy	1½— ½	0 — 1½
8.852	Photogrammetry	1 — 1	½— 1½
8.872	Land Valuation	1 — 0	0 — 0
8.881	Survey Laws and Regulations	1 — 0	2 — 0
11.411	Town Planning	2 — 0**	0 — 0
		11½— 1½	7½— 3

Note.—Part-time students are not required to complete a thesis since their professional experience is taken into consideration.

Honours are not awarded in the part-time course. To qualify for honours a part-time student must transfer to the full-time course and complete, at his first attempt, the fourth year of the full-time Honours course.

TRAINEE SURVEYING DEGREE COURSE

(6 years with day release)

The first two years of this course are identical with the first two years of the part-time Surveying Degree Course. In later years individual timetables must be arranged at the time of enrolment, to accord with timetables for subjects offered in the full-time and part-time courses.

---

* A survey camp of one week must be attended in third term.

** One term of lectures and one term of studio work.

FIRST YEAR

(30 weeks part-time course)

		Hours per week for 30 weeks lec. lab./tut.
1.001/1	Physics I, Part I	1½— 1½
2.001/1	Chemistry I, Part I	1½— 1½
5.001/1	Engineering I, Part I	1½— 1½
10.001/1	Mathematics I, Part I	2 — 1
		6½— 5½

SECOND YEAR

(30 weeks part-time course)

		Hours per week for 30 weeks lec. lab./tut.
1.001/2	Physics I, Part II	1½— 1½
2.001/2	Chemistry I, Part II	1½— 1½
5.001/2	Engineering I, Part II	1½— 1½
10.001/2	Mathematics I, Part II	2 — 1
		6½— 5½

THIRD YEAR

(30 weeks part-time course)

		Hours per week for 30 weeks lec. lab./tut.
1.212	Physics II(T)	1½— 1½
8.421	Engineering Surveying*	½— ½
8.841	Surveying Computations	½— ½
8.861	Cartography	½— 1½
10.022/1	Mathematics II, Part I	1 — 1
10.361	Statistics	1 — 0
50.011/1	English Language	1 — 0
		6½— 5½

FOURTH YEAR

(30 weeks part-time course)

		Hours per week for 30 weeks lec. lab./tut.
5.501	Fluid Mechanics	1 — 1
7.531	Geology	1½— ½
8.811	Surveying*	½— ½
8.842	Surveying Computations	1 — ½
8.862	Cartography	1½— 0
8.871	Land Utilisation	1 — ½
10.022/2	Mathematics II, Part II	1 — 1
50.011/2	English Literature	1 — 0
51.011 52.011	History *or* Philosophy	1 — 0
		9½— 4½

* Saturday fieldwork additional. A survey camp of one week must be attended in the third term.

FIFTH YEAR

(30 weeks part-time course)

		Hours per week for 30 weeks lec. lab./tut.
8.241	Soil Mechanics	1 — 1
8.611	Civil Engineering	2 — 0
8.812	Surveying*	1½— 0
8.821	Geodesy	1½— 2½
8.831	Astronomy	2 — ½
8.851	Photogrammetry	1½— 1½
8.891	Theory of Instruments	½— 0
	Social Science Elective	1 — 0
		10½— 5½

SIXTH YEAR

(30 weeks part-time course)

		Hours per week for 30 weeks lec. lab./tut.
7.533	Geophysics	2 — 0
8.613	Civil Engineering	3½— 0
8.822	Geodesy	1½— 0
8.832	Astronomy	1½— ½
8.852	Photogrammetry	1 — 1
8.872	Land Valuation	½— 0
8.881	Survey Laws and Regulations	1½— 0
11.411	Town Planning	1½— 0
	Advanced Elective	2 — 0
		14½— 1½

Note—Trainee students are not required to complete a thesis since their professional experience is taken into consideration.

For an Honours degree, a part-time student must transfer to and complete the 4th Year of the full-time course.

EXEMPTIONS

The following exemptions are granted to registered surveyors and persons who have completed subjects in the Surveying Certificate Course of the N.S.W. Department of Technical Education, viz:—

(a) Exemptions for Licensed Surveyors.

(i) The following exemptions in the Surveying Degree Course will be granted to Registered Surveyors who have passed the examination of the Surveyors' Registration Board.

	Subject	*Equivalent Subject Passed*
8.421	Engineering Surveying	Engineering Surveying A
8.841	Surveying Computations	Computations A
8.861	Cartography	Field Practice
8.881	Survey Laws and Regulations	Laws and Regulations affecting Surveys

* A survey camp of two weeks must be attended in the third term.

(ii) Registered Surveyors who have passed the examinations of the Surveyors' Registration Board will be granted admission to examinations in the following subjects of the Surveying Degree Course without attendance at classes.

	Subject	*Registration Board Subject Passed*
8.811	Surveying	Engineering Surveying A and B
8.821	Geodesy	Geodesy
8.831	Astronomy	Astronomy
8.871	Land Utilisation	Land Classification and Utilisation
8.872	Land Valuation	Principles and Practice of Land Valuation

(b) Persons who have completed individual subjects, etc.

The following exemptions in the Surveying Degree Course will be granted to persons who have passed the following equivalent individual subjects in the Surveying Certificate Course:—

	Subject Exempt	*Surveying Certificate Equivalent*
8.411	Engineering Surveying	Engineering Surveying I
8.841	Surveying Computations	Surveying Computation II
8.861	Cartography	Plotting and Plan Drawing
8.871	Land Utilisation	Land Classification and Utilisation
8.872	Land Valuation	Land Surveying II (Land Valuation)
	Town Planning	Town Planning

SCHOOL OF ELECTRICAL ENGINEERING

In preparation for a career in any branch of electrical engineering the student must acquire a knowledge of the basic sciences of mathematics and physics. Students should realise that electrical engineering, perhaps more than most other branches of engineering, is closely linked with the pure sciences, and requires a scientific outlook and approach for a proper understanding of its problems.

There are three main branches of electrical engineering, viz.— *(a)* power apparatus and systems—concerned mainly with electrical machinery, power generation, transmission and power systems; *(b)* utilisation and control—concerned with the utilisation and control of electrical plant and applied electronics; *(c)* communications—concerned with radio and line communications, radar and other navigational aids, and television. In the early stages of the course, students will concentrate on acquiring a knowledge of the basic science subjects of mathematics, physics and chemistry, but will have some introduction to engineering. However, advanced students are given an opportunity to specialise in their field of interest. They may elect, with the approval of the Professor, to study one of the three branches: *(a)* power apparatus and systems, *(b)* utilisation and control, or *(c)* communications, but will be required to study a common subject of electrical engineering. This will cover the portions of electrical engineering such as measurements, electron physics, servo-mechanisms, electric

circuit and field theory, and electronics, which are common to all three fields of study.

Each student is required to work on a project under the guidance of members of the lecturing staff. Generally, the project will involve the design and construction of experimental apparatus together with laboratory tests. Where possible the projects will be related to the research programme of the School and will be designed to develop the student's initiative. Each student will be required to deliver a seminar paper and to prepare a thesis based on the results of the project work.

Provision is made in the full-time course for students to undertake additional work in their third and fourth years towards the award of an honours degree.

The School offers a full-time course of four years duration leading to the degree of Bachelor of Engineering (pass or honours), and a six-year part-time course for the degree of Bachelor of Science (Technology). This course may also be completed in three years of part-time and two years of full-time study. Special conversion courses are provided for holders of the A.S.T.C. diploma in Electrical or Radio Engineering.

ELECTRICAL ENGINEERING—FULL-TIME COURSE

The full-time course is of four years duration and leads to the degree of Bachelor of Engineering (pass or honours). The first two years of the course each require attendance at the University for thirty weeks. The third year requires attendance for twenty-four weeks. Practical experience in industry is to be obtained at the end of the second year, for a minimum of ten weeks and at the end of the third year for a minimum of eighteen weeks.

The fourth year requires full-time day attendance for thirty weeks.

FIRST YEAR

(30 weeks day course)

		Hours per week for 3 Terms lec. lab./tut.
1.001	Physics I	3 — 3
2.001	Chemistry I	3 — 3
5.001	Engineering I	3 — 3
10.001	Mathematics I	4 — 2
		13 —11

SECOND YEAR*
(30 weeks day course)

		Hours per week for 3 Terms lec. lab./tut.
1.112	Physics	4 — 4
4.921	Materials Science	1 — ½
5.301	Engineering Mechanics	1 — 1
5.701	Thermodynamics	1 — 1
6.101	Electric Circuit Theory	1 — 2
8.112	Materials and Structures	1 — 2
10.111	Pure Mathematics II	3 — 2
50.011	English	2 — 0
		14 —12½

THIRD YEAR**—PASS COURSE
(24 weeks day course)

		Hours per week for 24 weeks lec. lab./tut.
5.304S	Theory of Machines	1 — 1
5.501S	Fluid Mechanics *or*	
10.351S	Statistics	1 — 1
6.102S	Electric Circuit Theory	3 — 3
6.201S	Electric Power Engineering	3 — 3
6.301S	Electronics	3 — 3
10.033S	Mathematics†	2 — 0
51.011S	History *or*	
52.011S	Philosophy ‡	1½— 0
	Social Science Elective	1½— 0
		16 —11

FOURTH YEAR**—PASS COURSE
(24 weeks day course)

		Hours per week for 24 weeks lec. lab./tut.
6.001S	Electrical Engineering	5 — 5
	Advanced Elective, Humanities‡	3 — 0
Plus one of the following options:—		
Option I—		
	Power Apparatus and Systems—	
6.202S	Power Systems	3 — 4
6.212S	Electrical Machines	3 — 4
Option II—		
	Utilisation and Control—	
6.401S	Utilisation and Control of Electrical Plant	3 — 4
6.322S	Applied Electronics	3 — 4
Option III—		
	Communications—	
6.302S	Communications A	3 — 4
6.312S	Communications B	3 — 4
		14 —13

* This year also meets the requirements of the Second Year of the Science course for the degree of Bachelor of Science.
** Lectures cease at the end of the 4th week of third term.
† Students who have taken the subjects Physics III and Mathematics III in the Science Course are exempt from this subject.
‡ Terms 1 and 2 (20 weeks) only.

Students in doubt concerning optional subjects in the third and fourth years should consult the Head of the School. It is expected that students intending to specialise in Option I—Power Apparatus and Systems—will elect 5.501S Fluid Mechanics. The subject 10.351S Statistics will be of more value to students intending to study in Communications or Control Systems.

Third Term

This term is mainly devoted to directed laboratory and research work on an approved subject, with special reading and study associated with the preparation of a thesis; seminar work is also carried out.

A course of specialist lectures, including engineering economics, is given by senior engineers from government departments and industry on problems met in practice. These are designed to acquaint the student with current projects and practical problems in industry and essential electrical services.

Additional for Honours

A full-time honours course in electrical engineering is offered, involving additional work in third and fourth years. Candidates for honours must obtain the permission of the Head of the School to enter the course.

After satisfactorily completing the first and second years as set out above, candidates for honours will undertake the following programme in third and fourth years.

THIRD YEAR—HONOURS COURSE

(24 weeks day course)

		Hours per week for 24 weeks lec. lab./tut.
5.304S	Theory of Machines	1 — 1
5.501S	Fluid Mechanics *or*	1 — 1
10.351S	Statistics	
6.102S	Electric Circuit Theory	3 — 3
6.201S	Electric Power Engineering	3 — 3
6.301S	Electronics	3 — 3
6.501	Electrical Engineering Honours	2 — 0
10.033S	Mathematics*	2 — 0
51.011S	History *or* †	1 — 0
52.011S	Philosophy	
	Social Science Elective‡	2 — 0
		18 —11

† Students who have taken the Subjects Physics III and Mathematics III in the Science course are exempt from this subject.

‡ Terms 1 and 2 (20 weeks) only.

FOURTH YEAR—HONOURS COURSE

(30 weeks day course)

		Hours per week for 24 weeks* lec. lab./tut.
6.001S	Electrical Engineering	5 — 5
6.502	Electrical Engineering Honours	3 — 0
	Advanced Elective, Humanities‡	3 — 0
Plus one of the following options:—		
Option I—		
	Power Apparatus and Systems—	
6.202S	Power Systems	3 — 4
6.212S	Electrical Machines	3 — 4
Option II—		
	Utilisation and Control—	
6.401S	Utilisation and Control of Electrical Plant	3 — 4
6.322S	Applied Electronics	3 — 4
Option III—		
	Communications—	
6.202S	Communications A	3 — 4
6.312S	Communications B	3 — 4
		17— 13

DOUBLE DEGREE OF B.SC., B.E. IN ELECTRICAL ENGINEERING

Full-time students in Electrical Enginering may qualify for the double degree of Bachelor of Science, Bachelor of Engineering in five years of full-time study. Having completed first and second years of the Electrical Engineering course students will take a special third year consisting of two Group III Science subjects (see the Science course regulations in the University Calendar) plus 51.011 History or 52.011 Philosophy plus a Social Science Elective. In their fourth year students in the combined course will take the normal third year of the Electrical Engineering course, less the Humanities subjects taken in the special third year. In their fifth year they will complete the normal fourth year of the Electrical Engineering course.

ELECTRICAL ENGINEERING—PART-TIME COURSE

The six-year part-time course in Electrical Engineering leads to the degree of Bachelor of Science (Technology).

---

* Lectures cease at the end of the 4th week of third term.

‡ Terms 1 and 2 (20 weeks) only.

FIRST STAGE

(30 weeks part-time course)

		Hours per week for 3 Terms lec. lab./tut.
1.001/1	Physics I, Part I	1½— 1½
2.001/1	Chemistry I, Part I	1½— 1½
5.001/1	Engineering I, Part I	1*— 2*
10.001/1	Mathematics I, Part I	2 — 1
		6 — 6

SECOND STAGE

(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
1.001/2	Physics I, Part II	1½— 1½
2.001/2	Chemistry I, Part II	1½— 1½
5.001/2	Engineering I, Part II	2 — 1
10.001/2	Mathematics I, Part II	2 — 1
		7 — 5

THIRD STAGE

(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
1.112/1	Physics II, Part I	1½— 1½
6.101	Electric Circuit Theory	1 — 2
8.112	Materials and Structures	1½— 1½
10.111/1	Pure Mathematics II, Part I	1½— ½
50.011/1	English Language	1 — 0
		6½— 5½

FOURTH STAGE

(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
1.112/2	Physics II, Part II	1½— 1½
4.921	Materials Science	1 — ½
6.152	Electric Circuit Theory	2 — 2
10.111/2	Pure Mathematics II, Part II	2 — 1
52.011/2	English Literature	1 — 0
		7½— 5

* Hours for terms 1 and 2 only; in term 3, the three hours per week are devoted to drawing office work in Engineering Drawing.

FIFTH STAGE
(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
5.301	Engineering Mechanics	1½— ½
5.701	Thermodynamics	1 — 1
6.251	Electric Power Engineering	1½— 2
6.351	Electronics	1½— 2
51.011 / 52.011	History *or* Philosophy	1 — 0
		6½— 5½

SIXTH STAGE
(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
6.051	Electrical Engineering	3 — 0
	Social Science Elective	1 — 0
Plus one of the following options:—		
Option I—		
	Power Apparatus and Systems—	
6.252	Power Systems	1½— 2½
6.262	Electrical Machines	1½— 2½
Option II—		
	Utilisation and Control—	
6.451	Utilisation and Control of Electrical Plant	1½— 2½
6.372	Applied Electronics	1½— 2½
Option III—		
	Communications—	
6.352	Communications A	1½— 2½
6.362	Communications B	1½— 2½
		7 — 5

ELECTRICAL ENGINEERING — COMBINED FULL-TIME/PART-TIME COURSE

The Electrical Engineering course leading to the degree of Bachelor of Science (Technology) may be completed in three years of part-time study and two years of full-time study as follows:

Stage 1 — Part-time (as for the Stage 1 of the B.Sc. (Tech.) course in Electrical Engineering).

Stage 2 — Part-time (as for Stage 2 of the B.Sc. (Tech.) course in Electrical Engineering).

Stage 3A — Full-time (as for Second Year of the full-time course in Electrical Engineering).

Stage 4A — Full-time (as for Third Year of the full-time course in Electrical Engineering).

Stage 5A — Part-time (as set out below).

STAGE 5A

(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
6.051	Electrical Engineering	3 — 0
Plus one of the following options:—		
Option I—		
	Power Apparatus and Systems—	
6.252	Power Systems	1½— 2½
6.262	Electrical Machines	1½— 2½
Option II—		
	Utilisation and Control—	
6.451	Utilisation and Control of Electrical Plant	1½— 2½
6.372	Applied Electronics	1½— 2½
Option III—		
	Communications—	
6.352	Communications A	1½— 2½
6.362	Communications B	1½— 2½
		6 — 5

CONVERSION COURSES—ELECTRICAL ENGINEERING

The programmes of study to be followed by A.S.T.C. diplomates from the School of Electrical Engineering who wish to qualify for the degree of Bachelor of Engineering depend on the content of the courses which have been completed for the diploma.

The subjects required to complete the degree may be obtained on application in writing to the Head of the School of Electrical Engineering.

Additional for Honours

Conversion students who wish to be considered for honours will be required to do additional work as outlined for full-time students. A credit or honours diploma is the normal prerequisite for entrance to the honours course and students who wish to study for honours should apply to the Head of the School at least two years before they expect to complete the course.

ELECTRICAL ENGINEERING—CONVERSION COURSES

(From A.S.T.C. Diploma in Electrical or Radio Engineering to B.Sc. (Tech.) Degree)

Recent diplomates in Electrical Engineering may qualify for the degree of Bachelor of Science (Technology) by completing the following course in a minimum of two years of part-time study.

		Hours per week for 3 terms lec. lab./tut.
1.112/1	Physics II, Part I	1½— 1½
1.112/2	Physics II, Part II	1½— 1½
2.001/2	Chemistry I, Part II	1½— 1½
6.051	Electrical Engineering	3 — 0
6.152	Electric Circuit Theory	2 — 2
8.112	Materials and Structures	1½— 1½
10.111/2	Pure Mathematics II, Part II	2 — 1
51.011 / 52.011	History *or* Philosophy	1 — 0
	Social Science Elective	1 — 0
		15 — 9

Recent diplomates in Radio Engineering may qualify for the degree of Bachelor of Science (Technology) by completing the following course in a minimum of two years of part-time study.

		Hours per week for 3 terms lec. lab./tut.
1.112/1	Physics II, Part I	1½— 1½
1.112/2	Physics II, Part II	1½— 1½
2.001/2	Chemistry I, Part II	1½— 1½
4.921	Materials Science	1 — ½
5.071	Thermodynamics	1 — 1
6.051	Electrical Engineering	3 — 0
6.251	Electric Power Engineering	1½— 2
8.112	Materials and Structures	1½— 1½
51.011 / 52.011	History *or* Philosophy	1 — 0
	Social Science Elective	1 — 0
		14½— 9½

Recent diplomates in both Electrical and Radio Engineering may qualify for the degree of Bachelor of Science (Technology) by completing the following course in a minimum of two years of part-time study.

		Hours per week for 3 terms lec. lab./tut.
1.112/1	Physics II, Part I	1½— 1½
1.112/2	Physics II, Part II	1½— 1½
2.001/2	Chemistry I, Part II	1½— 1½
6.051	Electrical Engineering	3 — 0
8.112	Materials and Structures	1½— 1½
51.011 / 52.011	History *or* Philosophy	1 — 0
	Social Science Elective	1 — 0
		11 — 6

Diplomates in either Electrical Engineering or Radio Engineering or both, who wish to proceed to the degree of Bachelor of Science (Technology) specialising in Control Engineering will be required to take the following additional subjects.

		Hours per week for 3 terms lec. lab./tut.
6.372	Applied Electronics	1½— 2½
6.451	Utilisation and Control of Electrical Plant	1½— 2½
		3 — 5

The above programmes set out what is required of recent diplomates. Diplomates of many years standing may be required to take additional subjects.

SCHOOL OF MECHANICAL ENGINEERING

The courses in this School are planned to provide the appropriate academic training for the professional engineer in the fields of aeronautical, industrial and mechanical engineering, and for the naval architect.

In the early years of all these courses the emphasis is placed on the study of the basic sciences—mathematics, physics and chemistry. This is followed by the study of the engineering sciences—thermodynamics, fluid mechanics, theory of machines, materials, and structures, and their application in the field of design. In the courses in industrial engineering, the more advanced sections of thermodynamics and fluid mechanics are replaced by industrial engineering subjects. Humanities subjects form a regular part of all courses, four being included in full-time and three in part-time courses.

Industrial experience is an integral part of the course; full-time students must complete two five-month periods of approved industrial training, one period in an engineering workshop between the second and third years and the other, between third and fourth years, in a drawing office or assisting a professional engineer.

Each student is required to prepare a short paper and deliver it in the seminar period, and each full-time student is also required to present a thesis at the end of his final year.

The full-time course in mechanical engineering of four years duration leads to the degree of Bachelor of Engineering (pass or honours), with additional work being taken in the third and fourth years for the honours degree.

Part-time courses of six years duration leading to the degree of Bachelor of Science (Technology) are offered in mechanical engineering, aeronautical engineering, and naval architecture. The Department of Industrial Engineering also offers a full-time and a part-time course, details of which are given below. The part-

time courses may also be completed by a combination of three years of part-time and two years of full-time study.

Within the School of Mechanical Engineering a student who has successfully completed the first two stages of any of the Bachelor of Science (Technology) courses mentioned above may transfer to second year of the full-time mechanical or industrial engineering B.E. courses.

A student who has successfully completed the first four stages of the part-time B.Sc. (Tech.) courses in industrial or mechanical engineering may transfer to third year of the corresponding full-time B.E. courses.

Recent A.S.T.C. diplomates may convert to the degrees of Bachelor of Engineering or Bachelor of Science (Technology) by courses of full-time or part-time study respectively.

MECHANICAL ENGINEERING—FULL-TIME COURSE

FIRST YEAR
(30 weeks day course)

		Hours per week for 3 terms lec. lab./tut.
1.001	Physics I	3 — 3
2.001	Chemistry I	3 — 3
5.001	Engineering I	3 — 3
10.001	Mathematics I	4 — 2
		13 —11

SECOND YEAR*
(24 weeks day course)

		Hours per week for 24 weeks lec. lab./tut.
1.212S	Physics II	2 —2½
4.911S	Materials Science	1½— 1½
5.202S	Mechanical Technology	2 — 0
5.301S	Engineering Mechanics	1½— 1
5.501S	Fluid Mechanics	1 — 1½
5.701S	Thermodynamics	1 — 1½
8.112S	Materials and Structures	2 — 2
10.022S	Mathematics	2½— 2½
50.011S	English†	3 — 0
		16½—12½

*Lectures cease at the end of the 4th week of third term.
†Terms 1 and 2 (20 weeks only).

THIRD YEAR* — PASS COURSE
(24 weeks day course)

		Hours per week for 24 weeks lec. lab./tut.
5.101S	Mechanical Engineering Design	0 — 5
5.204S	Mechanical Technology	2 — 0
5.302S	Theory of Machines	1½— 1½
5.401S	Numerical Analysis	1 — ½
5.502S	Fluid Mechanics	1½— 1½
5.702S	Thermodynamics	1 — 2
6.801S	Electrical Engineering	1½— 2½
8.133S	Structures	1½— 1½
51.011S	History *or*	1½— 0
52.011S	Philosophy	
	Social Science Elective†	1½— 0
		13 —14½

FOURTH YEAR* — PASS COURSE
(24 weeks day course)

		Hours per week for 24 weeks lec. lab./tut.
5.103S	Mechanical Engineering Design	0 — 3
5.321S	Automatic Control Engineering	1 — ½
5.304S	Theory of Machines	1 — 1
5.503S	Fluid Mechanics	1 — 1
5.703S	Thermodynamics	1 — 1
6.802S	Electrical Engineering	1½— 1½
18.121S	Engineering Administration	3 — 0
	Seminar	0 — 1½
	Minor Thesis	0 — 4
	Humanities, Advanced Elective†	3 — 0
		11½—13½

ADDITIONAL FOR HONOURS
THIRD YEAR* — HONOURS COURSE
(24 weeks day course)

		Hours per week for 24 weeks lec. lab./tut.
5.101S	Mechanical Engineering Design	0 — 5
5.204S	Mechanical Technology	2 — 0
5.302S	Theory of Machines	1½— 1½
5.401S	Numerical Analysis	1 — ½
5.502S	Fluid Mechanics	1½— 1½
5.702S	Thermodynamics	1 — 2
6.801S	Electrical Engineering	1½— 2½
8.133S	Structures	1½— 1½
10.023S	Engineering Mathematics	1 — ½
51.011S	History *or* †	1½— 0
52.011S	Philosophy	
	Social Science Elective†	1½— 0
		14 —15

*Lectures cease at the end of the 4th week of third term.
†Terms 1 and 2 (20 weeks only).

FOURTH YEAR* — HONOURS COURSE

(30 weeks day course)

		Hours per week for 24 weeks lec. lab./tut.
5.103S	Mechanical Engineering Design	0 — 3
5.322S	Automatic Control Engineering	2½ — ½
5.305S	Theory of Machines	1½ — 1½
5.601S	Mechanical Engineering	4½ — 1½
6.802S	Electrical Engineering	1½ — 1½
10.371S	Statistics	1 — 1
	Seminar	0 — 1½
	Thesis*	0 — 4
	Humanities, Advanced Elective†	3 — 0
		14 —14½

DOUBLE DEGREE OF B.SC., B.E. IN MECHANICAL ENGINEERING

Full-time students in Mechanical Engineering may qualify for the double degree of Bachelor of Science, Bachelor of Engineering by completing the following course of study over five years.

First Year—Normal First Year programme for full-time Mechanical Engineering as set out above.

Second Year—As set out below.

		Terms 1 & 2	Term 3 Weeks 1-4	Term 3 Weeks 5-10
1.112	Physics II	8	8	8
4.911S	Materials Science	2½	2½	0
5.202S	Mechanical Technology	2	2	0
5.301	Engineering Mechanics	2	2	2
5.501	Fluid Mechanics	2	2	2
5.701	Thermodynamics	2	2	2
8.112	Materials and Structures	3	3	3
10.111	Pure Mathematics II**	5	5	5
50.011	English	2	2	2
		28½	28½	24

Third Year — Two appropriate Third Year Science subjects (see Science course regulations in the University Calendar), plus 51.011 History or 52.011 Philosophy and a Social Science Elective. In the long vacation following this year, students are required to undertake a nine-week period of industrial training.

* 28 hours per week for the final six weeks of third term are occupied in work for Thesis.

† Terms 1 and 2 (20 weeks only).

** 10.121 Pure Mathematics II (Higher) may be substituted by selected students (7 hours per week for three terms).

Fourth Year — Normal Third Year of the Mechanical Engineering course less the Humanities taken in the special Third Year.

Fifth Year — Normal Fourth Year of the Mechanical Engineering course.

MECHANICAL ENGINEERING—PART-TIME COURSE

This course is of six years duration, and leads to the degree of Bachelor of Science (Technology).

FIRST STAGE

(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
1.001/1	Physics I, Part I	1½— 1½
2.001/1	Chemistry I, Part I	1½— 1½
5.001/1	Engineering I, Part I	1*— 2*
10.001/1	Mathematics I, Part I	2 — 1
		6 — 6

SECOND STAGE

(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
1.001/2	Physics I, Part II	1½— 1½
2.001/2	Chemistry I, Part II	1½— 1½
5.001/2	Engineering I, Part II	2 — 1
10.001/2	Mathematics I, Part II	2 — 1
		7 — 5

THIRD STAGE

(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
1.212	Physics II	1½— 1½
5.201	Mechanical Technology	1 — 0
5.301	Engineering Mechanics	1½— ¾
8.112	Materials and Structures	1½— 1½
10.022/1	Mathematics	1 — 1
50.011/1	English Language	1 — 0
		7½— 4¾

* Hours for terms 1 and 2 only; in term 3 the three hours per week are devoted to drawing office work in Engineering Drawing.

FOURTH STAGE
(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
4.911	Materials Science	1 — 1
5.101/1	Mechanical Engineering Design	0 — 2
5.203	Mechanical Technology	1 — 0
5.501	Fluid Mechanics	½— 1½
5.701	Thermodynamics	½— 1½
10.022/2	Mathematics	1 — 1
50.011/2	English Literature	1 — 0
		5½— 6½

FIFTH STAGE
(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
5.101/2	Mechanical Engineering Design	0 — 2
5.302	Theory of Machines	1½— 1
5.303	Mechanical Vibrations*	1½— 0
6.801	Electrical Engineering	1 — 2
8.133	Structures	1 — 1
	Seminar†	0 — 1½
51.011	History *or*	1 — 0
52.011	Philosophy	
		6 — 7½

SIXTH STAGE
(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
5.102	Mechanical Engineering Design	1 — 2
5.321	Automatic Control Engineering	1 — 0
5.502	Fluid Mechanics	1 — 1½
5.702	Thermodynamics	1 — 1½
6.802	Electrical Engineering	1 — 1
	Social Science Elective	1 — 0
		6 — 6

MECHANICAL ENGINEERING—
COMBINED FULL-TIME/PART-TIME COURSE

The Mechanical Engineering course leading to the degree of Bachelor of Science (Technology) may be completed in three years of part-time study and two years of full-time study as follows.

Stage 1 — Part-time (as for the Stage 1 of the B.Sc. (Tech.) course in Mechanical Engineering).

---

* Term 1 only.
† Terms 2 and 3 only.

Stage 2 — Part-time (as for Stage 2 of the B.Sc. (Tech.) course in Mechanical Engineering).
Stage 3A — Full-time (as for Second Year of the full-time course in Mechanical Engineering).
Stage 4A — Full-time (as for Third Year of the full-time course in Mechanical Engineering).
Stage 5A — Part-time (as set out below).

STAGE 5A
(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
5.102	Mechanical Engineering Design	1 — 2
5.303	Mechanical Vibrations*	1½— 0
5.321	Automatic Control Engineering	1 — 0
6.802	Electrical Engineering	1 — 1
		4½— 3

MECHANICAL ENGINEERING—CONVERSION COURSE
(A.S.T.C. Diploma to B.Sc. (Tech.) Degree)

Recent A.S.T.C. diploma holders in Mechanical Engineering may qualify for the degree of Bachelor of Science (Technology) by completing the following course of study. The programme outlined is what will be required of recent diplomates. Diplomates of many years standing may be required to take additional subjects.

FIRST STAGE
(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
1.001/2	Physics I, Part II	1½— 1½
1.212	Physics II(T)	1½— 1½
2.001/2	Chemistry I, Part II	1½— 1½
10.022/2	Mathematics	2 — 0
52.011	Philosophy	1 — 0
		7½— 4½

SECOND STAGE
(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
5.34D	Theory of Machines†	1 — ½
5.45D	Fluid Mechanics†	1 — 2
5.321	Automatic Control Engineering	1 — 0
	Social Science Elective	1 — 0
		4 — 2½

* Term 1 only.
† In 1964 these subjects may be changed.

A.S.T.C. diplomates who completed their course in Mechanical Engineering in 1961 or later years and who wish to qualify for the degree of Bachelor of Engineering by full-time study may do so by completing the subjects of Stages 6 and 7 of the existing part-time Bachelor of Engineering degree course, or their equivalent, in one year.

AERONAUTICAL ENGINEERING—PART-TIME COURSE

This course is of six years duration, and leads to the degree of Bachelor of Science (Technology). For outlines of the first two stages, see the Mechanical Engineering part-time course.

THIRD STAGE
(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
1.212	Physics II	1½— 1½
4.911	Materials Science	1 — 1
5.301	Engineering Mechanics	1½— ½
8.112	Materials and Structures	1½— 1½
10.022/1	Mathematics	1 — 1
		6½— 5½

FOURTH STAGE
(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
5.501	Fluid Mechanics	½— 1½
5.701	Thermodynamics	½— 1½
5.821	Aircraft Strength of Materials	1½— ½
6.801	Electrical Engineering	1 — 2
10.022/2	Mathematics	1 — 1
50.011/1	English Language	1 — 0
		5½— 6½

FIFTH STAGE
(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
5.302	Theory of Machines	1½— 1
5.702	Thermodynamics	1 — 1½
5.811	Aerodynamics	2 — 1
5.822	Aircraft Strength of Materials	1½— ½
50.011/2	English Literature	1 — 0
51.011 / 52.011	History *or* Philosophy	1 — 0
		7½— 4½

SIXTH STAGE
(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
5.812	Aerodynamics*	2½— 1½
5.823	Aircraft Materials and Structures	2 — 1
5.831	Aircraft Propulsion	2 — 0
	Social Science Elective	1 — 0
		7½— 2½

AERONAUTICAL ENGINEERING— COMBINED FULL-TIME/PART-TIME COURSE

The Aeronautical Engineering course leading to the degree of Bachelor of Science (Technology) may be completed in three years of part-time study and two years of full-time study as outlined below.

STAGE 1(A)
(30 weeks full-time course)

		Hours per week for 3 terms lec. lab./tut.
1.001	Physics I	3 — 3
2.001	Chemistry I	3 — 3
5.001	Engineering I	3 — 3
10.001	Mathematics I	4 — 2
		13 —11

STAGE 2(A)**
(24 weeks full-time course)

		Hours per week for 24 weeks lec. lab./tut.
1.212S	Physics	2 — 2½
4.911S	Materials Science	1½— 1½
5.202S	Mechanical Technology	2 — 0
5.301S	Engineering Mechanics	1½— 1
5.501S	Fluid Mechanics	1 — 1½
5.701S	Thermodynamics	1 — 1½
8.112S	Materials & Structures	2 — 2
10.022S	Mathematics	2½— 2½
50.011S	English†	3 — 0
		16½—12½

* Terms 1 and 2 only (2½ — 4½ hours per week for third term).

** Stage 2(A) is the same as the second year of the full-time Mechanical Engineering course.

† Terms 1 and 2 only.

STAGE 3(A)
(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
5.302	Theory of Machines	1½— 1
5.702	Thermodynamics	1 — 1½
5.821	Aircraft Strength of Materials	1½— ½
6.801	Electrical Engineering	1 — 2
		4½— 5½

STAGE 4(A)
(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
5.304S	Theory of Machines*	1 — 1
5.811	Aerodynamics	2 — 1
5.822	Aircraft Strength of Materials	1½— ½
51.011	History *or*	1 — 0
52.011	Philosophy	
	Social Science Elective	1 — 0
		6½— 2½

STAGE 5(A)
(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
5.812	Aerodynamics†	2½— 1½
5.823	Aircraft Materials & Structures	2 — 1
5.831	Aircraft Propulsion	2 — 0
		6½— 2½

AERONAUTICAL ENGINEERING—CONVERSION COURSE

(A.S.T.C. Diploma to B.Sc. (Tech.) Degree)

Recent A.S.T.C. diploma holders in Aeronautical Engineering may qualify for the degree of Bachelor of Science (Technology) by completing the following course of study. The programme outlined is what will be required of recent diplomates. Diplomates of many years standing may be required to take additional subjects.

---

* 24 weeks only.

† Terms 1 and 2 only. (2½—4½ hours per week for third term.)

FIRST STAGE
(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
1.001/2	Physics I, Part II	1½— 1½
1.212	Physics II(T)	1½— 1½
2.001/2	Chemistry I, Part II	1½— 1½
	Social Science Elective	1 — 0
		5½— 4½

SECOND STAGE
(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
5.702	Thermodynamics	1 — 1½
	Aerodynamics (Special)	1½— 1½
	Aircraft Structures (Special)*	1½— 1½
		4 — 4½

NAVAL ARCHITECTURE—PART-TIME COURSE

This course is of six years duration, and leads to the degree of Bachelor of Science (Technology). For outlines of the first two stages, see the Mechanical Engineering part-time course.

THIRD STAGE
(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
1.212	Physics II	1½— 1½
5.901	Naval Architecture	2 — 2
8.112	Materials and Structures	1½— 1½
10.022/1	Mathematics	1 — 1
		6 — 6

FOURTH STAGE
(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
4.911	Materials Science	1 — 1
5.501	Fluid Mechanics	½— 1½
5.902	Naval Architecture	2½— 2½
10.022/2	Mathematics	1 — 0
50.011/1	English Language	1 — 0
		6½— 5½

* 4 hours per week in third term.

FIFTH STAGE

(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
5.502	Fluid Mechanics	1 — 1½
5.701	Thermodynamics	½— 1½
5.903	Naval Architecture	3 — 3
50.011/2	English Literature	1 — 0
51.011 52.011	History *or* Philosophy	1 — 0
		6½— 5½

SIXTH STAGE

(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
5.904	Naval Architecture	3 — 5
6.801	Electrical Engineering	1 — 2
	Social Science Elective	1 — 0
		5 — 7

NAVAL ARCHITECTURE—
COMBINED FULL-TIME/PART-TIME COURSE

The Naval Architecture course leading to the degree of Bachelor of Science (Technology) may be completed in three years of part-time study and two years of full-time study as outlined below.

STAGE 1(A)

(30 weeks full-time course)

		Hours per week for 3 terms lec. lab./tut.
1.001	Physics I	3 — 3
2.001	Chemistry I	3 — 3
5.001	Engineering I	3 — 3
10.001	Mathematics I	4 — 2
		13 —11

STAGE 2(A)

(24 weeks full-time course)

		Hours per week for 24 weeks lec. lab./tut.
1.212S	Physics II	2 — 2½
4.911S	Materials Science	1½— 1½
5.301S	Engineering Mechanics	1½— 1
5.501S	Fluid Mechanics	1 — 1½
5.901	Naval Architecture*	2 — 2
8.112S	Materials and Structures	2 — 2
10.022S	Mathematics	2½— 2½
50.011S	English†	3 — 0
		15½—12½

STAGE 3(A)

(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
5.502	Fluid Mechanics	1 — 1½
5.701	Thermodynamics	½— 1½
5.902	Naval Architecture	2½— 2½
51.011	History *or*	1 — 0
52.011	Philosophy	
		5½— 5½

STAGE 4(A)

(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
5.903	Naval Architecture	3 — 3
6.801	Electrical Engineering	1 — 2
		4 — 5

STAGE 5(A)

(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
5.904	Naval Architecture	3 — 5
	Social Science Elective	1 — 0
		4 — 5

* 30 weeks course.

† Terms 1 and 2 only.

NAVAL ARCHITECTURE—CONVERSION COURSE

(A.S.T.C. Diploma to B.Sc. (Tech.) Degree)

Recent A.S.T.C. diploma holders in Naval Architecture may qualify for the degree of Bachelor of Science (Technology) by completing the following course of study. The programme outlined is what will be required of recent diplomates. Diplomates of many years standing may be required to take additional subjects.

FIRST STAGE
(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
1.001/2	Physics I, Part II	1½— 1½
1.212	Physics II(T)	1½— 1½
2.001/1	Chemistry I, Part I	1½— 1½
2.001/2	Chemistry I, Part II	1½— 1½
		6 — 6

SECOND STAGE
(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
4.911	Materials Science	1 — 1
5.021	Mechanical Technology	1 — 0
10.022/1	Mathematics	1 — 1
10.022/2	Mathematics	1 — 1
	Social Science Elective	1 — 0
		5 — 3

Department of Industrial Engineering

The Department of Industrial Engineering offers a full-time and a part-time course in industrial engineering leading to the degree of Bachelor of Engineering and Bachelor of Science (Technology) respectively. These courses are designed for students with engineering ability whose interests lie in the planning, developing and control of manufacturing operations. Completion of either of these courses gives full exemption from associate membership examinations of the Institution of Engineers, Australia, and the Institution of Production Engineers. Completion of the full-time course is accepted by the Institution of Mechanical Engineers, London, in lieu of all examinations required for associate membership.

The first two years of the full-time course and the first four years of the part-time course provide the student with a sound foundation in the basic science and engineering subjects, and this knowledge is used and extended in the later years in the study of the industrial subjects. Finally, the problems associated with the

practical economics of manufacturing operations are studied. These three fields of study provide the student with the training necessary to carry out an industrial job and to examine it critically in the light of economic efficiency.

Traditional engineering courses do not embrace the problems which are characteristic of industrial engineering. These problems include the analysis of a product to ensure satisfactory functioning with regard to methods and sequence of manufacturing operations; the disposition of buildings and of equipment in relation to buildings to permit efficient handling of materials; the avoidance or elimination of bottlenecks; the related problems of quality and cost control, testing and inspection; labour and personnel relations; and finally, the problem of distribution and sales.

The financial and economic aspects are studied as the problem in manufacturing has not been solved until the final translation of the product into money has been accomplished successfully. While it is not intended to develop an expert in accounting practice or economics it is intended to produce an engineer with an appreciation of the problems of cost and one who can apply considerations of ultimate economy to all industrial problems.

The full-time student gains practical experience in industry during the recess periods in the first, second and third years of the course.

A two-year course leading to a Graduate Diploma is also offered to graduates in engineering and related sciences. Details of this course can be found in Section III of the University Calendar.

The work of the Industrial Engineer

The industrial engineer may initially be employed in any of the four major areas of industrial activity:—

a) Industrial Economic Analysis

One of the principal functions of industrial engineering is to analyse a product, project or process from the economic point of view, in order to ensure that an adequate profit can be obtained from it, as industry cannot survive without profits. A general working knowledge of economics and management skill has to be directed towards the making of decisions on how to operate an enterprise most efficiently. The basis for such decisions is furnished largely by the application of mathematics and statistics to operations research, industrial marketing and other fields affecting all phases of operation of industry.

b) Planning and Control of Production

Manufacturing processes and operations must be planned in detail throughout an enterprise to ensure that they proceed smoothly and economically. Functions in this field include the establishment of production standards, the setting of production targets and, finally, control of quality.

The ultimate responsibility of those in charge of the planning and control of production is to ensure that the goods, as originally specified, perform satisfactorily and are produced when required at an optimum cost.

c) Product and Process Design

The design interest of the industrial engineer goes beyond normal mechanical design to develop a product that will not only function effectively, but also have a pleasing appearance.

Further, the product has to be adapted to suit existing manufacturing equipment, or a manufacturing process has to be developed by means of which an existing product can be manufactured at the right price and at the right quality. The design work of the industrial engineer incorporates also problems of equipment selection and application for both economy and performance.

d) Methods Engineering

Methods engineering is particularly concerned with the coordination of men, materials and machines, so that an enterprise will run at maximum efficiency. A considerable knowledge of engineering in general, as well as an understanding of human factors and materials science, is necessary for methods engineering work. Time and motion study is part of methods engineering. In many cases the methods engineer works in close co-operation with the design department and executives engaged in industrial economic analysis.

Employment in any of the fields mentioned may lead to specialisation in the more mathematical aspects of industrial engineering, such as operations research and systems engineering or it may lead, according to the preference of the student, to a position of responsibility in industrial management.

INDUSTRIAL ENGINEERING—FULL-TIME COURSE

FIRST YEAR

(30 weeks day course)

		Hours per week for 3 terms lec. lab./tut.
1.001	Physics I	3 — 3
2.001	Chemistry I	3 — 3
5.001	Engineering I	3 — 3
10.001	Mathematics I	4 — 2
		13 —11

SECOND YEAR*
(24 weeks day course)

		Hours per week for 24 weeks lec. lab./tut.
1.212S	Physics	2 — 2½
4.911S	Materials Science	1½— 1½
5.202S	Mechanical Technology	2 — 0
5.301S	Engineering Mechanics	1½— 1
5.501S	Fluid Mechanics	1 — 1½
5.701S	Thermodynamics	1 — 1½
8.112S	Materials and Structures	2 — 2
10.022S	Mathematics	2½— 2½
50.011S	English†	3 — 0
		16½—12½

THIRD YEAR*—PASS COURSE
(24 weeks day course)

		Hours per week for 24 weeks lec. lab./tut.
5.101/1	Mechanical Engineering Design	0 — 3
5.302S	Theory of Machines	1½— 1½
6.801S	Electrical Engineering	1½— 2½
10.381S	Statistics	1 — 1
18.111S	Industrial Administration	1 — 0
18.211S	Production Control	2½— 1
18.311S	Methods Engineering	3 — 1
18.411S	Design for Production I	3 — 2
51.011S 52.011S	History *or* Philosophy †	1½— 0
	Social Science Elective†	1½— 0
		16½—11½

FOURTH YEAR*—PASS COURSE
(24 weeks day course)

		Hours per week for 24 weeks lec. lab./tut.
5.304S	Theory of Machines	1 — 1
5.321S	Automatic Control Engineering	1 — ½
6.802S	Electrical Engineering	1½— 1½
14.001/1 14.001/2	Accounting Accounting Control	2 — 2
14.041	Industrial and Commercial Law	1 — 0
18.412S	Design for Production II	1 — 0
18.511S	Industrial Marketing	2 — 2
18.611S	Engineering Economic Analysis	1 — 1
	Humanities — Advanced Elective†	1 — 1
	Minor Thesis	3 — 0
		0 — 3
		14½—12

* Lectures cease at the end of the 4th week of third term.
† Terms 1 and 2 (20 weeks only).

ADDITIONAL FOR HONOURS

THIRD YEAR*—HONOURS COURSE
(24 weeks day course)

		Hours per week for 24 weeks lec. lab./tut.
5.101S/1	Mechanical Engineering Design	0 — 3
5.302S	Theory of Machines	1½— 1½
6.801S	Electrical Engineering	1½— 2½
10.381S	Statistics	1 — 1
12.121S	Psychology	2 — 0
18.111S	Industrial Administration	1 — 0
18.211S	Production Control	2½— 1
18.311S	Methods Engineering	3 — 1
18.411S	Design for Production I	3 — 2
51.011S 52.011S	History *or* Philosophy †	1½— 0
	Social Science Elective†	1½— 0
		18½—11½

FOURTH YEAR**—HONOURS COURSE
(30 weeks day course)

		Hours per week for 24 weeks lec. lab./tut.
5.304S	Theory of Machines	1 — 1
5.322S	Automatic Control Engineering	2½— ½
6.802S	Electrical Engineering	1½— 1½
14.001/1	Accounting	2 — 2
14.001/2	Accounting Control †	1 — 0
14.041	Industrial and Commercial Law	1 — 0
18.412S	Design for Production II	2 — 2
18.511S	Industrial Marketing	1 — 1
18.611S	Engineering Economic Analysis	1 — 1
	Humanities—Advanced Elective†	3 — 0
	Professional Elective	3 — 0
	Thesis and Project**	0 — 1
		18½—10½

DOUBLE DEGREE OF B.SC., B.E. IN INDUSTRIAL ENGINEERING

Full-time students in industrial engineering may qualify for the double degree of Bachelor of Science, Bachelor of Engineering by completing the following course of study over five years.

---

* Lectures cease at end of 4th week of third term.

† Terms 1 and 2 (20 weeks) only.

** 28 hours per week for the final 6 weeks of third term are occupied in work on a thesis and a project.

First Year — Normal first year programme for full-time Industrial Engineering as set out above.

Second Year — As set out below.

		Terms 1 & 2	Term 3 Weeks 1-4	Term 3 Weeks 5-10
1.112	Physic II	8	8	8
4.911S	Materials Science	2½	2½	0
5.301	Engineering Mechanics	2	2	2
5.501	Fluid Mechanics	2	2	2
5.701	Thermodynamics	2	2	2
8.112	Materials and Structures	3	3	3
10.111	Pure Mathematics II†	5	5	5
18.111S	Industrial Administration	2	2	0
50.011	English	2	2	2
		28½	28½	24

Third Year — Two appropriate third year Science subjects (see Science course regulations in the University Calendar), plus 51.011 History or 52.011 Philosophy and a Social Science Elective. In the long vacation following this year students are required to undertake a nine-week period of industrial training.

Fourth Year — Normal third year of the Industrial Engineering course less the Humanities taken in third year.

Fifth Year — Normal fourth year of the Industrial Engineering course.

INDUSTRIAL ENGINEERING—PART-TIME COURSE

This course is of six years' duration, and leads to the degree of Bachelor of Science (Technology).

FIRST STAGE

(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
1.001/1	Physics I, Part I	1½— 1½
2.001/1	Chemistry I, Part I	1½— 1½
5.001/1	Engineering I, Part I	1*— 2*
10.001/1	Mathematics I, Part I	2 — 1
		6 — 6

* Hours for terms 1 and 2 only; in term 3 the three hours per week are devoted to drawing office work in Engineering Drawing.

† 10.121 Pure Mathematics II (Higher) may be substituted by selected students (7 hours per week for three terms).

SECOND STAGE

(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
1.001/2	Physics I, Part II	1½ — 1½
2.001/2	Chemistry I, Part II	1½ — 1½
5.001/2	Engineering I, Part II	2 — 1
10.001/2	Mathematics I, Part II	2 — 1
		7 — 5

THIRD STAGE

(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
1.212	Physics	1½ — 1½
5.301	Engineering Mechanics	1½ — ¾
8.112	Materials and Structures	1½ — 1½
10.022/1	Mathematics	1 — 1
18.111/1	Industrial Administration, Part I	1 — 0
50.011/1	English Language	1 — 0
		7½ — 4½

FOURTH STAGE

(30 weeks part-time course)

		Hours per week for 3 terms lec. lab./tut.
4.911	Materials Science	1 — 1
5.101/1	Mechanical Engineering Design	0 — 2
5.501	Fluid Mechanics	¾ — 1¼
5.701	Thermodynamics	¾ — 1¼
10.022/2	Mathematics	1 — 1
18.111/2	Industrial Administration, Part II	1 — 0
50.011/2	English Literature	1 — 0
		5½ — 6½

FIFTH STAGE

(30 weeks part-time course)

		Hours per week for— Terms 1 & 2 lec. lab./tut.	Term 3 lec. lab./tut.
5.302	Theory of Machines	1½ — 1	1½ — 1
6.801	Electrical Engineering	1 — 2	1 — 2
10.381S	Statistics*	2 — 0	2 — 0
18.221	Production Control	1½ — 0	2 — 1
18.421	Design for Production I	1 — 1	2 — 1
51.011	History *or*	1 — 0	1 — 0
52.011	Philosophy		
		8 — 4	9½ — 5

* 24 weeks only.

SIXTH STAGE

(30 weeks part-time course)

		Hours per week for— Term 1 lec. lab./tut.	Terms 2 & 3 lec. lab./tut.
5.321	Auto. Control Engineering	1 — 0	1 — 0
6.802	Electrical Engineering	1 — 1	1 — 1
18.321	Methods Engineering	1 — 1	1 — 1
18.422	Design for Production II	1 — 1	2 — 1
18.521	Industrial Marketing	1 — 0	1 — 0
18.621	Engineering Economics	2 — 1	1 — 1
	Social Science Elective	1 — 0	1 — 0
		8 — 4	8 — 4

INDUSTRIAL ENGINEERING—

COMBINED FULL-TIME/PART-TIME COURSE

The Industrial Engineering course leading to the degree of Bachelor of Science (Technology) may be completed in three years of part-time study and two years of full-time study as follows:

Stage 1 — Part-time (as for Stage 1 of the B.Sc. (Tech.) course in Industrial Engineering).

Stage 2 — Part-time (as for Stage 2 of the B.Sc. (Tech.) course in Industrial Engineering).

Stage 3A — Full-time (as for Second Year of the full-time course in Industrial Engineering).

Stage 4A — Full-time (as for Third Year of the full-time course in Industrial Engineering).

Stage 5A — Part-time (as set out below).

STAGE 5A

(30 weeks part-time course)

		Hours per week for— Term 1 lec. lab./tut.	Terms 2 & 3 lec. lab./tut.
5.321	Auto. Control Engineering	1 — 0	1 — 0
6.802	Electrical Engineering	1 — 1	1 — 1
18.422	Design for Production II	1 — 1	2 — 1
18.521	Industrial Marketing	1 — 0	1 — 0
18.621	Engineering Economics	2 — 1	1 — 1
	Social Science Elective	1 — 0	1 — 0
		7 — 3	7 — 3

Text and Reference Books, 1963

SCHOOL OF CIVIL ENGINEERING

5.001 Engineering I

Parts A, B and C

See School of Mechanical Engineering.

D. Engineering Mechanics

Text Books

Hall: *Construction of Graphs and Charts.*
Hall and Archer: *Engineering Mechanics Lecture Notes.*

Reference Books

Rule and Watts: *Engineering Mechanics.*
Timoshenko and Young: *Engineering Mechanics.*

8.112 Materials and Structures

Reference Books

Timoshenko & MacCulloch: *Elements of Strength of Materials.*
Shanley: *Strength of Materials.*
Timoshenko: *Strength of Materials.* Vol. 1.
Davis, Troxell and Wiskocil: *Testing & Inspection of Engineering Materials.*
Salmon: *Materials & Structures.* Vol. 1.
Beaumont: *Mechanical Testing of Metallic Materials.*
Williams: *Hardness and Hardness Measurements.*
Gilkey, Murphy & Bergman: *Materials Testing.*
Stanford: *The Creep of Metals and Alloys.*
Jastrzeleski: *Nature and Properties of Engineering Materials.*
British Standards Handbook No. 13: *Mechanical Tests for Metals*
Timoshenko: *Strength of Materials.* Vol. II.

8.121 and 8.122 Structures

Text Books

S.A.A. Interim Code Nos. 350, 351, 352.
S.A.A. Code CA2—1958.

Reference Books

Stewart: *Practical Design of Simple Steel Structures.* Vols. I and II.
Grinter: *Design of Modern Steel Structures.*
Grinter: *Elementary Structural Analysis & Design.*
Gray & Others: *Steel Designer's Manual.*
Wilbur & Norris: *Elementary Structural Analysis*
Pippard & Baker: *Analysis of Engineering Structures*
Sutherland & Rees: *Introduction to Reinforced Concrete Design.*
Peabody: *The Design of Reinforced Concrete Structures.*
Fisher-Cassie: *Structural Analysis.*
Ferguson: *Reinforced Concrete Fundamentals.*

8.123 Structures

Text Books

S.A.A. Interim Code Nos. 350, 351, 352.

Reference Books

Stewart: *Practical Design of Simple Steel Structures.* Vols. I and II.
Grinter: *Design of Modern Steel Structures.*
Grinter: *Elementary Structural Analysis & Design.*
Gray & Others: *Steel Designer's Manual.*
Wilbur & Norris: *Elementary Structural Analysis.*

8.131 and 8.132 Structures

Reference Books

Hoff: *The Analysis of Structures.*
Lin: *Design of Pre-Stressed Concrete Structures.*
Pearson & Others: *Timber Engineering Design Handbook.*
Timoshenko & Young: *Theory of Structures.*
Parcel & Norman: *Analysis of Statically Indeterminate Structures.*
Ferguson: *Reinforced Concrete Fundamentals.*

8.141 and 8.142 Engineering Computations

Reference Books

Salvadori & Baron: *Numerical Methods in Engineering.*
Hall: *Construction of Graphs and Charts.*
Hartree: *Numerical Analysis.*
Shaw: *Relaxation Methods.*

8.211 Materials for Architects

Text Book

A.C.I. Manual of Concrete Inspection.

Reference Books

Davis, Troxell & Wiskocil: *Testing and Inspection of Engineering Materials.*
Withey and Washa: *Materials of Construction.*
British Standards Handbook No. 13: *Mechanical Tests for Metals.*
British Standards Handbook No. 2846: *Reduction Presentation of Experimental Results.*
U.S. Bureau of Reclamation: *Concrete Manual.*
Murdock: *Concrete Materials and Practice.*

8.221 Engineering Materials

Text Books

Troxell and Davis: *Composition and Properties of Concrete;* and
Taylor: *Fundamentals of Soil Mechanics;* or
Terzaghi and Peck: *Soil Mechanics in Engineering Practice.*

Reference Books

Terzaghi: *Theoretical Soil Mechanics.*
U.S. Bureau of Reclamation: *Concrete Manual.*
Murdock: *Concrete Materials and Practice.*
Blanks and Kennedy: *The Technology of Cement and Concrete.* Vol. I.
Lea: *The Chemistry of Cement and Concrete.*
H.M.S.O. Publication: *Soil Mechanics for Road Engineers.*
Bishop & Henkel: *Triaxial Testing of Soils.*

8.222 and 8.223 Engineering Materials

Text Books

Troxell & Davis: *Composition & Properties of Concrete.*
Terzaghi and Peck: *Soil Mechanics in Engineering Practice.*

Reference Books

U.S. Bureau of Reclamation: *Concrete Manual.*
Houwink: *Elasticity, Plasticity and Structure of Matter.*
Terzaghi: *Theoretical Soil Mechanics.*
Murdock: *Concrete Materials and Practice.*
H.M.S.O. Publication: *Soil Mechanics for Road Engineers.*
Bishop & Henkel: *Triaxial Testing of Soils.*
U.S. Bureau of Reclamation: *Earth Manual,* 1960.
Hetenyi: *Handbook of Experimental Stress Analysis.*
Jessop & Harris: *Photo-Elasticity—Principles and Practice.*
Charlton: *Model Analysis of Structures.*
Mills, Haywood & Radar: *Materials of Construction.*
Wallis: *Australian Timber Handbook.*
Timoshenko: *Strength of Materials.* Vol. II.

8.241 Soil Mechanics

Text Books

Taylor: *Fundamentals of Soil Mechanics;* or
Terzaghi & Peck: *Soil Mechanics in Engineering Practice.*

Reference Books

Terzaghi: *Theoretical Soil Mechanics.*
H.M.S.O. Publication: *Soil Mechanics for Road Engineers.*
Bishop & Henkel: *Triaxial Testing of Soils.*

8.251 Properties of Materials

Text Book

Davis, Troxell and Wiskocil: *Testing and Inspection of Engineering Materials.*

Reference Books

Salmon: *Materials and Structures.* Vol. I.
Beaumont: *Mechanical Testing of Metallic Materials.*
Williams: *Hardness and Hardness Measurements.*
Gilkey, Murphy & Bergman: *Materials Testing.*
Stanford: *The Creep of Metals and Alloys.*
Jastrzeleski: *Nature and Properties of Engineering Materials.*

8.411 Surveying

Text Book

Glendenning: *Principles of Surveying.*

Reference Book

Clarke: *Plane and Geodetic Surveying.*

8.421 Surveying

Text Book

Clarke: *Plane and Geodetic Surveying.* Vol. I.

Reference Book

Kissam: *Surveying for Civil Engineers.*

8.422 and 8.423 Surveying

Text Books

Clarke: *Plane and Geodetic Surveying.*
Bertil Hallert: *Photogrammetry.*

Reference Books

Bannister and Raymond: *Surveying.*
Sandover: *Plane Surveying.*
Kissam: *Surveying for Civil Engineers.*
Chapman: *Astronomy for Surveyors.*
Schwidefski: *Outline of Photogrammetry.*
Hart: *Air Photography Applied to Surveying.*
U.S. Manual of Photogrammetry.

8.521 and 8.522 Hydraulics

Text Books

Rouse: *Elementary Mechanics of Fluids.*
Vennard: *Elementary Fluid Mechanics*

Reference Books

Rouse: *Engineering Hydraulics.*
Addison: *Hydraulic Measurements.*
Dodge & Thompson: *Fluid Mechanics.*
Barna: *Fluid Mechanics for Engineers.*
Vallentine: *Applied Hydro-Dynamics.*
Streeter: *Fluid Dynamics.*
Davis: *Handbook of Applied Hydraulics.*

8.611 Civil Engineering

Text Books

Fair & Geyer: *Water Supply and Waste-Water Disposal;* and
Linsley, Kohler and Paulhus: *Hydrology for Engineers;* or
Wisler and Brater: *Hydrology.*

Reference Books

Steel: *Water Supply & Sewerage.*
Babbitt and Doland: *Water Supply Engineering.*
Phelps: *Public Health Engineering.*
Imhoff & Fair: *Sewage Treatment.*
Imhoff, Muller & Thistlethwaite: *Disposal of Sewage and Other Water Borne Wastes.*
Francis: *Sewage Treatment.*
Phelps: *Stream Sanitation.*
Timm: *An Introduction to Chemistry.*
Linsley, Kohler & Paulhus: *Applied Hydrology.*
Linsley, Kohler & Paulhus: *Hydrology for Engineers.*
Wisler & Brater: *Hydrology.*
Petterson: *Meteorology.*
Haurwitz: *Meteorology.*
Haurwitz: *Climatology.*
Griffith Taylor: *Australia.*
Johnstone & Cross: *Elements of Applied Hydrology.*
Butler: *Engineering Hydrology.*
Commonwealth Bureau of Meteorology—Bulletin No. 1:—*The Climate and Meteorology of Australia.*
Commonwealth Dept. of Civil Aviation: *Manual of Meteorology.*
American Society of Civil Engineers: *Hydrology Handbook.*

8.612 and 8.613 Civil Engineering

Text Books

Antill & Ryan: *Civil Engineering Construction.*
Ryan: *Engineering Administration.*

Reference Books

Creager, Justin & Hynes: *Engineering for Dams.*
Ackerman & Locker: *Construction Planning and Equipment.*
Houk: *Irrigation Engineering.*
Goldman: *Financial Engineering.*

8.613S Civil Engineering

Text Books

Antill & Ryan: *Civil Engineering Construction.*
Ryan: *Engineering Administration.*

Reference Books

Du Platt Taylor: *Docks, Wharves & Piers.*
Webb: *Railroad Constructions.*
Houk: *Irrigation Engineering.*
Creager, Justin & Hynes: *Engineering for Dams.*
Ackerman & Locker: *Construction Planning and Equipment.*
Creager & Justin: *Hydro-Electric Handbook.*
Fair & Geyer: *Water Supply & Waste Water Disposal.*

8.63A and 8.66A Engineering Construction

Text Book

Antill & Ryan: *Civil Engineering Construction.*

Reference Books

Ryan: *Engineering Administration.*
Ackerman & Locker: *Construction Planning and Equipment.*
Creager, Justin & Hynes: *Engineering for Dams.*

8.66B Engineering Administration

Text Book

Ryan: *Engineering Administration.*

Reference Books

Goldman: *Financial Engineering.*
Antill & Ryan: *Civil Engineering Construction.*

8.63B Hydrology

Reference Books

Linsley, Kohler & Paulhus: *Applied Hydrology.*
Linsley, Kohler & Paulhus: *Hydrology for Engineers.*
Wisler & Brater: *Hydrology.*
Johnstone & Cross: *Elements of Applied Hydrology.*
Butler: *Engineering Hydrology.*
Commonwealth Bureau of Meteorology—Bulletin No. 1:—*The Climate and Meteorology of Australia.*
Commonwealth Dept. of Civil Aviation: *Manual of Meteorology.*

8.811 and 8.812 Surveying

Text Book

Clarke: *Plane & Geodetic Surveying.* Vols. I and II.

8.821 and 8.822 Geodesy

Text Books

Bomford: *Geodesy.*
Clarke: *Plane & Geodetic Surveying.* Vol. II.
Rainsford: *Survey Adjustments and Least Squares.*

Reference Books

Tienstra: *Theory of Adjustment of Normally Distributed Observations.*
Weatherburn: *Differential Geometry.* Vols. I and II.
Whittaker & Robinson: *Calculus of Observations.*

8.831 and 8.832 Astronomy

Text Books

Rocklofs: *Astronomy Applied to Land Surveying.*
Shortride: *Tables of Logarithms of Sines and Tangents.*
Current Edition of *Star Almanac for Land Surveyors.*

Reference Book

Current edition of *Table of Fundamental Stars.*

8.841 and 8.842 Surveying Computations

A table of six-figure natural values of sines, cosines, tangents, etc. for every 10 seconds of arc.

8.851 and 8.852 Photogrammetry

Text Book

Hallert: *Photogrammetry.*

Reference Books

Manual of Photogrammetry.
Schwidefsky: *Photogrammetry.*
Von Gruber: *Photogrammetry.*

8.872 Land Utilisation

Text Book

Murray: *Principles and Practice of Land Valuation.*

8.881 Survey Laws and Regulations

Text Book

Willis: *Survey Investigations.*

Reference Books

Helmore: *Millard's Law of Real Property in N.S.W.*
Baalman & Wells: *Land Titles Office Practice.*

SCHOOL OF ELECTRICAL ENGINEERING

6.101 Electric Circuit Theory

Text Books

Timbie and Bush: *Principles of Electrical Engineering* (4th ed. Wiley); and
C.R.C. Standard Mathematical Tables (Chemical Rubber Publishing Company); or
Mathematical Tables and Formulas. Compiled by H. S. Burington (McGraw-Hill).

Reference Books

Strong: *Electrical Engineering* (Wiley).
Frank: *Electrical Measurement Analysis* (McGraw-Hill).
Scott: *Linear Circuits Part I—Time Domain Analysis* (Addison Wesley).
Middendorf: *Analysis of Electric Circuits* (Wiley).
McGreevy: *The M.K.S. System of Units* (Pitman).
M.I.T.: *Electric Circuits* (Wiley).
Corcoran and Reed: *Introducing Electrical Engineering* (Wiley).

6.102S and 6.152 Electric Circuit Theory

Text Books

Lepage and Steely: *General Network Analysis* (McGraw-Hill).
C.R.C. Standard Mathematical Tables (Chemical Rubber Publishing Company); or
Mathematical Tables and Formulas. Compiled by H. S. Burington (McGraw-Hill).

Reference Books

Guillemin: *Introductory Circuit Theory* (Wiley).
Seshu and Balabanian: *Linear Network Analysis* (Wiley).
Cheng: *Analysis of Linear Systems* (Addison Wesley).
Scott: *Linear Circuits Part I—Time Domain Analysis* (Addison Wesley).
Scott: *Linear Circuits Part II—Time Domain Analysis* (Addison Wesley).
Fich and Potter: *Theory of A.C. Circuits* (Prentice Hall).
Brenner and Javid: *Analysis of Electrical Circuits* (McGraw-Hill).
Gardner and Barnes: *Transients in Linear Systems* (Wiley).
Legros and Martin: *Transform Calculus for Electrical Engineers* (Prentice Hall).
Frank: *Electrical Measurement Analysis* (McGraw-Hill).

6.201S and 6.251 Electric Power Engineering

Text Book

Fitzgerald and Kingsley: *Electric Machinery* (McGraw-Hill).

Reference Books

Draper: *Electrical Machines* (Longmans).
Clayton: *Design and Performance of D.C. Machines* (Pitman).
Say: *Design and Performance of A.C. Machines* (Pitman).
M.I.T.: *Magnetic Circuits and Transformers* (Wiley).
Skilling: *Electromechanics* (Wiley).

6.301S and 6.351 Electronics

Text Books

Gray: *Applied Electronics* (Wiley) or
Ryder: *Engineering Electronics* (McGraw-Hill).
Joyce and Clarke: *Transistor Circuit Analysis* (Addison Wesley) or
Wolfendale: *The Junction Transistor and its Applications* (Heywood).

Reference Books

Shea: *Transistor Circuit Engineering* (Wiley).
Terman: *Electronic and Radio Engineering* (4th ed. McGraw-Hill).
RCA Electron Tube Handbook HB.3.
AWV Transistor Data Book.
RCA Semiconductor Products Handbook HB 10
Miniwatt Techical Data Book (7th Ed.).
Mullard Receiver Manual Transistor Circuits.
U.S. Army — *Basic Theory and Application of Transistors.*
Hunter: *Handbook of Semiconductor Electronics,* 1962 (McGraw-Hill).

6.501 Electrical Engineering (Honours)

Text Books

No specified texts.

Reference Books

Soroka: *Analog Methods in Computation and Simulation* (McGraw-Hill).
Karplus: *Analog Simulation* (McGraw-Hill).

6.001S and 6.051 Electrical Engineering

Note: 6.051 includes only the sections marked*.

CIRCUIT THEORY SECTION:—

Text Book

Van Valkenburg: *Introduction to Modern Network Synthesis* (Wiley).

Reference Books

Guillemin: *Synthesis of Passive Networks* (Wiley).
Truxal: *Control System Synthesis* (McGraw-Hill).
Kuh and Pederson: *Principles of Circuit Synthesis* (McGraw-Hill).

ELECTRONICS SECTION:—

Text Book

Kretzmann: *Industrial Electronics Handbook* (Philips Technical Library).

Reference Books

Westinghouse Electric Corp.: *Industrial Electronics Reference Book.*
Milnes: *Transductors and Magnetic Amplifiers* (Macmillan).
Cockrell: *Industrial Electronics Handbook* (McGraw-Hill).

*CONTROL SYSTEMS SECTION:—

Text Book

Bower and Schultheiss: *Introduction to the Design of Servomechanisms* (Wiley).

Reference Books

Chestnut and Mayer: *Servomechanisms and Regulating System Design.* Vol. I (Wiley).
Brown and Campbell: *Principles of Servomechanisms* (Wiley).
Porter: *Introduction to Servomechanisms* (Methuen).
West: *Servomechanisms* (E.U.P.).

*PHYSICAL ELECTRONICS SECTION:—

Text Book

Van Der Ziel: *Solid State Physical Electronics* (Prentice Hall).

Reference Books

Valdes: *Physical Theory of Transistors* (McGraw-Hill).
Ridenour: *Modern Physics for the Engineer* (McGraw-Hill).
Dunlap and Crawford: *An Introduction to Semiconductors* (Wiley).
Middelbrook: *An Introduction to Junction Transistor Theory* (Wiley).
Hunter: *Handbook of Semiconductor Electronics* (McGraw-Hill), 1962.

*MEASUREMENTS SECTION:—

Text Book

Stout: *Basic Electrical Measurements* (Prentice Hall), 2nd Ed.

Reference Books

Terman and Pettit: *Electronic Measurements* (McGraw-Hill).
Harris: *Electrical Measurements* (Wiley).

6.502 Electrical Engineering (Honours)

Text Books

No specified texts.

Reference Books

Pestarini: *Metadyne Statics* (Wiley).
Kron: *Tensor Analysis* (Wiley).
Lyon: *Transient Analysis of A.C. Machinery* (Wiley).
Caldwell: *Switching Circuits and Logical Design* (Wiley).
Goldman: *Information Theory* (Constable).

6.202S and 6.252 Power Systems

Text Books

Starr: *Generation, Transmission and Utilisation of Electrical Power.* (Pitman).
Stevenson: *Elements of Power System Analysis* (McGraw-Hill), 2nd Ed., 1962.
M.I.T.: *Magnetic Circuits and Transformers* (Wiley).

Reference Books

Westinghouse Electric Corp. *Electrical Transmission and Distribution Reference Book.*
Kimbark: *Power System Stability.* Vols. I, II and III (Wiley).

6.212S and 6.262 Electrical Machines

Text Books

Fitzgerald and Kinsley: *Electric Machinery* (McGraw-Hill).
Draper: *Electrical Machines* (Longmans).

Reference Books

Wood: *Theory of Electrical Machines* (Butterworth).
Clayton: *Performance and Design of D.C. Machines* (Pitman).
Say: *Performance and Design of A.C. Machines* (Pitman).
Taylor: *Performance and Design of A.C. Commutator Motors* (Pitman).
Adkins: *The General Theory of Electrical Machines* (Chapman and Hall).

6.401S and 6.451 Utilisation and Control of Electric Plant

Text Book

Fitzgerald and Kingsley: *Electric Machinery* (McGraw-Hill).

Reference Books

UTILISATION SECTION:—

Draper: *Electrical Machines* (Longmans).
Taylor: *Performance and Design of A.C. Commutator Motors* (Pitman).
White and Woodson: *Electromechanical Energy Conversion* (Wiley).
Kimbark: *Power System Stability.* Vol. III (Wiley).
Clarke: *Circuit Analysis of A.C. Power Systems.* Vol. I. (Wiley).
Tustin: *Direct Current Machines for Control Systems* (Sporn).

CONTROL SECTION:—

Bower and Schultheiss: *Introduction to the Design of Servomechanisms.* (Wiley).

Chestnut and Mayer: *Servomechanisms and Regulating System Design.* Vol. I, 2nd Ed. & Vol. II (Wiley).
Bruns and Saunders: *Analysis of Feedback Control Systems* (McGraw-Hill).
Korn and Korn: *Electronic Analog Computers* (McGraw-Hill).
Warfield: *Introduction to Electronic Analog Computers* (Prentice Hall).
Wass: *An Introduction to Electronic Analogue Computers* (Pergamon).
Gille: *Feedback Control Systems* (McGraw-Hill).
Truxall: *Control Engineering Handbook* (McGraw-Hill).
Taylor: *Servomechanisms* (Longmans).

6.322S and 6.372 Applied Electronics

Text Books

Millman and Taub: *Pulse and Digital Circuits* (McGraw-Hill).
Joyce and Clark: *Transistor Circuit Engineering* (Addison Wesley).

Reference Books

Arguimbau: *Vacuum Tube Circuits and Transistors* (Wiley).
Martin: *Electronic Circuits* (Prentice Hall).
Landee, Davis and Albrecht: *Electronic Designer's Handbook* (McGraw-Hill).
Shea: *Transistor Circuit Engineering* (Wiley).
Wolfendale: *The Junction Transistor and its Applications* (Macmillan).
Hunter: *Handbook of Semiconductor Electronics* (McGraw-Hill), 1962

6.302S Communications. A.

Text Books

Joyce and Clarke: *Transistor Circuit Engineering* (Addison Wesley).
Terman: *Electronic and Radio Engineering* (4th Ed. McGraw-Hill).
Radiotron Designers Handbook (A.W.V. Co.).
Wolfendale: *The Junction Transistor and its Applications* (Macmillan).

Reference Books

Sturley: *Radio Receiver Design* (Chapman Hall).
R.C.A. Receiving and Transmitting Tube Handbook (H.B. 3).
S.T.C. Receiving and Transmitting Tube Handbook.
Philips Transistor Data.
Terman: *Radio Engineer's Handbook* (McGraw-Hill).
Fraser: *Telecommunications.*
Strauss: *Wave Generation and Shaping* (McGraw-Hill).
Millman and Taub: *Pulse and Digital Circuits* (McGraw-Hill)
Bevitt: *Transistor Handbook* (Prentice Hall).
Shea: *Principles of Transistor Circuits* (Wiley).
Shea: *Transistor Circuit Engineering* (Wiley).
Williams: *Antenna Theory and Design* (Pitman).
Arguimbau: *Vacuum Tube Circuits and Transistors* (Wiley).
Hunter: *Handbook of Semiconductor Electronics* (McGraw-Hill), 1962.
Jasik: *Antenna Engineering Handbook*, (McGraw-Hill), 1961.

6.312S Communications. B.

Text Books

Kimbark: *Electrical Transmission of Power and Signals* (Wiley).
Starr: *Telecommunications* (Pitman).

Reference Books

Cohen: *A Handbook of Telecommunications* (Pitman).
Attwood: *Electric and Magnetic Fields* (Wiley).
Von Hippel: *Dielectric Materials and Applications* (Chapman and Hall).

Von Hippel: *Dielectrics and Waves* (Chapman and Hall).
Klewe: *Interference Between Power Systems and Telecommunication Lines* (Arnold).
Schmidt and Marlies: *Principles of High Polymer Theory and Practice* (McGraw-Hill).
Kaden: *Wirbelstrome und Schirmung in der Nachrichtentechnik* (Springer-Verlag).
Ehlers and Lau: *Kabel-Herstellung* (in German) (Springer-Verlag).
Hancock: *An Introduction to the Principles of Communication Theory* (McGraw-Hill).

6.352 and 6.362 Communications

Text Books

Terman: *Electronic and Radio Engineering* (4th Ed. McGraw-Hill).
Radiotron Designers' Handbook (A.W.V. Co. Ed. Langford Smith).
Wolfendale: *The Junction Transistor and its Applications* (Macmillan).
Joyce and Clarke: *Transistor Circuit Analysis* (Addison Wesley)

Reference Books

Sturley: *Radio Receiver Design* (Chapman Hall).
R.C.A. Receiving Tube Manual (HB3).
A.W.V. Transistor Data Book.
Bronwell and Bean: *Theory and Application of Microwaves* (McGraw-Hill).
Millman and Taub: *Pulse and Digital Circuits* (McGraw-Hill).
Chance et al.: (M.I.T. Series, Vol. 19): *Waveforms* (McGraw-Hill).
Fink: *Radar Engineering* (McGraw-Hill).
Harvard: *Very High Frequency Techniques,* Vols. I and II (McGraw-Hill).
M.I.T.: *Principles of Radar* (3rd Ed. McGraw-Hill).
Ramo and Whinnery: *Fields and Waves in Modern Radio* (Wiley).
C.S.I.R.: *A Textbook of Radar* (Angus and Robertson).
Jasik: *Antenna Engineering Handbook* (McGraw-Hill), 1961.
Hunter: *Handbook of Semiconductor Electronics* (McGraw-Hill), 1962.

DIPLOMA AND CONVERSION COURSES

6.101 Electric Circuit Theory

As for 6.101 (Degree Course).

6.152 and 6.13B Electric Circuit Theory

As for 6.102S-6.152 (Degree Course).

6.23A Electric Power Engineering

Text Books

No specified texts.

Reference Books

As for 6.201S-6.251 (Degree Course).

6.23B Electric Power Engineering

As for 6.201S-6.251 (Degree Course)

6.303B Electronics

As for 6.301S-6.351 (Degree Course).

6.354 Radio Engineering

As for 6.302S (Degree Course).

6.255 Power Systems

As for 6.202S-6.252 (Degree Course) with the following additions:—

Reference Books

Say: *Magnetic Amplifiers and Saturable Reactors* (Pitman).
Tustin: *D.C. Machines for Control Systems* (Sporn).
Blume: *Transformer Engineering* (Wiley).

6.265 Electric Machines

As for 6.212S-6.262 (Degree Course).

6.355 Radio Communications

As for 6.302S (Degree Course).

6.365 Pulse and High Frequency Techniques

Text Books

No specified texts.

Reference Books

Bronwell and Bean: *Theory and Application of Microwaves* (McGraw-Hill).
C.S.I.R.: *A Textbook of Radar* (Angus and Robertson).
Millman and Taub: *Pulse and Digital Circuits* (McGraw-Hill).
Chance et al.: *Waveform*, M.I.T. Series Vol. 19 (McGraw-Hill).
Fink: *Radar Engineering* (McGraw-Hill).
Harvard: *Very High Frequency Techniques*, Vols. I and II (McGraw-Hill).
M.I.T.: *Principles of Radar* (3rd Ed. McGraw-Hill).
Ramo and Whinnery: *Fields and Waves in Modern Radio* (Wiley).
Strauss: *Wave Generation and Shaping* (McGraw-Hill).

6.001A Electrical Engineering

As for 6.001S (Degree Course): *Electronics and Physical Electronics Sections only.*

6.001B Electrical Engineering

As for 6.001S (Degree Course): *Measurement Section only.*

6.001C Electrical Engineering

As for 6.001S (Degree Course): *Control Systems and Circuit Theory Sections only.*

SERVICING SUBJECTS

6.801 and 6.802 Electrical Engineering

Text Book

Fitzgerald and Higginbotham: *Basic Electrical Engineering* (McGraw-Hill), 2nd Ed.

SCHOOL OF MECHANICAL ENGINEERING

5.001 Engineering I

A. Descriptive Geometry

Reference Book

Abbott: *Practical Geometry and Engineering Graphics.*

B. Engineering Drawing

Text Books

Union Store: *Exercises in Engineering Drawing,* 2nd Ed.
Institution of Engineers, Australia: *Australian Standard Engineering Drawing Practice* (c.z.1).

C. Mechanical Technology

Text Book

Wright Baker: *Modern Workshop Technology, Pt. 1.*

D. Engineering Mechanics

See School of Civil Engineering.

MECHANICAL ENGINEERING DESIGN

5.101/1 Mechanical Engineering Design

Text Book

Phelan: *Fundamentals of Mechanical Design.*

Reference Books

Aust. Standard: *Engineering Practice,* 1951.
Faires: *Design of Machine Elements.*
Marks: *Mechanical Engineer's Handbook.*
Kent: *Mechanical Engineer's Handbook—Design and Production.*
Limits and Fits for Engineering, BS 1916, Part 1, 1953.
Guide to the Selection of Fits, BS 1916, Part 2, 1953.

5.101/2 Mechanical Engineering Design

Text Books

Same as 5.101/1, plus
Crane and Hoist Code, C.B.2 1960.
Machine Cut Helical and Spur Gears BS 436, 1940.

Reference Books

Same as 5.101/1,plus
Regulations under Scaffolding and Lifts Act 1912-1958.
Machine Cut Gears — Worm Gearing, BS 721, 1937.

5.101S Mechanical Engineering Design

Text Books

Same as 5.101/2.

Reference Books

Same as 5.101/2.

5.103S Mechanical Engineering Design

Text Book

Same as 5.101/1.

Reference Books

Same as 5.101/1, plus
Jones and Horton: *Ingenious Mechanisms for Designers and Inventors*, 3 Vols.
Marin: *Mechanical Behaviour of Engineering Materials.*

5.102 Mechanical Engineering Design

Text Books

Same as 5.101/1 plus
Licthy: *Internal Combustion Engines*, 6th Ed.

Reference Books

Same as 5.101/1 plus
Purday: *Diesel Engine Design*, 5th Ed.
Heldt: *High Speed Combustion Engines.*
Armstrong-Hartman: *The Diesel Engine.*
Ricardo: *High Speed Internal Combustion Engines.*
Marin: *Mechanical Behaviour of Engineering Materials.*

MECHANICAL TECHNOLOGY

5.201 and 5.202S Mechanical Technology

Reference Book

Crane: *Plastic Working of Metals.*

5.203 and 5.204S Mechanical Technology

Text Book

Wright Baker: *Modern Workshop Technology*, Part II.

APPLIED MECHANICS AND THEORY OF MACHINES

5.301 and 5.301S Engineering Mechanics

Text Book

Beer and Johnston: *Mechanics for Engineers.*

Reference Books

Timoshenko and Young: *Engineering Mechanics.*

5.302 and 5.302S Theory of Machines

Text Book

Hirschhorn: *Kinematics and Dynamics of Plane Mechanisms.*

Reference Books

Mabie and Ocvirk: *Mechanisms and Dynamics of Machinery.*
Rosenauer and Willis: *Kinematics of Mechanisms.*
Holowenko: *Dynamics of Machinery.*
Rothbart: *Cams.*
Buckingham: *Analytical Mechanics of Gears.*

5.303 Mechanical Vibrations

Text Book

Church: *Mechanical Vibrations.*

Reference Books

Den Hartog: *Mechanical Vibrations.*
Burton: *Vibration and Impact.*

5.304S Theory of Machines

Text Book

Church: *Mechanical Vibrations.*

Reference Books

Den Hartog: *Mechanical Vibrations.*
Burton: *Vibration and Impact.*
Holowenko: *Dynamics of Machinery.*
Mabie and Ocvirk: *Mechanisms and Dynamics of Machinery.*

5.305S Theory of Machines

Text Books

Church: *Mechanical Vibrations.*
Holowenko: *Dynamics of Machinery.*
Hirschhorn: *Kinematics and Dynamics of Plane Mechanisms.*

Reference Books

Den Hartog: *Mechanical Vibrations.*
Burton: *Vibrations and Impact.*
Mabie and Ocvirk: *Mechanisms and Dynamics of Machinery.*

AUTOMATIC CONTROL ENGINEERING

5.321 and 5.321S Automatic Control Engineering

Reference Books

Eckman: *Automatic Process Control.*
Raven: *Automatic Control Engineering.*

5.322S Automatic Control Engineering (Honours)

Text Book

Raven: *Automatic Control Engineering.*

Reference Books

Eckman: *Automatic Process Control.*
Chestnut and Mayer: *Servomechanisms and Regulating System Design,* Vol. I.
Nixon: *Principles of Automatic Controls.*
Ahrendt and Taplin: *Automatic Feedback Control.*

NUMERICAL ANALYSIS

5.401S Numerical Analysis

Reference Books

Mickley, Sherwood and Reed: *Applied Mathematics in Chemical Engineering.*
Hall: *The Construction of Graphs and Charts.*
Nielsen: *Methods in Numerical Analysis.*
Stanton: *Numerical Methods for Science and Engineering.*

5.501 and 5.501S Fluid Mechanics

Text Books

Barna: *Fluid Mechanics for Engineers;* or
Streeter: *Fluid Mechanics,* 2nd Ed. or
Vennard: *Elementary Fluid Mechanics.*

Reference Books

Addison: *Hydraulic Measurements.*
Brenkert: *Elementary Theoretical Fluid Mechanics.*
Francis: *Fluid Mechanics.*
B.S. 1042 — *Flow Measurement.*

5.502 Fluid Mechanics

Text Books

Barna: *Fluid Mechanics for Engineers,* or
Shapiro: *Dynamics and Thermodynamics of Compressible Fluid Flow,* Vol. I Parts 1 and 2, and
Shepherd: *Principles of Turbomachinery.*

Reference Books

Addison: *Centrifugal and Axial Flow Pumps.*
Binder: *Advanced Fluid Mechanics, Vols. I and II.*
Langhaar: *Dimensional Analysis and Theory of Models.*
Prandtl: *Essentials of Fluid Dynamics.*
Streeter: *Fluid Mechanics,* 2nd Ed.
Francis: *Fluid Mechanics.*
Cambel and Jennings: *Gas Dynamics.*
Zucrow: *Aircraft Propulsion, Vol. I.*

5.503 Fluid Mechanics

Reference Books

Barna: *Fluid Mechanics for Engineers.*
Binder: *Advanced Fluid Mechanics,* Vols. 1 and 2.
Brown: *Hydroelectric Practice,* Vol. 2.
Cohen and Rogers: *Gas Turbine Theory.*
Davis: *Handbook of Applied Hydraulics.*
Foa: *Elements of Flight Propulsion.*
Jaeger: *Engineering Fluid Mechanics.*
Rouse: *Engineering Hydraulics.*
Shapiro: *Dynamics and Thermodynamics of Compressible Fluid Flow,* Vol. I, Parts 1 and 2.
Shepherd: *Introduction to the Gas Turbine.*
Cambel and Jennings: *Gas Dynamics.*
Zucrow: *Aircraft Propulsion,* Vol. 1.
Vallentine, H. R.: *Applied Hydrodynamics.*
Nechleba: *Hydraulic Turbines.*

5.601 Mechanical Engineering

Reference Books

To be prescribed by the Lecturers.

THERMODYNAMICS

5.701 Thermodynamics

Text Book

Rogers and Mayhew: *Engineering Thermodynamics, Work and Heat Transfer.*

Reference Books

Lee and Sears: *Thermodynamics.*
Van Wylen: *Thermodynamics.*
Faires: *Thermodynamics of Heat Power.*
Beckwith and Buck: *Mechanical Measurements.*
Moore: *Theory and Application of Mechanical Engineering Measurements.*

5.702 Thermodynamics

Text Book

Rogers and Mayhew: *Engineering Thermodynamics, Work and Heat Transfer.*

Reference Books

Lee and Sears: *Thermodynamics.*
Van Wylen: *Thermodynamics.*
Wrangham: *Theory and Practice of Heat Engines.*
Cohen and Rogers: *Gas Turbine Theory.*
Giedt: *Principles of Engineering Heat Transfer.*
Soo: *Thermodynamics of Engineering Science.*
Shepherd: *Introduction to the Gas Turbine.*

5.703 Thermodynamics

Reference Books

Rogers and Mayhew: *Engineering Thermodynamics, Work and Heat Transfer.*
Lee and Sears: *Thermodynamics.*
Gaffert: *Steam Power Stations.*
Stoecker: *Refrigeration and Air Conditioning.*
Giedt: *Principles of Engineering Heat Transfer.*
Cohen and Rogers: *Gas Turbine Theory.*
Hodge: *Gas Turbine Cycles and Performance Estimation.*
Threlkeld: *Thermal Environmental Engineering.*
Openshaw-Taylor: *Nuclear Reactors for Power Generation.*
Eckert and Drake: *Heat and Mass Transfer.*
Gebhart: *Heat Transfer.*

AERONAUTICAL ENGINEERING

5.821 Aircraft Materials and Structures

Text Books

Piffard and Pritchard: *Aeroplane Structures;* or
Peery: *Aircraft Structures;* or
Miles and Newell: *Airplane Structures,* Vol. I.

Reference Book

Timoshenko: *Strength of Materials,* Vol. 1.

5.822 Aircraft Materials and Structures

Text Book

Peery: *Aircraft Structures.*

Reference Book

Timoshenko: *Strength of Materials,* Vol. II.

5.823 Aircraft Materials and Structures

Text Books

Peery: *Aircraft Structures.*
Timoshenko and Soodin: *Theory of Elasticity.*

Reference Books

Timoshenko: *Theory of Elastic Stability.*
Bruhn: *Analysis and Design of Aircraft Structures.*
Royal Aeronautical Society: *Structures Data Sheets.*

5.811 Aerodynamics

Text Books

Houghton and Brock: *Aerodynamics for Engineering Students,* or
Streeter: *Fluid Dynamics;* and
Toms: *Introduction to Aeronautics.*

Reference Books

Air Registration Board: *British Civil Airworthiness Requirements.*
Royal Aeronautical Society: *Aerodynamics and Performance Data Sheets.*
Vallentine: *Applied Hydraulics.*

5.812 Aerodynamics

Text Books

Perkins and Hage: *Aeroplane Performance Stability and Control.*
Bonney: *Engineering Supersonic Aerodynamics.*

Reference Books

Air Registration Board: *British Civil Airworthiness Requirements.*
Royal Aeronautical Society: *Aerodynamics and Performance Data Sheets.*

5.831 Aircraft Propulsion

Text Books

Liston: *Aircraft Engine Design.*
Zucrow: *Gas Turbines.*

Reference Book

Judge: *Aircraft Engines,* Vols. I and II.

NAVAL ARCHITECTURE

5.901 Naval Architecture

Text Book

Rossell and Chapman: *Principles of Naval Architecture,* Vol. I.

Reference Books

De Rooij: *Practical Shipbuilding.*
Halliburton: *Mould Loft Work.*

5.902 Naval Architecture

Text Books

Rossell and Chapman: *Principles of Naval Architecture,* Vols. I and II.
Arnott: *Design and Construction of Steel Merchant Ships.*

Reference Books

Robb: *Theory of Naval Architecture.*
Hovgaard: *Structural Design of Warships.*
De Rooij: *Practical Shipbuilding.*
Rules and Regulations for the Construction and Classification of Steel Ships—Lloyd's Register of Shipping.

5.903 Naval Architecture

Text Book

Robb: *Theory of Naval Architecture.*

Reference Books

Hovgaard: *Structural Design of Warships.*
Van Lammeren: *Resistance, Propulsion and Steering of Ships.*
Bullen: *The Ventilation of Ships.*
Schokker, Neuerburg and Vossnack: *The Design of Merchant Ships.*

5.904 Naval Architecture

Text Book

Manning: *The Theory and Technique of Ship Design.*

Reference Books

Schokker, Neuerburg, and Vossnack: *The Design of Merchant Ships.*
The Commonwealth of Australia: *Navigation Act.*
Ministry of Transport: *Instruction as to the Survey of Passenger Steamships,* Vols. I and II.
Ministry of Transport: *Instructions as to the Tonnage Measurment of Ships.*
Ministry of Transport: *Measurements of Vessels for the Panama Canal.*

DEPARTMENT OF INDUSTRIAL ENGINEERING

18.111S and 18.111 Industrial Administration

Text Book

Davis: *Industrial Organisation and Management* (Harper Bros.), 3rd Ed., 1957.

Reference Book

Carson: *Production Handbook* (Ronald Press, New York).

18.211S and 18.221 Production Control

Text Books

Moore: *Production Control* (McGraw-Hill).
Bowman and Fetter: *Analysis for Production Management* (Irwin) 1957.

18.311S and 18.321 Methods Engineering

Text Books

Barnes: *Motion and Time Study* (Wiley) 4th Ed. or
Niebel: *Motion and Time Study* (Irwin, Illinois), 3rd Ed.

Reference Books

Carson: *Production Handbook* (Ronald Press), 2nd Ed.
Maynard: *Industrial Engineering Handbook* (McGraw-Hill) 1956.
Ryan: *Work and Effort* (Ronald Press).
Quick, Duncan and Malcolm: *Work Factor Time Standards* (McGraw-Hill).

18.411S and 18.421 Design for Production I

Text Books

Niebel and Baldwin: *Designing for Production* (Irwin).
B.S. 308: *Engineering Drawing Practice.*
B.S. 1609: *1949 Press Tool Sets.*

Reference Books

Van Doren: *Industrial Design* (McGraw-Hill).
Knoblaugh: *Model Making for Industrial Design* (McGraw-Hill).

18.412S and 18.422 Design for Production II

Text Books

Parker: *Drawings and Dimension* (Pitman), 1956.
B.S. 1916 Parts 1 and 2: *Limits and Fits for Engineering.*
B.S. 308: *1953 Engineering Drawing Practice.*

Reference Book

Ministry of Supply: *Dimensional Analysis of Engineering Design.* H.M.S.O. (London), 1948.

18.511S and 18.521 Industrial Marketing

Text Book

Alexander, Cross and Cunningham: *Industrial Marketing* (Irwin).

Reference Books

Alexander, Surface and Alderson: *Marketing,* 3rd Edition.
Ferber: *Statistical Techniques in Market Research* (McGraw-Hill).

18.611S Engineering Economic Analysis

Text Books

Barish: *Economic Analysis* (McGraw-Hill).
De Garmo: *Engineering Economy* (Macmillan, N.Y.).

Reference Books

Rautenstrauch and Villers: *The Economics of Industrial Management* (Funk and Wagnalls, N.Y.) 2nd Ed., 1957.
Edwards and Townsend: *Business Enterprise* (Macmillan), 1958.
Dean: *Managerial Economics* (Prentice Hall), 1951.
Stigler: *The Theory of Price* (Revised Ed. Macmillan N.Y.) Revised Ed., 1952.
Sasyeni, Jaspan and Friedman: *Introduction to Operations Research* (Wiley).

18.621 Engineering Economics

Text Books

Barish: *Economic Analysis* (McGraw-Hill).
De Garmo: *Engineering Economy* (Macmillan, N.Y.).

Reference Books

Robnett, Hill and Beckett: *Accounting — A Management Approach* (Irwin).

Keller: *Management Accounting for Profit Control* (McGraw-Hill).

Stigler: *The Theory of Price* (Macmillan), 1952.

Dean: *Managerial Economics* (Prentice Hall), 1951.

Grant: *Engineering Economic Analysis* (McGraw-Hill).

Sasyeni, Jaspan and Friedman: *Introduction to Operations Research* (Wiley).