THE N.S.W. UNIVERSITY OF TECHNOLOGY, CALENDAR, 1955

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The New South Wales UNIVERSITY of TECHNOLOGY

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CALENDAR, 1955

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CALENDAR

OF

THE NEW SOUTH WALES UNIVERSITY OF TECHNOLOGY

1955

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THE NEW SOUTH WALES UNIVERSITY OF TECHNOLOGY.

Calendar—1955

January—	
Monday 31.....	Australia Day—Public Holiday.
February—	
Tuesday 8	Professorial Board meets.
Monday 14.....	Enrolments begin all courses except 2nd year of courses I, IV, V, VI, VII, VIII and IX.
Monday 21.....	First term begins.
March—	
Monday 14.....	Council meets.
Tuesday 15	Professorial Board meets.
Wednesday 23 ...	Faculty of Architecture meets.
Monday 28.....	Enrolments and lectures commence—2nd year courses I, IV, V, VI, VII, VIII and IX.
Wednesday 30 ...	Faculty of Engineering meets.
April—	
Wednesday 6.....	Faculty of Science meets.
Friday 8 to Monday 11.	Easter Holidays.
Tuesday 12	Professorial Board meets.
Monday 25.....	Anzac Day—Public Holiday.
Wednesday 27 ...	Faculty of Humanities and Social Sciences meets.
May—	
Tuesday 3	Council Election—undergraduate representative.
Monday 9	Council meets.
Tuesday 10	Professorial Board meets.
Saturday 14	First term ends.
Monday 16 to Saturday 28.	Vacation (2 weeks).
Monday 30.....	Second term begins.
	Council Election—graduate representative.

CALENDAR—1955—*continued.*

June—

Wednesday 1.....	Faculty of Engineering meets.
Monday 13.....	Queen's Birthday—Public Holiday.
Tuesday 14	Professorial Board meets.
Wednesday 15 ...	Faculty of Science meets.
Wednesday 22 ...	Faculty of Architecture meets.
Wednesday 29 ...	Faculty of Humanities and Social Sciences meets.
	Council Election—staff representative.

July—

Monday 11.....	Council meets.
Tuesday 12	Professorial Board meets.
Wednesday 20 ...	Faculty of Engineering meets.

August—

Monday 1	Bank Holiday—classes meet as usual.
Tuesday 9	Professorial Board meets.
Wednesday 17 ...	Faculty of Science meets.
Saturday 20	Second term ends.
Monday 22 to Saturday, September 3.	Vacation (2 weeks).

September—

Monday 5	Third term begins.
	Examinations commence—two-term courses, except 2nd year of courses I, V, VI, VII, VIII, IX.
Monday 12.....	Council meets.
Tuesday 13	Professorial Board meets.
Wednesday 14 ...	Faculty of Engineering meets.
Saturday 17	Examinations cease—two-term courses.
Monday 19.....	Industrial training begins—two-term courses not engaged in Survey Camp.
Monday 19 to Friday 23.	Survey Camp—1st year courses VII and VIII, 2nd year courses VIIA and VIIB, 3rd year courses V, VI, VII, VIIA and VIII, 4th year courses VII and VIII, 6th year course VIIB.
Wednesday 21 ...	Faculty of Science meets.
Monday 26.....	Industrial training begins—two-term courses attending Survey Camp, except 3rd year of courses VII, VIIA and VIII.
Monday 26 to Friday 30.	Geology excursion—3rd year of courses VII, VIIA and VIII.
Wednesday 28 ...	Faculty of Architecture meets.

CALENDAR—1955—*continued.*

October—

Monday 3	Six Hour Day—Public Holiday.
Tuesday 4	Industrial training begins—3rd year of courses VII, VIIA and VIII.
Wednesday 5.....	Faculty of Humanities and Social Sciences meets.
Saturday 8.....	Lectures cease—2nd year courses I, V, VI, VII, VIII and IX.
Tuesday 11	Professorial Board meets.
Monday 17.....	Examinations commence—2nd year courses I, V, VI, VII, VIII and IX.
Saturday 29	Examinations cease—2nd year courses I, V, VI, VII, VIII and IX.
Monday 31.....	Industrial training commences—2nd year courses, I, V, VI, VII, VIII and IX.

November—

Saturday 12	Lectures cease—diploma and three-term degree courses.
Monday 14.....	Council meets.
Tuesday 15	Professorial Board meets.
Monday 21.....	Examinations begin—diploma and three-term degree courses.
Saturday 26	Third term ends.

December—

Saturday 10	Examinations end—diploma and three-term degree courses.
Tuesday 13	Professorial Board meets.

1956.

February—

Monday 13.....	Enrolments begin.
Tuesday 14	Professorial Board meets.
Monday 20.....	First term begins.

LOCATION OF SCHOOLS AND STAFF.

The University administrative staff is located at the Sydney Technical College, Broadway, but will be transferred to the new University site at Barker Street, Kensington, early in the 1955 academic year.

The location of the various Schools of the University and their staff is as follows:

The Schools of Applied Chemistry, Applied Psychology, Civil Engineering, Electrical Engineering, Mathematics, and Mechanical Engineering are at the Sydney Technical College, Broadway.

The Schools of Applied Physics, Humanities and Social Sciences, and Mining Engineering and Geology are also at the Sydney Technical College, Broadway, but will be transferred to the new University site at Barker Street, Kensington, early in the 1955 academic year.

The Faculty of Architecture is at Barker Street, Kensington, and the Schools of Chemical Engineering and Metallurgy are at High Street, Kensington.

The postal address at Kensington is Box 1, P.O., Kensington.

The School of Wool Technology is at East Sydney Technical College, Forbes Street, Darlinghurst.

PREFACE.

Incorporated by Act of the New South Wales Parliament on 1st July, 1949, the N.S.W. University of Technology was established to assist in meeting the urgent demand in Australia for increasing numbers of technologists and applied scientists, and to provide them with the means of advanced training and research.

In the words of the Act, the objects of the University are—

(*a*) the provision of facilities for higher specialised instruction and advanced training in the various branches of technology and science in their application to industry and commerce; and

(*b*) the aiding by research and other suitable means of the advancement, development and practical application of science to industry and commerce.

Provision is made for the government of the University by a Council representative of Parliament, industry and commerce, the trade unions, technical education, professional bodies, the University of Sydney, and of the University's own teaching staff and its undergraduates and graduates. The present membership of the Council is listed on pages 43 and 44 of the Calendar.

The Council under the authority given to it by the Act—

(*a*) may provide courses in applied science, engineering, technology, commerce, industrial organisation and such other related courses as it deems fit, and may, after examination, confer the several degrees of Bachelor, Master and Doctor, and such other degrees and such certificates in the nature of degrees or otherwise as it thinks fit;

(*b*) may from time to time appoint deans, professors, lecturers and other officers and employees of the University;

(*c*) shall have the entire control and management of the affairs, concerns and property of the University; and

(*d*) may act in all matters concerning the University in such manner as appears to it best calculated to promote the objects and interests of the University.

The first courses, leading to the degree of Bachelor of Engineering, were instituted in 1948 in Civil, Electrical, Mechanical, and Mining Engineering. These courses were planned to give students full-time lecture and laboratory instruction at the University for approximately half the year, with planned industrial experience for the remainder of the year. This initial step was made possible by the work of the Developmental Council appointed in August, 1947, by the Minister for Education, the Hon. R. J. Heffron, M.L.A. Courses leading to

the degree of Bachelor of Science were introduced in Applied Chemistry and Chemical Engineering for the 1949 academic year, and in Applied Physics and Wool Technology for the 1951 academic year. A first degree course in Architecture (B.Arch.) was established in 1950, and in 1954 a further full-time Bachelor of Science course, in Metallurgy, and a four-year degree course in Applied Geology leading to the degree of Bachelor of Engineering (Geology), were offered. A four-year full-time course in Food Technology (B.Sc.) was instituted in 1954.

Part-time degree courses were introduced in 1954 in Applied Biology, Applied Chemistry, Applied Geology, Chemical Engineering, Civil Engineering, Electrical Engineering, Food Technology, General Science, Industrial Chemistry, Leather Chemistry, Mechanical Engineering and Metallurgy. These courses are of the same standard as the full-time degree courses, and are arranged to enable the student to remain continuously in employment related to his studies throughout the whole course. A part-time course will be instituted in Applied Psychology in 1955, leading to the degree of Bachelor of Science in Psychology.

Two features are emphasised in the planning of first degree courses of the University of Technology. The first is the inclusion of industrial experience as an essential part of the courses to supplement the laboratory and lecture-room work at the University. In the Faculty of Engineering this practical work occupies five months a year, and is supervised and organised to suit the stage and syllabus of each course of study. A different pattern obtains in the Faculty of Applied Science, where, for example, in the case of Applied Chemistry (Course II) the first and fourth years are full-time at the University while the second and third years are part-time at the University concurrently with appropriate industrial employment.

Secondly, in all faculties, the study of general subjects such as language and literature, history, economics and psychology, is compulsory. These courses are designed to broaden the experience and interests of the student and thus to assist him to take the place in contemporary affairs for which he is otherwise qualified. In view of the development which the Humanities subjects have undergone, the Council approved the establishment of a Faculty of Humanities and Social Sciences in 1954.

The University offers the customary club and social features of university life—sport and societies dealing with literature, religion, art, music and public questions. During 1952 the constitution of the University of Technology Students' Union was approved by Council. Membership of the Union is compulsory for all registered students. Membership of the N.S.W. University of Technology Sports Association is also compulsory for all registered students.

In order to secure a closer integration between the relevant activities of the Department of Technical Education and the University, arrangements were completed during 1951 for the University to administer twenty of the Department's professional diploma courses and to further this integration in 1954 the syllabuses of the diploma courses were revised in the Faculties of Applied Science and Engineering to align them as closely as possible with the part-time degree courses. Where a part-time degree course is conducted in the particular field of study, a student may generally qualify for the diploma of Associateship of Sydney Technical College by completing the first five years (in the case of Chemical Engineering, Food Technology and Metallurgy, six years) of the part-time degree course. Should the student then desire to take out a degree, he can do so by completing the remainder of the part-time degree course. The diploma courses now administered by the University of Technology are—

Faculty of Applied Science: *Applied Biology, *Applied Chemistry, *Chemical Engineering, *Food Technology, *Leather Chemistry, *Metallurgy, *Optometry, *Physics, Science, *Secondary Metallurgy.

Faculty of Architecture: *Architecture, Building, Quantity Surveying.

Faculty of Engineering: Aeronautical Engineering, *Civil Engineering, *Electrical Engineering, *Mechanical Engineering, Metalliferous Mining, Naval Architecture, Production Engineering, *Radio Engineering.

Where the diploma was obtained prior to this alignment of courses, a first degree of the New South Wales University of Technology may be gained by further study in a conversion course conducted by the University.

Special investigations may be carried out on problems of technology or applied science on request, and in respect of any such investigation the Council of the University may charge such fees therefor and agree to such conditions in relation thereto as it thinks fit.

A number of industrial undertakings and Government departments are co-operating with the University by their recognition of its courses as a means of training their industrial cadets in the theory and practice of their profession. To this end, they have selected employees as students to attend degree courses, paying their fees and the ordinary cadet rates payable during their periods in industry.

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*Students completing these courses may proceed to the appropriate degree with full credit for their diploma studies.

In many cases the attendance of such students is also counted as part of their service for seniority grading and salary purposes.

A number of scholarships with liberal living allowances have been granted, particularly from the coal-mining and metal industries.

Students may also prepare for the degrees of Master of Science, Master of Science in Psychology, Master of Architecture, Master of Engineering or Doctor of Philosophy in Science or Engineering.

Pending the completion of its own buildings and the acquisition of equipment, the University has had at its disposal the facilities of the Department of Technical Education. The foundation stone of the first major building on the seventy-acre site reserved for the University at Kensington was set on 25th February, 1950, by the Governor of New South Wales, Sir John Northcott, K.C.M.G., K.C.V.O., C.B. Work on the building, which will provide 136,745 square feet of floor space, has progressed satisfactorily and it is expected that the building will be completed by the commencement of the 1955 academic year. The School of Architecture and Building already occupies the top floor of the new building and plans have been made for occupation by the Faculty of Humanities and Social Sciences, the Schools of Applied Physics and Mining Engineering and Applied Geology, and the University Administration in 1955.

The School of Chemical Engineering is housed in seven light-framed permanent buildings at the northern end of the University site, and the School of Metallurgy occupies four similar buildings in the same area.

Power to decentralise the University's activities, both in its co-operation with industry and in its teaching services, is given to the Council, which is authorised to establish and maintain branches, departments or colleges at Newcastle, Wollongong, Broken Hill, or such other places in the State of New South Wales as it may approve. Action has been taken under this authority to establish the Newcastle University College of the University within the Newcastle Technical College and this College was opened on 3rd December, 1951.

Late in 1953 the Minister for Education announced that the New England University College would become the University of New England in 1954 with authority to confer degrees. In conjunction with this development arrangements were made for students to enrol in classes at the Newcastle College of the New South Wales University of Technology with a view to meeting the requirements for the degree of Bachelor of Arts of the University of New England, and in accordance with this arrangement Arts courses were commenced at Newcastle in 1954.

TECHNICAL EDUCATION AND NEW SOUTH WALES UNIVERSITY OF TECHNOLOGY ACT, 1949.

PART III.

THE NEW SOUTH WALES UNIVERSITY OF TECHNOLOGY.

DIVISION 1.—Preliminary.

Commencement.

14. This Part of this Act shall, except where otherwise expressly provided, commence upon a day to be appointed by the Governor and notified by proclamation published in the Gazette.

Proclamation issued G.G. 24-6-49, sections 35 and 36 excepted.

Definitions.

15. In this Part of this Act, unless the context or subject matter otherwise indicates or requires—

"By-laws" means by-laws made under this Part of this Act.

"Council" means the Council of the University.

"Prescribed" means prescribed by this Part of this Act or by the regulations.

"Regulations" means regulations made under this Part of this Act.

"University" means the New South Wales University of Technology.

DIVISION 2.—Incorporation of the University and Establishment of a Council thereof.

New South Wales University of Technology.

16. (1) There shall be a New South Wales University of Technology consisting of the Council, the professors and such other classes of persons giving instruction within the University as may be prescribed and the graduate and under-graduate members thereof.

(2) The University shall be a body corporate under the name of "The New South Wales University of Technology" with perpetual succession and a common seal, and shall be capable by that name of suing and being sued, and of doing and suffering all such other acts and things as bodies corporate may by law do and suffer.

(3) The University shall, subject to this Part of this Act and the regulations, have power to take, purchase, hold, grant, alienate, demise or otherwise dispose of real and personal property:

Provided that the University shall not, except with the approval of the Governor, alienate, mortgage, charge or demise any real property.

Common Seal.

17. (1) The common seal of the University shall be kept in such custody as the Council directs, and shall not be used except upon resolution of the Council.

(2) All courts, judges and persons acting judicially shall take judicial notice of the common seal of the University affixed to any document, and shall presume that it was duly affixed.

Objects of the University.

18. The objects of the University shall include the following:—

(*a*) to provide facilities for higher specialised instruction and advanced training in the various branches of technology and science in their application to industry and commerce; and

(*b*) to aid by research and other suitable means the advancement, development, and practical application of science to industry and commerce.

The Council.

19. (1) There shall be a Council of the University which shall have and may exercise and discharge the powers, authorities, duties and functions conferred and imposed upon the Council by or under this Part of this Act.

(2) The Council shall consist of not more than thirty members who shall be appointed by the Governor.

Of the members so appointed—

(*a*) five shall be appointed on the nomination of the Minister, being persons who, in the opinion of the Minister, by their knowledge and experience can advance the full development of the University;

(*b*) one shall be a member of the Legislative Council elected by that Council;

(*c*) one shall be a member of the Legislative Assembly elected by that Assembly;

(*d*) four shall be appointed on the nomination of the Minister to represent persons engaged in the professions;

(*e*) two shall be officers within the meaning of the Public Service Act, 1902, as amended by subsequent Acts, directly concerned with and engaged in the administration of technical education and shall be appointed on the nomination of the Minister;

(*f*) five shall be appointed on the nomination of the Minister to represent industrial and commercial interests;

(*g*) three shall be appointed on the nomination of the Minister to represent trade unions and employee organisations;

(*h*) one shall be appointed upon the nomination of the Senate of the University of Sydney.

(*i*) one shall be a person having the qualifications as prescribed by the by-laws, elected in the manner prescribed by the by-laws, by undergraduates within the University;

(*j*) one shall be a person having the qualifications as prescribed by the by-laws, elected in the manner prescribed by the by-laws, by the graduates of the University;

(*k*) one shall be a person elected, in the manner prescribed by the by-laws, by the professors and such other classes of persons giving instruction within the University as may be so prescribed;

(*l*) one shall be the person for the time being holding the office of Director of the University;

(*m*) not more than four shall be persons elected in the manner prescribed by the by-laws to represent such principal faculties as may be so prescribed.

(3) The person or persons to be nominated by the Minister for appointment pursuant to paragraph (*d*), (*f*) or (*g*) of subsection two of this section shall, in respect of each such paragraph, be selected by him from a panel of such number of names as may be prescribed submitted to him for the purpose by such person or class or classes of persons or body or bodies of persons as may be prescribed in relation to that paragraph.

The regulations may prescribe—

(*a*) the time within which any such panel of names shall be submitted to the Minister;

(*b*) where any such panel of names is to be submitted by more than one prescribed class or body of persons, the number of names which each such class or body is entitled to include in such panel.

(4) If for any reason a panel of names is not submitted to the Minister in accordance with this section or the regulations or is not submitted within the time prescribed with respect thereto, the Minister may nominate such person or persons as he thinks fit and such person or persons shall be deemed to have been validly nominated in accordance with subsection three of this section and the regulations.

(5) (*a*) Members of the Council, other than the Director of the University, shall, subject to this Part of this Act, hold office for such period not exceeding four years as may be prescribed. Different periods may be prescribed in respect of the different classes of members.

The Director of the University shall hold office while he remains Director.

(*b*) The regulations may provide for the retirement in rotation of members of any particular class and for that purpose may provide that, on the first appointment of members of any such class after the introduction of rotational retirement, such number as may be prescribed of the members of that class shall be appointed for a less period than that prescribed pursuant to paragraph (*a*) of this subsection with respect to members of that class.

(*c*) All retiring members shall, unless otherwise disqualified, be eligible for reappointment.

(6) Where a casual vacancy occurs in the office of a member of the Council the Governor may appoint a person to the vacant office. The person so appointed shall have the like prescribed qualification (if any) as that of the member whose office has become vacant and shall, subject to this Part of this Act, hold office for the residue of his predecessor's term of office.

(7) The provisions of the Public Service Act, 1902, as amended by subsequent Acts, shall not apply to or in respect of the appointment by the Governor of any member of the Council, and any member so appointed shall not, in his capacity as such member, be subject to the provisions of such Act during his term of office.

Vacation of Office.

20. A member of the Council shall be deemed to have vacated his office if he—

(*a*) dies;

(*b*) resigns his office by writing under his hand addressed to the Governor;

(*c*) becomes bankrupt, compounds with his creditors or makes any assignment of his salary or estate for their benefit;

(*d*) becomes an insane person or patient or an incapable person within the meaning of the Lunacy Act, 1898-1947;

(*e*) absents himself from four consecutive meetings of the Council without leave of the Council; or

(*f*) in the case of a member elected by either House of Parliament—ceases to be a member of that House.

President and Vice-President.

21. (1) (*a*) The first President of the University shall be appointed by the Minister and shall hold office for a period of one year.

The person so appointed shall be a member of the Council.

(*b*) Whenever a vacancy in the office of President occurs, the Council shall elect one of its number to be President of the University.

(*c*) The President, other than the first President, shall hold office for such period and on such terms and conditions as may be prescribed by the by-laws.

(2) (*a*) The Council shall, at its first meeting and thereafter whenever a vacancy in the office of Vice-President occurs, elect one of its number to be Vice-President of the University.

(*b*) The Vice-President shall hold office for such period and on such terms and conditions as may be prescribed by the by-laws.

Chairman.

22. At every meeting of the Council the President or, in his absence, the Vice-President shall preside as chairman, but if the President and Vice-President are both absent, the members present shall elect a person from among their number to preside as chairman.

Questions How Decided.

23. (1) All questions which come before the Council shall be decided at any meeting duly convened, at which a quorum is present, by a majority of the votes of the members present.

(2) The chairman at any such meeting shall have a vote; and in case of an equality of votes a second or casting vote.

(3) At any such meeting ten members shall form a quorum.

Validity of Acts and Proceedings.

24. (1) No act or proceeding of the Council or any committee of the Council, or of the Director or any person acting pursuant to any direction of the Council shall be invalidated or prejudiced by reason only of the fact that at the time when such act or proceeding was done, taken or commenced there was a vacancy or vacancies, not exceeding twelve in number, in the office or offices of any member or members of the Council.

(2) All acts and proceedings of the Council or any committee of the Council, or of the Director or any person acting pursuant to any direction of the Council shall, notwithstanding the subsequent discovery of any defect in the appointment, nomination or election

of any member of the Council, or that any such member was disqualified from acting as or incapable of being a member of the Council, be as valid as if such member had been duly appointed, nominated or elected and was qualified to act as or capable of being a member and had acted as a member of the Council and as if the Council had been properly and fully constituted.

DIVISION 3.—Administration.

Powers of the Council.

25. Subject to this Part of this Act and to the regulations and by-laws, the Council—

(*a*) may provide courses in applied science, engineering, technology, commerce, industrial organisation and such other related courses as it deems fit and may, after examination, confer the several degrees of Bachelor, Master and Doctor, and such other degrees and such certificates in the nature of degrees or otherwise as it thinks fit;

(*b*) may from time to time appoint deans, professors, lecturers and other officers and employees of the University;

(*c*) shall have the entire control and management of the affairs, concerns and property of the University; and

(*d*) may act in all matters concerning the University in such manner as appears to it best calculated to promote the objects and interests of the University:

Provided that no appointment of a dean, professor, lecturer or other officer or employee shall be made pursuant to this section before the day appointed and notified pursuant to subsection three of section thirty-three of this Act.

Director.

26. (1) There shall be a Director of the University who shall be the chief executive officer of the Council.

(2) The Director shall have and may exercise and discharge such powers, authorities, duties and functions as may be prescribed in the regulations and by-laws.

(3) The Director shall be appointed in the manner prescribed and shall hold office for such period and upon such terms and conditions as may be prescribed.

Delegation to Committees, etc.

27. (1) The Council may constitute and appoint such committees as it thinks fit and may delegate all or any of its powers, authorities

and functions (except this power of delegation and the power to make by-laws) to any such committee or to any member of the Council, or to any officer or officers of the University.

(2) Every delegation under this section shall be revocable by resolution of the Council and no delegation shall prevent the exercise or discharge by the Council of any of its powers, authorities, duties or functions.

Ad Eundem and Honorary Degrees.

28. (1) Where any person has obtained in any university or other educational establishment recognised by the by-laws of the university in force for the time being any degree or diploma corresponding or equivalent, in the opinion of the Council, to any degree which the Council is now or may hereafter be empowered to confer after examination, the Council may confer such latter degree upon such person without examination.

(2) The persons upon whom degrees are conferred, under the provisions of subsection one of this section, shall be entitled to the same rights and privileges as appertain to those who have taken the same degrees in the ordinary course in the University.

(3) By-laws may be made for or with respect to the conferring of honorary degrees or other distinctions on approved persons.

Power to Establish and Maintain Branches, Departments, or Colleges.

29. (1) The Council may establish and maintain branches, departments or colleges of the University at Newcastle, Wollongong, Broken Hill or such other place in the State as the Council deems fit.

Council May Authorise Educational Establishments to Issue Certificates.

(2) (*a*) The Council may authorise any college or educational establishment, whether incorporated or not, engaged in the promotion of applied science and technology, to issue to candidates for any degree or diploma, certificates to the effect that the candidate for any such degree or diploma has completed such course of instruction therefor as the Council by by-law prescribes.

(*b*) Any person who presents to the Council any such certificate may be admitted as a candidate for the degree or diploma to which it has reference.

Evidence of Degrees Conferred.

30. All degrees conferred by the University shall be evidenced by a certificate under the common seal of the University and be signed by the President and the Director.

Fees.

31. The Council may by by-law make provision for the payment by students of the University of reasonable fees for entrance to the University, attendance at lectures, conferring of degrees and other University charges, except in the case of any student who is granted any fellowship, scholarship, exhibition, bursary or similar benefit to the extent to which he is thereby exempted from payment of fees.

Technological and Scientific Investigation.

32. (1) The Council may carry out special investigations in any technological or scientific matter at the request of any authority, institution, association, firm or person, and in respect of any such investigation may charge such fees therefor and agree to such conditions in relation thereto as it thinks fit.

(2) The Council may publish information relating to any matter investigated by it pursuant to the provisions of subsection one of this section or otherwise:

Provided that no such publication shall be made in contravention of any condition agreed to pursuant to the said subsection.

Transitional Provisions—Appointments.

33. (1) (*a*) During the period commencing on the date of commencement of this Part of this Act and ending on the appointed day the provisions of this subsection shall have effect.

(*b*) All deans, professors, lecturers and other officers and employees necessary to enable the Council to exercise and discharge the powers, authorities, duties and functions conferred and imposed upon it by this Part of this Act shall be appointed under and subject to the provisions of the Public Service Act, 1902, as amended by subsequent Acts; and every such dean, professor, lecturer or other officer or employee shall be subject to the said Act, as so amended, during his tenure of office or employment; and the permanent head of the Department of Technical Education shall in relation to such deans, professors, lecturers and other officers and employees be the permanent head within the meaning of the said Act, as so amended.

(2) Any person appointed under subsection one of this section and in office immediately before the appointed day who is not appointed by the Council to the staff of the University on that day shall be entitled, if he is under the age of sixty years, to be appointed on the recommendation of the Public Service Board to some office or position in the Public Service not lower in salary than that which he held under the said subsection immediately before the appointed day.

(3) In this section, "appointed day" means a day to be appointed by the Governor and notified by proclamation published in the Gazette. The day so appointed and notified shall not be earlier than one month after the date of the publication of such proclamation in the Gazette.

Use of Services of Officers and Employees of the Public Service.

34. For the purpose of exercising and discharging the powers, authorities, duties and functions conferred and imposed on the Council by this Part of this Act the Council may, with the approval of the Minister of the Department concerned and of the Public Service Board, on such terms as may be arranged, make use of the services of any of the officers and employees of any Government Department.

Saving of Rights.

35. (1) Where a person who is appointed by the Council to the staff of the University was immediately before his appointment an officer within the meaning of the Public Service Act, 1902, or an employee within the meaning of the Superannuation Act, 1916, he shall—

(*a*) retain any rights accrued or accruing under either of those Acts;

(*b*) continue to contribute to any fund or account and shall be entitled to receive any deferred or extended leave and any payment, pension or gratuity as if he were an officer or employee within the meaning of the Public Service Act, 1902, or the Superannuation Act, 1916, as the case may be, and for such purpose his service with the University shall be deemed to be service for the purposes of such Acts;

(*c*) in the event of his ceasing to be employed by the University (otherwise than on account of misconduct or disgraceful or improper conduct) be entitled, if he is under the age of sixty years, to be appointed upon the recommendation of the Public Service Board to some office in the Public Service not lower in classification and salary than that which he held immediately before his appointment to the staff of the University.

(2) This section shall commence upon the day appointed and notified pursuant to subsection three of section thirty-three of this Act.

Amendment of Act No. 28, 1916, Sch. III.

36. (1) The Superannuation Act, 1916-1948, is amended by inserting at the end of Schedule Three thereto the following words:—

The New South Wales University of Technology.

(2) This section shall commence upon the day appointed and notified pursuant to subsection three of section thirty-three of this Act.

By-laws.

37. (1) The Council may make by-laws, not inconsistent with this Part of this Act or the regulations, with respect to all matters pertaining to the University.

(2) Without prejudice to the generality of subsection one of this section the Council may make by-laws with respect to—

(*a*) the management, good government, and discipline of the University;

(*b*) the method of election of members of the Council (other than the members referred to in paragraphs (*b*) and (*c*) of subsection two of section nineteen of this Act) who are to be elected;

(*c*) the manner and time of convening, holding and adjourning the meetings of the Council; the manner of voting at such meetings, including postal voting or voting by proxy; the powers and duties of the chairman thereof; the conduct and record of the business; the appointment of committees of the Council, and the quorum, powers and duties of such committees;

(*d*) the number, stipend, manner of appointment and dismissal of deans, professors, lecturers, examiners, and other officers and servants of the University;

(*e*) the entrance standards for students;

(*f*) the examinations for and the granting of degrees, diplomas, certificates and honours;

(*g*) the examinations for and the granting of fellowships, scholarships, exhibitions, bursaries, and prizes;

(*h*) the admission of students of other universities and technical colleges to any corresponding status or of graduates of other universities or technical colleges to any corresponding degree or diploma without examination;

(*i*) generally, all other matters authorised by this Part of this Act or necessary or convenient for giving effect to this Part of this Act.

(3) Every by-law made by the Council shall be sealed with the common seal of the University, shall be submitted for the consideration and approval of the Governor, and when so approved shall—

(*a*) be published in the Gazette;

(*b*) take effect from the date of publication or from a later date to be specified in the by-law.

(4) A copy of every such by-law shall be laid before each House of Parliament within fourteen sitting days after the publication thereof in the Gazette if Parliament is in session, and if not, then within fourteen sitting days after the commencement of the next session.

(5) Any such by-law may be proved in any court by the production of a verified copy under the seal of the University or by the production of a document purporting to be a copy of such by-law and to be printed by the Government Printer.

DIVISION 4.—Finance.

New South Wales University of Technology Account.

38. (1) The University shall have an account which shall be called the "New South Wales University of Technology Account" (in this section referred to as the "Account").

(2) There shall be paid to the credit of the Account—

(*a*) all moneys received by the University by way of fees, charges, gifts, bequests or otherwise;

(*b*) all moneys made available to the University or the Council in accordance with the provisions of this Division.

(3) All expenditure incurred by the University (including the repayment of moneys borrowed by or advanced to the University in accordance with this Division) shall be paid from the Account.

Colonial Treasurer to Meet Certain Costs.

39. (1) Any expenditure incurred by the University with the approval of the Governor given on the recommendation of the Colonial Treasurer is in this section referred to as approved expenditure.

(2) The Colonial Treasurer shall, in each year, pay to the University the amount by which the approved expenditure exceeds the income from all sources of the University or so much of such income as is capable of being applied for the purpose of meeting approved expenditure.

(3) Any moneys payable by the Colonial Treasurer under this section shall be paid out of moneys provided by Parliament.

Advances by Colonial Treasurer.

40. The Colonial Treasurer may for the temporary accommodation of the University advance such moneys to the Council as the Governor may approve upon such terms and conditions as to repayment and interest as may be agreed upon.

Power of Council to Borrow.

41. The Council may borrow money for—

(*a*) the purpose of carrying out or performing any of its powers, authorities, duties and functions;

(*b*) the renewal of loans; or

(*c*) the discharge or partial discharge of any indebtedness to the Colonial Treasurer or to any bank,

within such limits, to such extent and upon such conditions as to security or otherwise as the Governor upon the recommendation of the Colonial Treasurer may approve.

Accounts To Be Rendered.

42. The Council shall cause to be kept proper books of account in relation to the funds of the University and shall, as soon as practicable after the thirtieth day of June in each year, prepare and transmit to the Minister for presentation to Parliament a statement of accounts in a form approved by the Auditor-General exhibiting a true and correct view of the financial position and transactions of the University.

Audit.

43. The accounts of the University shall be audited by the Auditor-General, who shall have, in respect thereof, all the powers conferred on the Auditor-General by any law now or hereafter in force relating to the audit of public accounts; and the Audit Act, 1902, and any Acts amending the same, shall apply to the members of the Council and to the officers and employees of the University in the same manner as it applies to accounting officers of public departments.

DIVISION 5.—General.

No Religious Test.

44. No religious test shall be administered to any person in order to entitle him to be admitted as a student of the University, or to hold office therein, or to graduate thereat, or to enjoy any benefit, advantage or privilege thereof.

Power to Accept Gifts, etc.

45. (1) The University shall have power to acquire by gift, bequest or devise any property for the purposes of this Part of this Act, and to agree to and carry out the conditions of any such gift, bequest or devise.

(2) The rule of law relating to perpetuities shall not apply to any condition of a gift, bequest or devise to which the University has agreed.

Council to Co-operate with Other Bodies.

46. In the exercise of its powers, authorities, duties and functions under this Part of this Act the Council shall, so far as is practicable, co-operate with the University of Sydney, the Commonwealth Scientific and Industrial Research Organisation, the Department of Technical Education, and other Commonwealth and State institutions devoted to science and research.

Report of Proceedings.

47. (1) As soon as practicable after the thirtieth day of June in each year, the Council shall prepare and furnish to the Minister a report upon the proceedings of the University during the period of twelve months immediately preceding that day. Such report shall include a summary of the work, researches and investigations carried out by the University during such period.

(2) A copy of such report shall be laid before both Houses of Parliament as soon as practicable after it has been received by the Minister.

Regulations.

48. (1) The Governor may make regulations not inconsistent with this Part of this Act prescribing all matters which by this Part of this Act are required or permitted to be prescribed or which are necessary or convenient to be prescribed in relation to any matter within the powers and functions of the University and the Council and generally for carrying out or giving effect to the objects of the University and to this Part of this Act.

(2) The Regulations shall—

(*a*) be published in the Gazette;

(*b*) take effect from the date of publication or from a later date to be specified therein;

(*c*) be laid before both Houses of Parliament within fourteen sitting days after the publication thereof if Parliament is in session, and if not, then within fourteen sitting days after the commencement of the next session.

If either House of Parliament passes a resolution of which notice has been given at any time within fifteen sitting days after such regulations have been laid before such House disallowing any regulation or part hereof, such regulation or part shall thereupon cease to have effect.

PART IV.

Acquisition of Land.

49. (1) For the purposes of this Act, the Governor may, under the Public Works Act, 1912, as amended by subsequent Acts, resume or appropriate any land and the Minister may, under the said Act as so amended, purchase any land.

(2) (*a*) Where any land has been appropriated or resumed pursuant to this section the Governor may, by notification published in the Gazette, notify that the land so resumed or appropriated and specified in such notification is vested in The New South Wales University of Technology.

(*b*) Thereupon the land so specified shall vest in the said University.

(3) For the purposes of the Public Works Act, 1912, as amended by subsequent Acts, any such resumption, appropriation or purchase shall be deemed to be for an authorised work, and the Minister shall be deemed to be the Constructing Authority:

Provided that sections thirty-four, thirty-five, thirty-six and thirty-seven of the Public Works Act, 1912, as amended by subsequent Acts, shall not apply to any such resumption, appropriation or purchase, but section thirty-eight of such Acts shall, mutatis mutandis, apply to and in respect of any contracts relating to any such resumption, appropriation or purchase.

Power to Rescind Resumptions. Cf. Act No. 7, 1912, s. 4c.

50. (1) The Governor may, by notification in the Gazette, rescind in whole or in part any notification of resumption made in pursuance of section forty-nine of this Act.

(2) Upon the publication of any notification of rescission the land described in such notification shall revest in the person who was entitled thereto immediately before the resumption for his estate, interest or right immediately before such resumption, but subject to any interest in or equity binding upon such land created by the Constructing Authority since such resumption; and the land shall be subject to all trusts, obligations, estates, interests, contracts, charges, rates, rights-of-way or other easements from which it was freed and discharged by such resumption as if the land had not been resumed and shall also be subject to any interests in or equities binding on compensation moneys created since the resumption.

(3) On the lodgment with the Registrar-General of a copy of a notification in the Gazette rescinding a notification of resumption of land under the provisions of the Real Property Act, 1900, the Registrar-General shall cancel any entry or notification in the register

book made by him pursuant to section 46A of the Real Property Act, 1900, in so far as it relates to the land the notification of the resumption of which has been rescinded, and for the purpose of any dealing with such land the entry or notification made pursuant to section 46A of the Real Property Act, 1900, shall be deemed never to have been made.

(4) The person in whom any land is revested under this section shall be entitled to be compensated by the Constructing Authority for any loss or damage actually suffered by him as a direct consequence of the resumption and its rescission other than compensation in respect of the value of the land.

(5) Any claim for compensation arising under this section shall be heard and determined in like manner and subject to the like conditions as a claim for compensation by reason of the acquisition of land under the Public Works Act, 1912, as amended by subsequent Acts, and the provisions of the Land and Valuation Court Act, 1921, as amended by subsequent Acts, shall, mutatis mutandis, apply to and in respect of the hearing and determination of any such claim.

REGULATIONS.

Interpretation.

1. In these Regulations, "Act" means the Technical Education and New South Wales University of Technology Act, 1949.

Incorporation of the University.

2. For the purposes of subsection one of section sixteen of the Act, "lecturers and fellows of the University" are hereby prescribed as classes of persons giving instruction within the University.

Submission to Minister of Panels of Names Relating to the Appointment of Certain Members of the Council of the University.

3. (1) The persons to be nominated by the Minister for appointment—

(*a*) pursuant to paragraph (*d*) of subsection two of section nineteen of the Act shall be selected by him from a panel of twenty-one names submitted to him by the organisations specified in Part A of the Schedule hereto;

(*b*) pursuant to paragraph (*f*) of the same subsection shall be selected by him from a panel of twenty-two names submitted to him by the organisations specified in Part B of the Schedule hereto;

(*c*) pursuant to paragraph (*g*) of the same subsection shall be selected by him from a panel of four names submitted to him by the organisations specified in Part C of the Schedule hereto.

(2) The number of names which each such organisation is entitled to include in the appropriate panel shall be the number specified in the said Schedule opposite the name of such organisation.

For the purposes of this Regulation the four bodies grouped together at the end of Part B of the said Schedule shall be deemed to be one organisation.

(3) All names which any such organisation is entitled to include in a panel shall, in respect of the first appointment of members to the Council of the University, be submitted to the Minister not later than the twenty-eighth day of June, one thousand nine hundred and forty-nine, and in respect of any subsequent appointment of members to that Council, be submitted to the Minister not later than the fourteenth day of June in the year in which any such appointment is to be made.

SCHEDULE.

Part A.

Representation of Persons Engaged in the Professions.

Organisation.	Number of Names.
The Institution of Engineers, Australia, Sydney Division	3
The Institution of Engineers, Australia, Newcastle Division	3
The Royal Australian Chemical Institute (N.S.W. Branch)	3
The Institute of Optometrists of New South Wales	3
The Royal Australian Institute of Architects, New South Wales Chapter	3
The Institution of Production Engineers (Sydney Section)	3
The Institute of Physics (Australian Branch, N.S.W. Division)	3

Part B.

Representation of Industrial and Commercial Interests.

Organisation.	Number of Names.
Chamber of Manufacturers of New South Wales	3
Sydney Chamber of Commerce	3
Metal Trades Employers' Association	3
The Employers' Federation of New South Wales	3
Building Industry Congress of New South Wales	3
The Institute of Management	3
Primary Producers' Union	4 (Chosen conjointly.)
The Graziers' Association of New South Wales	
Farmers and Settlers' Association of New South Wales	
Wheat Growers' Union of New South Wales	

Part C.

Representation of Trade Unions and Employee Organisations.

Organisation.	Number of Names.
Labor Council of New South Wales	1
Technical Teachers' Association of New South Wales	3

Period of Office.

4. (1) The members of the Council of the University, other than the Director of the University and the members referred to in clause two, three and four of this regulation, shall, subject to the Act, hold office for a period of four years.

(2) The member of the Council of the University elected by the Legislative Council shall, subject to the Act, hold office until his successor has been elected by the Legislative Council as hereinafter provided and has been appointed by the Governor to the Council of the University.

After the first election of a member by the Legislative Council in the year one thousand nine hundred and forty-nine each subsequent election shall be held as soon as practicable after the commencement of the term of service of the fifteen members of the Legislative Council elected at each triennial election of members of the Legislative Council held after such year.

(3) The member of the Council of the University elected by the Legislative Assembly shall, subject to the Act, hold office until his successor has been elected by the Legislative Assembly as hereinafter provided and has been appointed by the Governor to that Council.

After the first election of a member by the Legislative Assembly in the year one thousand nine hundred and forty-nine each subsequent election shall be held as soon as practicable after every general election of members of the Legislative Assembly held after such year.

(4) The members of the Council appointed pursuant to paragraphs (*i*), (*j*), (*k*) and (*m*) of subsection two of section nineteen of the Act shall hold office for a period of two years: Provided that the members first appointed pursuant to paragraphs (*i*), (*k*) and (*m*) of the said subsection shall hold office for a period of one year.

The Director.

5. (1) The Director shall be the chief executive officer of the Council and shall be specially charged with the duty of promoting the interests and furthering the development of the University.

(2) The Director shall, under the Council, subject to the by-laws and to any resolution of the Council—

(*a*) manage and supervise the administrative, financial and other activities of the University;

(*b*) consult with and advise the Professorial Board, and all other University Boards, Faculties, Committees, Professors, and other Heads of Departments;

(*c*) exercise supervision over the discipline of the University, with power, in the case of students, to impose penalties in accordance with academic usage for breach of discipline or for misconduct of any kind;

(*d*) give effect to the by-laws and to any resolution or report passed or adopted by the Council;

(*e*) perform such other duties as may from time to time be assigned to him by the Council.

(3) Nothing in this Regulation shall affect the precedence or authority of the President or Vice-President.

BY-LAWS.

CHAPTER I.—THE PRESIDENT AND VICE-PRESIDENT.

1. (*a*) The President shall hold office for a period commencing from his election and terminating at the close of the ordinary meeting of Council next preceding the expiration of two years from the date of his election.

(*b*) The Vice-President shall hold office for a period commencing from his election and terminating at the close of the ordinary meeting of the Council next preceding the expiration of two years from the date of his election.

(*c*) Any retiring President or Vice-President shall be eligible for re-election.

2. (*a*) The President and Vice-President shall, by virtue of their office, be members of any Committee constituted by any By-law or by any resolution of the Council and of any Board or Faculty within the University.

(*b*) The President may preside at any meeting of any such Committee, Board or Faculty and shall have all the rights and powers of the Chairman of any such Committee, Board or Faculty.

(*c*) If the President is absent or does not desire or is unable to act, or if the office of President is vacant, the Vice-President may preside at any such meeting and shall have the like rights and powers.

(*d*) In the absence of the President, or if the office of President is vacant, any powers or duties conferred or imposed upon the President by these By-laws may be exercised and discharged by the Vice-President.

(*e*) This By-law shall have effect notwithstanding the provisions of any other By-law.

CHAPTER II.—THE COUNCIL.

Meetings and Rules of Procedure.

1. The Council shall meet on the second Monday of March, May, July, September and November in each year, and on such other days as may be necessary for the despatch of business: Provided that if the Monday so specified for the regular meeting is a public holiday the Council shall meet on the following Monday. The Council shall have power to adjourn any meeting to a later date.

2. At any time in the interval between such meetings the President or, in his absence, the Vice-President or, in the absence of both, the Director shall have power to call a special meeting for consideration of any urgent business which he may wish to submit to the Council.

3. Upon the written requisition of any five members, the President or Vice-President or Director, or in their absence, the Registrar shall convene a special meeting of the Council to be held within fourteen days after the receipt of the requisition. The written requisition shall set forth the objects for which the meeting is required.

4. Except in the case of a special meeting as aforesaid or unless otherwise decided by the Council no motion initiating any subject for discussion shall be made except in pursuance of notice given to the Secretary to the Council at any time not less than ten clear days before the meeting of the Council at which the motion is to be moved, and the Secretary shall enter all such notices in the Notice of Motion Book in the order in which they are received by him.

5. The Secretary to the Council shall transmit by post or deliver to each member of the Council a written or printed notice of the date of the next ensuing meeting of the Council, whether such meeting is an ordinary or special meeting. Such notice shall, except in any case of emergency, be so posted or delivered at least seven days previous to the meeting. Except in any case of emergency all matters to be considered at the meeting shall be stated in the said notice or in a supplementary notice transmitted by post or delivered to each member of the Council not less than three days before the meeting. The said notice or supplementary notice shall be accompanied by supporting statements in sufficient detail to allow members to consider the matters prior to the meeting.

6. In the event of a quorum of the Council not being present at any meeting within half-an-hour after the time appointed for the meeting, whether such meeting is an ordinary or special meeting, the members then present may appoint any convenient future day, of which at least seven days' notice shall be given by the Secretary to the members of the Council in the usual way. Such day may be chosen as the day of the next ordinary meeting of the Council and all business which should have been transacted at the meeting lacking a quorum shall take precedence thereat.

7. The Minutes of any preceding meeting of the Council, whether ordinary or special not previously approved as being a true record, shall be circulated to members of the Council prior to the meeting at which they are to be considered. Upon being approved as correct such Minutes shall be signed by the Chairman as being a true record.

Members Representing Principal Faculties.

8. The members to be elected pursuant to paragraph (*m*) of subsection two of section nineteen of the Technical Education and New South Wales University of Technology Act, 1949, shall be elected by the three principal Faculties to be chosen by the Council at its March meeting in 1955 and in every alternate year after 1955.

9. The election of a member by each of the Faculties so chosen shall be held at a meeting of the Faculty duly convened by the Registrar to be held in May or June in 1955 and in every alternate year after 1955.

10. The Registrar shall act as Chairman of the meeting.

11. The method of election shall be by ballot, at which the candidate polling the largest number of votes shall be declared elected. Where an equal number of votes is cast for more than one candidate and it is necessary to determine between them which of them shall be elected the Registrar shall determine the matter by lot.

In this By-law the expression "determine by lot" means determine in accordance with the following directions:—The names of the candidates concerned having been written on similar slips of paper and the slips having been folded so as to prevent identification and mixed and drawn at random, the candidate whose name is first drawn shall be the candidate elected.

Member Representing Teaching Staff.

12. The member to be elected pursuant to paragraph (*k*) of subsection two of section nineteen of the Technical Education and New South Wales University of Technology Act, 1949, shall be elected by the professors, persons giving full-time instruction within the University and such other persons giving instruction within the University as the Council may determine by resolution from time to time. The election shall be held on such day in the month of June in 1953 and in every alternate year after 1953, as the Council may appoint.

13. At least forty days' notice of the date of election shall be given by notice posted at the University and in such other place as the Council may determine.

14. The Registrar shall prepare a list of electors comprised of all persons eligible to vote as provided under By-law 12 of this chapter, completed to the last day for receiving nominations for any election, and a copy of such list shall be exhibited at the University during the period from that date to the time of election.

14A. (*a*) No person shall be eligible for election unless his name has been communicated to the Registrar in writing under the hands of two qualified voters not less than twenty-eight days before the day fixed for the election.

(*b*) Every nomination of the person for election shall contain the written consent of such person to his nomination.

14B. On the expiration of the time for receiving nominations, the Registrar shall cause the name of each person so nominated and the fact of his candidature to be forthwith posted at the University.

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14C. In the case of there being only one nomination the Registrar shall declare the candidate duly elected. If there are two or more candidates, the election shall be by postal ballot.

14D. (*a*) At least fourteen days before the date fixed for the election the Registrar shall transmit a voting paper through the post to each person eligible to vote, addressed to the last known address of the person as noted in the records of the Registrar. Each voting paper shall be accompanied by an envelope marked "voting paper" and by a second envelope addressed to the Registrar on the inside of which shall be printed a form of declaration to be signed by the voter stating that he is a person qualified under the provisions of By-law 12 of this Chapter to vote at the election of a member of Council to represent the teaching staff.

The envelopes addressed to the Registrar shall be numbered in consecutive numerical order and the number appearing on such an envelope sent to each person eligible to vote shall be entered on the list of electors prepared by the Registrar opposite the name of the person to whom such envelope is sent.

(*b*) The provisions of paragraphs (*b*), (*c*), (*d*), (*e*), (*f*) and (*g*) of By-law twenty-one of this Chapter shall apply to and in respect of any such election.

Member Elected by Graduates.

15. The member to be elected pursuant to paragraph (*j*) of subsection two of section nineteen of the Technical Education and New South Wales University of Technology Act, 1949, shall be elected in May in 1953 and in every alternate year thereafter.

The election shall be held on such day in that month as the Council may appoint.

16. At least sixty days' notice of the day of election shall be given by advertisement in two or more of the daily newspapers published in Sydney, and by notice posted at the University.

17. The Registrar shall prepare a list of electors comprised of all graduates of the University, completed to the last day for receiving nominations for any election, and a copy of such list shall be exhibited at the University during the period from that date to the time of election.

18. (i) No person shall be eligible for election—

(*a*) unless he is a graduate of the University and of the full age of twenty-one years; and

(*b*) unless his name has been communicated to the Registrar in writing under the hands of two qualified voters not less than twenty-eight days before the day fixed for the election.

(*c*) if he is engaged in duties connected with the University either on the teaching staff or otherwise.

(ii) Every nomination of the person for election shall contain the written consent of such person to his nomination.

19. On the expiration of the time for receiving nominations the Registrar shall cause the name of each person so nominated and the fact of his candidature to be forthwith advertised in two or more of the daily newspapers published in Sydney, and to be posted at the University.

20. In the case of there being only one nomination the Registrar shall declare the candidate duly elected. If there are two or more candidates, the election shall be by postal ballot.

21. The election shall be conducted in the following manner:—

(*a*) At least fourteen days before the date fixed for the election the Registrar shall transmit a voting paper through the post to each graduate eligible to vote, addressed to the last known address of the graduate as noted in the records of the Registrar.

Each voting paper shall be accompanied by an envelope marked "voting paper" and by a second envelope addressed to the Registrar on the inside of which shall be printed a form of declaration to be signed by the applicant stating that he is a graduate of the University.

The envelopes addressed to the Registrar shall be numbered in consecutive numerical order, and the number appearing on such an envelope sent to each graduate eligible to vote shall be entered on the list of electors prepared by the Registrar opposite the name of the graduate to whom such envelope is sent.

(*b*) The voting papers shall contain the names of all duly nominated candidates arranged in alphabetical order. The voter shall record his vote by placing the number "1" opposite the name of the candidate for whom he desires to give his first preference vote, and shall give contingent votes for all the remaining candidates by placing the numbers "2," "3," "4" and so on, as the case may require, opposite the names of such candidates respectively so as to indicate by numerical sequence the order of his preference for them.

(*c*) Having marked his voting paper and signed the declaration, the voter shall place the voting paper without any other matter in the envelope marked "voting paper," which he shall seal and transmit to the Registrar in the envelope provided for that purpose.

All voting papers so transmitted and received at the University not later than 5 p.m. on the day of the election shall be counted in the ballot.

(*d*) The ballot shall be conducted by the Registrar who shall be assisted in the counting of votes by scrutineers to be appointed by the President. Each candidate shall be entitled to nominate one scrutineer.

(*e*) As soon as practicable after the closing of the poll the Registrar, in the presence of such of the scrutineers as choose to be present, shall proceed to the examination of the voting papers.

The method of counting the votes to ascertain the result of the election shall be as prescribed in By-law twenty-nine of this Chapter.

(*f*) Where in the final count under By-law twenty-nine of this chapter two candidates shall have an equal number of votes, the Registrar shall determine between them by lot which of them shall be elected.

In reckoning an absolute majority of votes for the purposes of the said By-law twenty-nine, the candidate so selected shall be deemed to have received an additional vote.

In this paragraph the expression "determine by lot" means determine in accordance with the following directions:— The names of the candidates concerned having been written on similar slips of paper and the slips having been folded so as to prevent identification and mixed and drawn at random, the candidate whose name is first drawn shall be the candidate elected.

(*g*) The Registrar shall reject as informal any voting paper upon which the voter has failed to indicate the number of his preference in respect of the name of any candidate: Provided that where there are not more than two candidates a voting paper shall not be informal by reason only of the fact that the voter has recorded his vote by placing the number "1" opposite the name of one candidate and has failed to place the number "2" opposite the name of the other candidate.

Member Elected by Undergraduates.

22. The member to be elected pursuant to paragraph (*i*) of subsecton two of section nineteen of the Technical Education and New South Wales University of Technology Act, 1949, shall be elected in May in 1950 and in 1951 and in every alternate year after 1951.

The election shall be held on such day in that month as the Council may determine.

23. At least sixty days' notice of the day of election shall be given by notice posted at the University and in such other places as the Council may determine.

24. (1) No person shall be eligible for election—

(*a*) (i) at the elections to be held in 1950 and 1951 unless he is a registered student of the University and of the full age of twenty-one years;

(ii) at any subsequent election unless he is a graduate of the University and of the full age of twenty-one years; and

(*b*) unless his name has been communicated to the Registrar under the hands of two qualified voters not less than twenty-eight days before the day fixed for the election.

(*c*) if he is engaged on duties connected with the University either on the teaching staff or otherwise.

(2) Every nomination of a person for election shall contain the written consent of such person to his nomination.

25. On the expiration of the time for receiving nominations the Registrar shall cause the name of each person so nominated and the fact of his candidature to be forthwith posted at the University.

26. In the case of there being only one nomination the Registrar shall declare the candidate duly elected. If there are two or more candidates, the election shall be by ballot of qualified voters voting personally.

27. The election shall be conducted in the following manner:—

(*a*) A ballot shall be taken on the day appointed for the election at the University and at such other place as the Council may determine, of which due notice shall be given.

(*b*) The ballot shall commence at 10 a.m. and close at 9.30 p.m. on the day appointed.

(*c*) The provisions of paragraphs (*b*), (*d*), (*e*), (*f*) and (*g*) of By-law twenty-one of this Chapter shall apply to and in respect of any such election.

*28. . . . . * Repealed 27.3.58.

Method of Counting Votes.

29. (1) (*a*) The Registrar shall count the total number of first preference votes given for each candidate.

(*b*) The candidate who has received the largest number of first preference votes shall, if that number constitutes an absolute majority of votes, be elected.

(*c*) If no candidate has received an absolute majority of first preference votes, the Registrar shall make a second count.

(*d*) On the second count the candidate who has received the fewest first preference votes shall be excluded, and each ballot-paper counted to him shall be counted to the candidate next in the order of the voter's preference.

(*e*) If any candidate then has an absolute majority of votes he shall be declared elected; but if no candidate then has an absolute majority of votes, the process of excluding the candidate who has the fewest votes and counting each of his ballot-papers to the continuing candidate next in the order of the voter's preference shall be repeated until one candidate has received an absolute majority of votes.

(*f*) The candidate who has received an absolute majority of votes shall be declared elected.

(2) If on any count two or more candidates have an equal number of votes, and one of them has to be excluded, that candidate amongst them who had the least number of votes at the last count at which they had not an equal number of votes, shall be excluded. And if such candidates had an equal number of votes at all preceding counts, the Registrar shall determine between them by lot which of them shall be excluded.

(3) In this By-law—

The expression "an absolute majority of votes" means a greater number than one-half of the whole number of ballot-papers counted.

The expression "continuing candidate" means a candidate not already excluded at the count.

The expression "determine by lot" means determine in accordance with the following directions:—The names of the candidates concerned having been written on similar slips of paper, and the slips having been folded so as to prevent identification and mixed and drawn at random, the candidate whose name is first drawn shall be excluded.

Chapter III.—The Professorial Board.

1. The Professors and Associate Professors in the several Faculties and such other persons as Council may appoint shall form a Board, to be called the Professorial Board.

2. The members of the Professorial Board shall elect a Chairman at a duly convened meeting to be held in May in 1950 and in 1951 and in May of every alternate year after 1951.

The Chairman shall hold office for a period of two years from the first day of July following the election: Provided that the first Chairman shall hold office for a period of one year from the first day of July following his election.

If the office becomes vacant by death, resignation or otherwise before the expiration of the full term, a successor shall be elected at a duly convened meeting of the Board to be held as soon as conveniently may be, and the Chairman so elected shall hold office during the remainder of his predecessor's term of office.

3. The Registrar shall, by virtue of his office, be a member of the Professorial Board and shall act as Secretary to the Board.

4. (i) The Professorial Board shall be specially charged with the duty of furthering and co-ordinating the work of Faculties and Departments and of encouraging scholarship and research and of considering the studies and discipline of the University.

The Board shall consider and report upon all matters referred to it by the Council or by the Director.

(ii) Subject to By-laws and to any resolution of the Council the Board—

(*a*) may consider and take action upon reports submitted to it by any Faculty;

(*b*) may refer matters to Faculties for consideration and report;

(*c*) may appoint internal and external examiners after report from the Faculty or from the Dean of the Faculty concerned;

(*d*) shall, on the recommendation of the appropriate Faculties, annually prescribe all books and details of subjects for lectures or annual examinations in the University, but in any of these subjects pertaining to more than one Faculty when the recommendations of the Faculties concerned do not coincide, the Professorial Board shall, after further communication with the said Faculties, prescribe such books and details;

(*e*) may determine the conditions of competition for any post-graduate fellowship, scholarship or prize and make the awards: Provided that any conditions of competition approved by the Board for any post-graduate fellowship, scholarship or prize shall be subject to conditions, if any, with respect thereto made by the founder or donor;

(*f*) may, after report from the Faculties concerned, decide all questions of admission ad eundem gradum. The Professorial Board may by an absolute majority of its members (provided that the Faculty, if any, concerned concurs by an absolute majority of its members) recommend to the Council that a person who has obtained any degree or diploma in another University or educational establishment be admitted to a Degree in the New South Wales University of Technology without any examination;

(*g*) may submit recommendations to the Council on the invitation of the Council with respect to the selection of Professors, Lecturers, and other teaching and research staff;

(*h*) may, after a report of the Faculties concerned, decide all questions of admission with advanced standing. The Professorial Board may by an absolute majority of its members (provided that the Faculty, if any, concerned concurs by an absolute majority of its members) recommend to Council that a person who has completed an approved course of study in a University or educational establishment approved by the Council be admitted with such advanced standing as may be permitted in each case to a course leading to a Degree of the New South Wales University of Technology;

(*i*) may perform the duties of a Faculty for all subjects not pertaining to any faculty and perform any function committed to it by this By-law, although any Faculty or Faculties may have failed to report;

(*j*) may submit recommendations to Council with respect to any other matter pertaining to academic standards or facilities.

Where the Board does not approve without amendment any recommendation made by a Faculty, the Board shall, if so requested by the Faculty, transmit the recommendation to the Council.

(iii) The Board shall have such other duties and powers as may from time to time be assigned to it by the Council.

(iv) A report of the proceedings of the Board shall be circulated to members of the Council with the notice or supplementary notice of matters to be considered at the meeting of the Council next following that of the Board and shall be laid upon the table of the Council at that meeting.

(v) The Council may at any time of its own motion or at the request of a Faculty review any decision of the Board.

5. (*a*) The Director or any member of the Professorial Board may suspend any student from attendance at classes and examinations for breach of discipline or misconduct, and may impose penalties in accordance with academic usage on any student for breach of discipline or misconduct, provided that the circumstances relating to the suspension or fine shall be reported in writing by the member to the Director forthwith. This By-law shall only extend to breach of discipline or misconduct committed in or with respect to the classes of work of the Department of such member, or committed in his presence.

(*b*) On reference by the Director the Board shall investigate matters which involve any question as to breach of discipline or

misconduct of any kind by any student or candidate at any University examination and may impose penalties in accordance with academic usage.

(*c*) Any person affected by a decision of any member of the Professorial Board (other than the Director) in respect of breach of discipline or misconduct may appeal to the Director, and in the case of disciplinary action by the Director, whether on appeal or otherwise, to the Council.

6. (*a*) The Professorial Board shall meet at the discretion of the Chairman or upon the written request of the President, or Director, or of three members of the Board.

(*b*) Except where otherwise provided by these By-laws, all questions which shall come before a meeting of the Professorial Board at which a quorum is present shall be decided by the majority of members present, and the Chairman shall have a vote, and in the case of an equality of votes, a casting vote.

The number of members who shall constitute a quorum of the Professorial Board shall be the product obtained by multiplying the total number of members of the Board by two-thirds, any fraction in the product being disregarded.

(*c*) All meetings shall be convened by written notice from the Registrar, specifying the time and place and agenda of the meeting.

Chapter IV—The Faculties.

1. (*a*) The Council may constitute such Faculties as it may deem fit.

(*b*) Each Faculty so constituted shall consist of the Professors and Associate Professors in the subjects of the curriculum of the Faculty concerned and of such lecturers and other persons having appropriate qualifications as the Council may appoint thereto.

(*c*) The Registrar shall, by virtue of his office, be a member of each Faculty.

2. The Dean appointed to a Faculty pursuant to the Technical Education and New South Wales University of Technology Act, 1949, shall be the Chairman thereof.

3. Each Faculty shall—

(*a*) supervise the teaching in the subjects with which the Faculty is concerned;

(*b*) be responsible, with the assistance of such examiners as the Professorial Board may from time to time appoint on the report of the Faculty or of the Dean, for the conduct of examinations in those subjects;

(*c*) take cognizance of and encourage scholarship and research in those subjects;

(*d*) consider and report upon all matters referred to it by the Council or by the Director, or by the Professorial Board.

4. Each Faculty shall consider and report to the Professorial Board upon all matters relating to the studies, lectures, examinations and Degrees of the Faculty.

5. Each Faculty shall have such other duties and powers as may from time to time be assigned to it by the Council.

6. Except where otherwise provided by these By-laws all questions which come before a meeting of a Faculty at which a quorum is present shall be decided by the majority of the members present and the Chairman shall have a vote, and in the case of an equality of votes, a casting vote.

The number of members who shall constitute a quorum of any Faculty shall be the product obtained by multiplying the total number of that Faculty by two-thirds, any fraction in the product being disregarded.

7. The Chairman of a Faculty shall be the Executive Officer of the Faculty and shall have such other duties and powers as may from time to time be assigned to him by the Council.

8. Each Faculty shall deal with all applications for information and other correspondence on subjects appropriate to such Faculty which may be brought before it by the Dean or by the Registrar.

Chapter V—Director.

1. The Director shall, by virtue of his office, be a member of every Board, Faculty and Committee within the University, and may, if he so desires, preside at any meeting of such Board, Faculty or Committee.

Nothing in this By-law shall affect the precedence or authority of the President or Vice-President.

Chapter VI—Honorary Degrees.

1. The Council may admit on Honoris Causa to any Degree of Doctor in the New South Wales University of Technology any graduate of another University who is recommended for such admission by an absolute majority of the Professorial Board and by an absolute majority of the Faculty in which the Degree is to be conferred as being a person of distinguished eminence in some branch of learning appropriate to such Faculty.

2. The Council may admit on Honoris Causa to the Degree of Doctor in an appropriate field in the New South Wales University of Technology any person considered by the Council to be distinguished by eminent public service in a particular technical field.

THE NEW SOUTH WALES UNIVERSITY OF TECHNOLOGY.

President.

WALLACE CHARLES WURTH, C.M.G., LL.B., Chairman of the New South Wales Public Service Board.

Vice-President.

The Hon. JOHN SYDNEY JAMES CLANCY, LL.B., Justice of the Supreme Court.

Director.

JOHN PHILIP BAXTER, O.B.E., B.Sc., Ph.D., A.M.I.Chem.E., F.R.A.C.I., M.I.E. Aust., Professor of Chemical Engineering, N.S.W. University of Technology.

THE COUNCIL.

Reconstituted in July, 1953, *in accordance with the Provisions of the Technical Education and New South Wales University of Technology Act,,* 1949.

FREDERICK WILLIAM AYSCOUGH, B.Sc., A.R.I.C., A.R.A.C.I., Senior Lecturer in Chemical Engineering, N.S.W. University of Technology; Vice President, Technical Teachers' Association of New South Wales.

JOHN PHILLIP BAXTER, O.B.E., B.Sc., Ph.D., A.M.I.Chem.E., F.R.A.C.I., M.I.E. Aust., Director and Professor of Chemical Engineering.

GEOFFREY BOSSON, M.Sc., Professor of Mathematics, N.S.W. University of Technology.

The Hon. JOHN SYDNEY JAMES CLANCY, LL.B., Justice of the Supreme Court.

WILLIAM EDWARD CLEGG, M.I.E. Aust., F.C.A.A., Chairman, Newcastle Technical Education District Council; Director-Consultant, Commonwealth Steel Co. Ltd.

HAROLD GRAYDON CONDE, M.I.E. Aust., Manager, Electric Light and Power Supply Corp. Ltd.; Electricity Commissioner, New South Wales.

ARTHUR DENNING, B.Sc., Dip.Ed., A.S.T.C., F.R.S.A., Director. New South Wales Department of Technical Education.

The Hon. WILLIAM MCCULLOCH GOLLAN, M.L.A., Minister for Mines.

JOHN WILLIAM GOODSELL, C.M.G., F.A.S.A., Under Secretary and Comptroller of Accounts, New South Wales Treasury; Vice-President, Metropolitan Water, Sewerage and Drainage Board.

HARRY FREDRICK HEATH, B.A., B.Ec., Member, New South Wales Public Service Board.

WILLIAM GEORGE KETT, F.S.M.C., F.I.O. (Lond.), Past President, Australian Optometrical Association; Director, Mark Foy's Ltd.

The Hon. ROBERT ARTHUR KING, M.L.C., Secretary, Labor Council of New South Wales.

JAMES NORMAN KIRBY, Managing Director, James N. Kirby Pty. Ltd.; Technical Director, Nuffield (Aust.) Pty. Ltd.; Technical Director, International Products Ltd.

WILLIAM RAE LAURIE, B.Arch., F.R.I.B.A., F.R.A.I.A., Architect; Past President, Royal Australian Institute of Architects.

JAMES KENNETH MACDOUGALL, M.I.E.E. (Lond.), A.M.I.E. Aust., Consultant to Rylands Bros., Australia, Pty. Ltd.

The Hon. JAMES JOSEPH MALONEY, M.L.C., Minister without Portfolio.

FRANCIS MACKENZIE MATHEWS, B.E., M.I.E. Aust., Chairman, Wollongong Technical Education District Council; Chief Engineer, Australian Iron and Steel Limited.

RICHARD GODFREY CHRISTIAN PARRY-OKEDEN, Managing Director, Lysaghts Works Pty. Ltd.; President, Chamber of Manufactures of N.S.W.

DAVID WATKIN PHILLIPS, B.Sc., Ph.D., Dip.Met.Min., F.G.S., M.I.Min.E., M.Amer.I.M.E., M.Aus.I.M.M., Professor of Mining Engineering, N.S.W. University of Technology.

STEPHEN HENRY ROBERTS, M.A., D.Sc., Litt.D., D.Sc. (Econ.), Vice-Chancellor, The University of Sydney.

ARTHUR ALFRED ROBINSON, M.B.S.I., Head of School of Footwear, New South Wales Department of Technical Education.

RAYMOND LOUIS ROGERSON, B.E., Assistant Engineer, Australian Glass Manufacturers Co. Pty. Ltd.

GREGORY BEDE THOMAS, LL.B., B.Sc., B.E., Barrister.

FREDERICK EDWARD TOWNDROW, F.R.I.B.A., F.R.A.I.A., F.T.C.P.I. (Aust.), Professor of Architecture, N.S.W. University of Technology.

GEOFFREY WARD, B.E., Engineer, Postmaster-General's Department.

ROBERT JOSEPH WEBSTER, M.C., A.A.A., Past President, The Australian Institute of Management, Sydney Division; Chairman of Directors and Managing Director, Burlington Mills (Aust.) Limited; Managing Director, Bradford Cotton Mills Limited.

JOHN FELL DALRYMPLE WOOD, B.Sc., B.E., A.M.I.E. Aust., Associate Professor of Mechanical Engineering, N.S.W. University of Technology; President, Technical Teachers' Association of New South Wales.

WALLACE CHARLES WURTH, C.M.G., LL.B., Chairman of the New South Wales Public Service Board.

HAROLD STANLEY WYNDHAM, M.A., Dip.Ed., Ed.D., Director-General, New South Wales Department of Education.

JOHN STEWART FRASER, Secretary to Council.

STANDING COMMITTEES OF COUNCIL.

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The Vice-President
The Director
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A. Denning
J. W. Goodsell
W. G. Kett
W. R. Laurie
J. K. MacDougall
Professor D. W. Phillips
Professor S. H. Roberts
R. J. Webster

Finance Sub-Committee of the Executive Committee.

The President (Chairman)
The Vice-President
The Director
J. W. Goodsell
W. R. Laurie

Personnel Sub-Committee of the Executive Committee.

The President (Chairman)
The Vice-President
The Director
W. G. Kett

Academic Committee.

The Vice-President (Chairman)
The Director
A. Denning
W. G. Kett
F. M. Mathews
Professor D. W. Phillips
R. L. Rogerson
G. B. Thomas
G. Ward
Associate Professor J. F. D. Wood
Dr. H. S. Wyndham

Appeals Committee.

The President (Chairman)

The Vice-President

Member of Council nominated by association or union representing staff members.

Building and Equipment Committee.

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The Director
The Hon. W. M. Gollan
The Hon. R. A. King
J. N. Kirby
W. R. Laurie
J. K. MacDougall
Professor D. W. Phillips
A. A. Robinson
Professor F. E. Towndrow

Library Committee.

W. G. Kett (Chairman)
The Director
Professor G. Bosson
The Hon. J. J. Maloney
Professor D. W. Phillips
G. B. Thomas

Newcastle College Committee.

J. K. MacDougall (Chairman)
The Director
W. E. Clegg
A. Denning
R. G. C. Parry-Okeden
Dr. H. S. Wyndham

Public Relations Committee.

R. J. Webster (Chairman).
The Director
F. W. Ayscough
H. G. Conde
J. N. Kirby
The Hon. J. J. Maloney
F. M. Mathews

LECTURING STAFF.

Faculty of Applied Science.

SCHOOL OF APPLIED CHEMISTRY.

PROFESSOR OF APPLIED CHEMISTRY—A. E. Alexander, B.Sc. Reading, M.A., Ph.D., Sc.D. Cantab., F.R.A.C.I., Dean of the Faculty of Applied Science.

ASSOCIATE PROFESSOR OF ORGANIC CHEMISTRY—S. J. Angyal, Ph.D. Bud., F.R.A.C.I.

Senior Lecturers.

J. R. A. Anderson, M.Sc., A.S.T.C., F.R.A.C.I., F.R.I.C.

A. Bryson, M.Sc., B.App.Sc. Qld., A.R.A.C.I.

G. W. K. Cavill, M.Sc. Syd., Ph.D. Liv., A.R.I.C., A.R.A.C.I.

E. R. Cole, M.Sc. Syd., A.R.A.C.I.

R. A. Eade, M.Sc. Syd., Ph.D. Liv., A.R.I.C., A.R.A.C.I.

R. M. Gascoigne, M.Sc., Syd., Ph.D. Liv., A.R.A.C.I.

L. W. O. Martin, B.Sc. Syd., A.R.A.C.I.

R. L. Martin, M.Sc., Melb., Ph.D., Cantab.

B. J. F. Ralph, B.Sc. Tas., Ph.D. Liv., A.R.A.C.I.

G. Shaw, B.Sc., Ph.D., Lond., D.I.C., A.R.C.S.

L. N. Short, M.Sc., Dip.Ed. Syd., D.Phil. Oxon.

G. J. Sutton, M.Sc., A.S.T.C., F.R.A.C.I., A.R.I.C.

R. L. Werner, M.Sc., A.S.T.C., A.R.A.C.I.

Lecturers.

J. R. Anderson, Ph.D. Cantab., B.Sc., A.S.T.C., A.R.A.C.I.

M. R. Atkinson, B.Sc., Ph.D., Tas.

G. H. Aylward, M.Sc., A.S.T.C., A.R.A.C.I.

J. R. Backhouse, M.Sc. Syd.

R. G. H. Barbour, B.Sc.Agr. Syd.

G. A. Barclay, B.Sc., Ph.D., Dip.Ed. Syd., A.R.A.C.I. (*on leave*).

G. S. Buchanan, M.Sc. Syd., A.R.A.C.I.

J. L. Courtney, B.Sc., A.S.T.C., A.R.A.C.I.

N. R. Davies, B.Sc. Lond., F.R.I.C. (*on leave*).

W. J. Dunstan, M.Sc. Syd., A.R.A.C.I. (*on leave*).

F. Gutmann, Ph.D. Vienna, M.I.R.E. (Aust.), M.I.R.E. (U.S.A.), F.Inst.P., F.A.P.C.

C. M. Harris, B. Sc., A.S.T.C., A.R.A.C.I.

R. J. Irving, M.Sc. Adel., Ph.D. Leeds.

P. D. Lark, B.Ec. Syd., B.Sc., A.S.T.C., A.R.A.C.I.

Lecturers—continued.

S. E. M. R. Livingstone, B.Sc., A.S.T.C., A.R.A.C.I.
E. C. Martin, A.S.T.C., A.R.I.C., A.R.A.C.I.
B. S. Morris, M.Sc. Syd., A.R.A.C.I.
E. Shipp, B.Sc. Syd.
J. J. H. Simes, M.Sc., Dip.Ed. Syd., Ph.D. Liv., A.R.A.C.I.
E. S. Swinbourne, B.Sc., A.S.T.C., A.R.A.C.I.
C. R. Taylor, B.Sc. Syd.

Demonstrators.

J. McD. Armstrong, B.Sc. Syd.
Mrs. M. I. Blackwell, B.Sc. Syd.
Miss T. I. Christie, B.Sc. Syd.
V. Cranmer, A.S.T.C.
Miss J. H. K. Donovan, B.Sc. Syd.
Miss N. Gill, M.Sc., Ph.D. Syd.
W. E. Goodin, B.Sc., Dip.Ed. Syd.
N. A. Magnusson, B.Sc. Lond.
D. J. McHugh, B.Sc. Syd.
Miss S. M. Smith, B.Sc.Agr. Syd.
D. H. Solomon, B.Sc., A.S.T.C.
R. J. Young, B.Sc. Syd.

SCHOOL OF APPLIED PHYSICS.

PROFESSOR OF APPLIED PHYSICS—C. J. Milner, M.A., Ph.D. Cantab., F.Inst.P.

ASSOCIATE PROFESSOR OF APPLIED PHYSICS—G. H. Godfrey, M.A., B.Sc. Syd., F.Inst.P.

Senior Lecturers.

C. E. Curnow, M.Sc. Syd., A.Inst.P.
J. Lederer, B.Sc. Syd., A.S.T.C., F.I.O.
R. E. Lishmund, B.Sc., Ph.D. St. And., A.Inst.P.
J. F. McConnell, M.Sc., Syd., A.Inst.P. (*on leave*).
W. L. Price, B.Sc., B.E. Syd., F.Inst.P.

Lecturers.

G. Amigo, A.S.T.C.
L. O. Bowen, B.Sc., B.E. W.Aust., M.Sc.
C. R. Brown, A.S.T.C., F.I.O.
R. S. Caddy, B.Sc., Dip.Ed. Syd.

Lecturers—continued.

G. P. Falls, B.A., B.Sc. W. Aust., A.Inst.P.

N. R. Hansen, B.Sc., Dip.Ed. Syd.

G. A. Harle, B.Sc. Syd.

E. Lanczi, B.A., B.Sc. Melb.

J. A. Milledge, M.Sc., Dip.Ed. Syd., A.Inst.P.

L. G. Parry, B.Sc., Dip.Ed. Syd., A.Inst.P.

H. F. Pollard, M.Sc. W. Aust., A.Inst.P.

SCHOOL OF CHEMICAL ENGINEERING.

PROFESSOR OF CHEMICAL ENGINEERING—J. P. Baxter, O.B.E., B.Sc., Ph.D. Birm., A.M.I.Chem.E., F.R.A.C.I., M.I.E. Aust.

ASSOCIATE PROFESSOR OF FOOD TECHNOLOGY—F. H. Reuter, Dr. Phil. Berl., F.R.I.C., F.R.A.C.I.

Senior Lecturers.

F. W. Ayscough, B.Sc. Syd., A.R.I.C., A.R.A.C.I.

F. L. Connors, M.Sc., A.S.T.C., A.M.I.E. Aust.

G. H. Roper, M.Sc., A.S.T.C., A.R.I.C., A.R.A.C.I. (*on leave*).

Lecturers.

R. H. Buchanan, B.Sc. Corn., A.R.A.C.I.

R. C. Cairns, B.Sc., A.S.T.C., A.R.A.C.I.

R. A. Edwards, A.S.T.C.

F. O. Howard, B.E. Syd.

C. H. Hunt, A.S.T.C., A.R.I.C., A.R.A.C.I.

E. R. McCartney, B.Sc. Syd., A.R.A.C.I.

R. K. Murphy, Chem.E. Col., Dr. Ing. Darmstadt, A.S.T.C., F.R.A.C.I., M.I.Chem.E.

J. D. Smith, B.Sc., A.S.T.C. A.R.A.C.I.

Demonstrators.

R. E. C. Beattie, A.S.T.C.

B. F. A. Collins, A.S.T.C.

H. T. Stoddart, A.S.T.C.

SCHOOL OF MATHEMATICS.

PROFESSOR OF MATHEMATICS—G. Bosson, M.Sc. Lond.

Senior Lecturers.

J. B. Douglas, M.A., B.Sc., Dip.Ed. Melb.
J. L. Griffith, B.A., M.Sc., Dip.Ed. Syd.
C. B. Kirkpatrick, M.Sc. Syd., A.Inst.P.
S. A. Senior, M.Sc., Dip.Ed. Leeds.

Lecturers.

Mrs. E. Bofinger, B.Sc. Syd.
M. A. Eggar, M.Sc., D.Sc., Dip.Ed. Berl.
C. M. Groden, M.Sc. Zur.
A. Keane, M.Sc. Syd., F.R.A.S.
A. H. Low, M.Sc., Dip.Ed. Syd.
M. H. McKay, M.A., Dip.Ed. Syd.
J. St. A. Sandiford, B.Sc. Syd.

SCHOOL OF METALLURGY.

PROFESSOR OF METALLURGY—R. H. Myers, M.Sc., Ph.D. Melb., A.I.M., A.M.Aus.I.M.M., A.R.A.C.I.

Senior Lecturers.

J. S. Bowles, M.Sc. Melb.
J. B. Forster, M.Sc. Leeds.
A. E. Jenkins, B.Met.E., M.Eng.Sc., Ph.D. Melb.

Lecturer.

B. W. Armstrong, A.S.T.C., A.R.A.C.I.

SCHOOL OF WOOL TECHNOLOGY.

PROFESSOR OF WOOL TECHNOLOGY—P. R. McMahon, M.Agr.Sc. N.Z., Ph.D. Leeds, A.R.I.C., A.R.A.C.I.

Lecturers.

C. L. Goldstone, B.Agr.Sc. N.Z., R.C.A. N.Z.
J. D. McFarlane, B.Sc.Agr. Syd.

SCHOOL OF APPLIED PSYCHOLOGY.

PROFESSOR OF APPLIED PSYCHOLOGY—J. F. Clark, M.A., B.Sc., Dip.Ed. Syd., Ph.D. Lond.

Senior Lecturer.

L. M. Haynes, B.A. Syd.

Lecturers.

E. E. Davies, B.A. Syd.

G. Fitzgerald, M.A. Col.

C. P. Kenna, B.A., B.Sc. Syd.

R. T. Martin, B.A., Dip.Pub.Admin. Syd.

J. C. Murray, B.A. Syd.

A. K. Olley, B.A. Syd.

Faculty of Architecture.

SCHOOL OF ARCHITECTURE AND BUILDING.

PROFESSOR OF ARCHITECTURE—F. E. Towndrow, F.R.I.B.A., F.R.A.I.A., F.T.C.P.I. (Aust.), Dean of the Faculty of Architecture.

ASSOCIATE PROFESSOR OF ARCHITECTURE—S. W. Lucas, A.R.I.B.A., F.R.A.I.A.

Senior Lecturers.

N. J. Anderson, B.Arch. Syd., Dip.T.P. Lond., A.R.A.I.A., A.M.T.P.I.

G. H. B. McDonell, B.Arch. Syd., F.R.A.I.A.

P. Spooner, A.S.T.C. (Arch.), A.R.I.B.A., A.R.A.I.A.

F. Woolard, A.S.T.C. (Arch.), A.R.A.I.A., M.R.San.I. Lond.

Lecturers.

N. F. Bazeley, A.S.T.C. (Arch.), A.R.A.I.A.

E. C. Daniels, A.S.T.C. (Arch.), A.R.A.I.A.

M. J. Dunphy, F.R.A.I.A.

D. P. Kirkland, A.A.Dip. Lond., A.R.I.B.A., A.R.A.I.A.

D. Lennon, B.Arch. Syd., A.R.I.B.A., A.R.A.I.A., M.T.C.P.I. (Aust.).

E. C. Parker, A.S.T.C. (Arch.).

R. O. Phillips, B.Arch. Syd., A.R.A.I.A.

D. F. Wrigley, Dip.A. Manc., A.R.I.B.A., A.R.A.I.A.

Faculty of Engineering.

SCHOOL OF CIVIL ENGINEERING.

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Senior Lecturers.

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

P. W. S. Ryan, A.S.T.C., A.M.I.E. Aust.

H. R. Vallentine, B.E. Syd., M.S. Iowa, A.S.T.C., A.M.I.E. Aust.

Lecturers.

F. E. Archer, B.Sc., B.E. Syd.

D. R. Axelrad, Dip. Ing. Vienna.

P. Balint, B.E. Bud., A.M.I.E. Aust.

H. J. Brettle, B.E. Syd., A.S.T.C.

J. R. Burton, B.E. Syd.

A. J. Carmichael, B.E., A.S.T.C., A.M.I.E. Aust., A.I.P.E.

A. G. Douglas, B.E.

L. S. Edwards, B.E. Melb., B.Ec. Syd.

H. K. Fischer, Dip.Ing. Hanover, A.M.S.E.

B. W. Gould, B.E. Tas.

R. T. Hattersley, A.S.T.C. (Local Govt.Eng. and Mech.Eng.).

D. T. Howell, B.E. Syd.

J. L. Jenkins, B.E. Syd., A.S.T.C.

P. B. Jones, B.E. Syd.

E. M. Kitchen, B.E. Syd.

J. R. Learmonth, B.E. Syd.

A. F. S. Nettleton, B.Sc., B.E. Syd.

D. C. O'Connor, B.E.

P. Shuleshko, M.Sc., B.E. Regensburg.

O. G. F. Ward, L.S. (N.S.W.), A.R.I.C.S., M.I.S. (Aust.).

K. K. Watson, B.E. Syd.

G. B. Welch, B.E. Syd., A.M.I.E. Aust.

R. W. Woodhead, B.E. Syd., A.M.I.E. Aust.

Demonstrators.

P. G. Armstrong, B.E. Cantab.

C. G. Coulter, B.E. Cantab.

I. R. Wood, B.E. N.Z.

School of Electrical Engineering.

Professor of Electrical Engineering—R. E. Vowels, M.E. Adel., A.M.I.E. Aust., M.I.E.E.

Senior Lecturers.

A. P. Blake, B.Sc., B.E. Syd., A.M.I.E. Aust.
G. C. Dewsnap, M.E.E. Melb., A.M.I.E. Aust.
R. M. Huey, B.Sc., B.E. Syd., A.M.I.E. Aust.
W. F. Lovering, M.Sc. Birm., A.M.I.E.E.
F. L. Mortimer, B.Sc. (Eng.) Lond., A.M.I.E.E.
G. J. Parker, B.Sc., B.E. Syd., A.M.I.E. Aust.
H. S. A. Rosenthal, Dip.Ing., Dr.Ing. Berl.

Lecturers.

W. H. Arnold, A.S.T.C., A.M.I.E. Aust.
R. H. J. Clarke, B.E., A.S.T.C., A.M.I.E. Aust.
D. J. Cole, B.E.E. Melb., A.M.I.E. Aust. (*on leave*).
G. W. Donaldson, B.E. Qld., M.A., B.Sc. Oxon.
H. N. Edwardes, B.Sc., B.E. Syd.
W. W. T. H. Ehlers, Dr.Nat.Scs. Ham.
C. P. Gilbert, B.Sc. Dunelm, A.M.I.E.E.
R. Guertler, B.E., Dr.Tech. Brno., A.M.I.E. Aust.
E. G. Hopkins, B.E., A.S.T.C., A.M.I.E. Aust.
H. L. Humphries, B.Sc., B.E., B.Ec. Syd.
G. Karoly, B.E.E. Melb.
C. St. J. Lamb, A.S.T.C.
F. Lewin, B.Sc., B.E. Syd.
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A. S. Plowman, A.S.T.C., M.I.E. Aust., A.M.I.E.E., A.Am.I.E.E.
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SCHOOL OF MECHANICAL ENGINEERING.

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NUFFIELD RESEARCH PROFESSOR OF MECHANICAL ENGINEERING—(*vacant*).

ASSOCIATE PROFESSOR OF MECHANICAL ENGINEERING—J. F. D. Wood, B.Sc., B.E. Syd., A.M.I.E. Aust.

Senior Lecturers.

P. S. Barna, M.E. Syd., A.M.I.E. Aust.
T. M. Baylis, A.S.T.C., A.M.I.E. Aust.
S. E. Bonamy, A.S.T.C., B.E. Syd., A.M.I.E. Aust.
A. J. Carroll, B.E. Syd., A.M.I.E. Aust.
R. E. Corbett, A.S.T.C., A.M.I.E. Aust.
J. Hirschhorn, Dip.Ing. Vienna, A.M.I.E. Aust.
J. N. Hool, B.E. Syd., Ph.D. Oxon., A.S.T.C., A.M.I.E. Aust.
J. Munro, B.E. Syd., M.I.Mar.E. (Lond.).

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N. Rosenauer, M.E. St. Petersburg, Dr.Ing. Riga, A.M.I.E. Aust.
G. P. Taylor, B.S. Chic., B.A.Sc. Tor.
R. J. Tuft, A.S.T.C. (Mech. and Nav. Arch.), A.M.I.E. Aust.

Lecturers.

A. F. Allen, A.S.T.C. (Mech. and Elec.), A.M.I.E. Aust., A.M.I. Prod.E.
H. A. Borchhardt, Dip.Ing.Eth. Zur., A.M.I.E. Aust.
H. Brock, Dip.Ing. Vienna, A.M.I.E. Aust.
R. A. A. Bryant, A.S.T.C., Grad.I.E. Aust.
G. F. Butler, B.E. Syd.
R. A. Dane, A.S.T.C.
E. W. Dodds, A.F.R.Ae.S.
T. W. Girdler, B.Sc., B.E. Syd., A.M.I.E. Aust.
H. Grafton, Dip.Ing. Munich.
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SCHOOL OF MINING ENGINEERING AND APPLIED GEOLOGY.

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Senior Lecturer.

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Lecturers.

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N. Sinicins, Dr.Chem.Ing. Riga.
N. C. Stephenson, M.Sc.
Mrs. G. Sugowdz, Dip.Chem.Eng. Kharkov.
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SCHOOL OF WOOL TECHNOLOGY.

Technical Officers.

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Faculty of Engineering.

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T. Glucharoff, Dip.Elec.Eng. Tech. Hoch, Munich.
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J. N. Guerrato, Dip.Mech.Eng. Tech.Inst.Leghorn.
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B. R. Langevad, A.S.T.C.
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SCHOOL OF MINING ENGINEERING AND APPLIED GEOLOGY.

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H. Bardsley.
G. C. Curthoys, B.Sc. Syd.
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S. C. Baker, M.Sc. Syd., A.Inst.P.

Lecturer.

J. A. Ramsey, M.Sc. Melb.

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Senior Lecturer.

J. S. Ratcliffe, A.S.T.C. (Chem. Eng. and Mech. Eng.), A.R.A.C.I. A.M.I.E. Aust., A.M.I.R.E. (Aust.).

Lecturer.

W. G. Kirchner, A.S.T.C.

SCHOOL OF CIVIL ENGINEERING.

Lecturers.

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W. S. Butcher, B.E. Syd., A.M.I.E. Aust.
G. J. Haggarty, B.E. Syd., A.M.I.E. Aust.

SCHOOL OF ELECTRICAL ENGINEERING.

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Lecturers.

J. H. Caldwell, B.Sc., B.E. Syd.
H. Harrison, B.Sc., B.E. Syd.
J. W. Wilson, A.S.T.C.

SCHOOL OF HUMANITIES AND SOCIAL SCIENCES.

ASSOCIATE PROFESSOR OF HISTORY—J. J. Auchmuty, M.A., Ph.D. Dublin, M.R.I.A., F.R.Hist.S.

ASSOCIATE PROFESSOR OF ECONOMICS—C. C. Renwick, M.Ec. Syd.

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J. Duhigg, B.A. Syd., M.A. Cantab.

Senior Lecturer in English.

D. C. Muecke, B.A. Adel., M.A. Oxon.

Senior Lecturer in German.

O. Spindler, Dr.phil., Dip.Ed. Vienna.

Senior Lecturer in Geography.

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Senior Lecturer in Philosophy.

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Senior Lecturer in Psychology.

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Lecturer in English.

B. V. Share, M.A., B.Litt., Dublin.

Lecturer in History.

J. P. S. Bach, M.A. Syd.

Lecturer in Philosophy.

A. J. Anderson, B.A. Syd.

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M. Temple, M.A. Dublin.

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Lecturers.

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H. S. Craddock, B.E. Syd.

J. Rector, B.Sc., B.E. Syd.

SCHOOL OF METALLURGY.

Lecturers.

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V. J. Moran, A.S.T.C.

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Lecturer.

A. S. Ritchie, A.S.T.C.

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SCHOOL OF APPLIED CHEMISTRY.

Technical Officer.

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SCHOOL OF APPLIED PHYSICS.

Technical Officer.

E. F. Palmer, A.S.T.C.

SCHOOL OF CIVIL ENGINEERING.

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A. Herzog, B.Chem.E. Bud.

SCHOOL OF MECHANICAL ENGINEERING.

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E. Betz, A.S.T.C., A.M.I.E. Aust.
K. R. Irvine, A.S.T.C.

WOLLONGONG.

SCHOOLS OF APPLIED CHEMISTRY AND METALLURGY.

Lecturers.

T. W. Barnes, A.S.T.C. (Metallurgy), A.R.A.C.I.
P. Beckman, F.S.T.C. (Chem.), A.R.I.C., A.R.A.C.I.
F. M. Hall, A.S.T.C. (Chem.), A.R.A.C.I.
M. C. Steele, A.S.T.C. (Chem.), A.R.A.C.I.

SCHOOL OF ELECTRICAL ENGINEERING.

Lecturer.

C. A. Stapleton, B.Sc., B.E. Syd., A.M.I.E. Aust.

SCHOOL OF MATHEMATICS.

Lecturer.

B. E. Clancy, B.Sc., Dip.Ed. Syd.

SCHOOL OF MECHANICAL ENGINEERING.

J. McA. Carswell, A.S.T.C., Head of School.

Lecturers.

G. T. Csanady, B.E. Munich.

J. B. Mackaness, B.E. Syd.

C. M. Sapsford, B.Sc. (Eng.) Lond., A.M.I.E. Aust., G.I.Mech.E.

Technical Officer.

L. England.

BROKEN HILL.

SCHOOL OF APPLIED CHEMISTRY.

Lecturer.

K. G. O'Brien, M.Sc. Syd., A.R.A.C.I., A.M.Aus.I.M.M.

SCHOOL OF ELECTRICAL ENGINEERING.

Lecturer.

R. C. Yates, B.E. Adel., F.S.A.S.M., A.M.I.E.E.

SCHOOL OF MECHANICAL ENGINEERING.

Lecturer.

J. R. Allen, B.E. Syd.

Technical Officer.

B. Santich, A.S.T.C.

GENERAL INFORMATION.

There are four Faculties in the University, each being responsible under the Professorial Board for the supervision of courses of study given in their respective fields. The Faculties are Applied Science, Engineering, Architecture, and Humanities and Social Sciences.

The Academic Year.

The academic year is divided into three terms. Each term is of twelve weeks' duration. In the third term classes cease at the close of the tenth week and examinations begin one week later. Vacations, each of two weeks' duration, occur between the first and second terms and between the second and third terms. The dates of commencement and ending of each term are given in the Calendar on pages 5 to 7.

Undergraduate Courses of Study.

The undergraduate courses of the New South Wales University of Technology aim to provide—

(*a*) a thorough training in the fundamental sciences of mathematics, physics and chemistry;

(*b*) a sound training in the professional topics of the course chosen and such subjects in allied professional fields as are considered necessary;

(*c*) a study of the art of expression, both written and oral, and of selected general subjects which aim to extend the student's understanding of himself and his environment;

(*d*) a close link with industry on the practical aspects of the profession throughout the course.

This last-named objective applies to all courses with one exception, General Science, and is achieved through requiring students to complete an approved period of industrial training prior to graduation. The staff at the University will assist students to obtain this employment either as sponsored students or as trainees employed on a temporary basis. Private students may make their own arrangements for industrial training but such employment and training must be of a standard approved by the University. Where reports are required on industrial experience, they must be submitted by 31st March following the training period.

The University provides undergraduate courses leading to the degrees of Bachelor of Science, Bachelor of Science (Optometrical Science), Bachelor of Science in Psychology, Bachelor of Engineering, Bachelor of Engineering (Geology) and Bachelor of Architecture.

First Degree Courses.

Faculty of Applied Science.

Three first degrees are awarded in the Faculty of Applied Science, namely, Bachelor of Science, Bachelor of Science (Optometrical Science), and Bachelor of Science in Psychology. The degree of Bachelor of Science may be taken by completing courses specialising in Applied Physics, Applied Chemistry, Chemical Engineering, Industrial Chemistry, Leather Chemistry, Applied Biology, Metallurgy, Food Technology or Wool Technology. In addition, students may take a General Science course as distinct from Applied Science.

Faculty of Engineering.

Two first degrees are awarded in the Faculty of Engineering, namely, Bachelor of Engineering and Bachelor of Engineering (Geology). The degree of Bachelor of Engineering may be taken by completing courses specialising in Mechanical Engineering, Electrical Engineering, Mining Engineering or Civil Engineering.

Faculty of Architecture.

One first degree is awarded in the Faculty of Architecture, the degree of Bachelor of Architecture.

Faculty of Humanities and Social Sciences.

The Faculty of Humanities and Social Sciences conducts Arts degree courses at Newcastle University College and provides instruction in Humanities subjects for all undergraduate courses given in the University.

A number of the first degree courses may be taken either by full-time attendance at the University or by part-time attendance concurrently with employment in industry. Details of the alternative courses where they occur are set out in the section of the Calendar headed "Syllabuses for Undergraduate Courses".

Diploma Courses.

By arrangement with the Department of Technical Education the University provides the undermentioned diploma courses leading to the award of the Associateship of the Sydney Technical College (A.S.T.C.). Students enrolled in the these courses are Registered Students of the University.

Faculty of Architecture—

Diploma courses in: Architecture, Building, Quantity Surveying.

Faculty of Applied Science—

Diploma courses in Applied Biology, Applied Chemistry, Chemical Engineering, Food Technology, Leather Chemistry, Metallurgy, Optometry, Physics, Science, Secondary Metallurgy.

Faculty of Engineering—

Diploma courses in: Aeronautical, Civil, Electrical, Mechanical, Metalliferous Mining, Naval Architecture, Production Engineering, Radio Engineering.

Details of these courses are published in the Handbook of the Department of Technical Education.

Conversion Courses for Diplomates of the New South Wales Department of Technical Education.

Associates of the New South Wales Department of Technical Education are given special consideration by the University of Technology so as to permit them to pursue their studies in the appropriate degree course with the minimum of repetition or overlap.

The Professorial Board may refuse to accept applications for conversion courses from students who completed their diploma course prior to 1944, and may require such students to enter the normal undergraduate courses with such advanced standing as it determines. The acceptance of such applicants for entry into conversion courses shall be at the discretion of the Professorial Board.

In all cases, an Associate wishing to proceed to a degree must first make application in writing to the Registrar of the University of Technology for a statement of requirements for conversion. Each application is considered individually according to the applicant's academic record and professional experience. Applications for conversion requirements should be made before 31st December of the year prior to that in which the applicant wishes to enter upon the additional studies. This applies equally to students who are completing the final year of their diploma course and are not in possession of the results of their final examinations.

The application must set out full details of the applicant's academic and professional career under the following headings:—

Full name, and address for correspondence.

Date and place of birth.

Details of passes in Matriculation, Leaving Certificate or Diploma Entrance examination, with dates, school and passes in each subject.

Full details of academic career and awards granted, with dates and college.

(Additional subjects to those normally included in the course and details of prizes, credits, honours, etc., should be given.)

Professional and trade experience.

Research work undertaken and technical articles published.

Course in which applicant wishes to graduate.

Each application will be considered on its merits, but the minimum requirements to qualify for a degree, subsequent to completing a diploma course, are indicated following the outline of the related degree course in later pages of the Calendar.

Examinations.

In assessing students' progress in the University courses, consideration is given to work in laboratory, and class exercises and any term or other tests given throughout the year, as well as to the annual examination results.

Students are required to attend lectures punctually and diligently, and to complete all practical work prescribed for the year and course in which they are enrolled. In general, no exemptions from subjects or examinations are granted.

No student will be permitted to attend lectures or to sit for examination in any subject in any year until he has passed in all subjects of the previous year, unless special permission has been granted by the faculty in which he is enrolled. Such permission must be applied for, and, if allowed, will be for one subject only in any year. The student must then, during the subsequent year, pass the examination in the subject for which the special permission has been granted. A student availing himself of the provisions of this section will not be eligible for any prizes or scholarships at the annual examinations.

Higher Degrees and Graduate Courses.

Graduate students may proceed to the degree of Master of Science, Master of Science in Psychology, Master of Engineering, Master of Architecture or Doctor of Philosophy in Science or Engineering. Conditions for the award of these degrees are set out on pages 85 to 92 of the Calendar.

Special, short, intensive graduate courses are provided from time to time according to demand. The programme of such courses for 1955 is advertised separately.

Fees.

Undergraduate (Diploma, Degree or Conversion) Courses.

(*a*) Courses other than Arts.

(i) Full-time Courses—£60 per annum or two payments of £30 per term or three payments of £20 per term, according to number of terms in year.

(ii) Part-time Courses (including Part-time years of Degree courses in Applied Chemistry, Chemical Engineering and Architecture)—£24 per annum or £8 per term for instruction involving over 5 hours per week, otherwise £12 per annum or £4 per term.

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In addition all students enrolling for the first time in courses in categories (i) and (ii) above will be required to pay a matriculation fee of £2. A graduation fee of £3 is also payable before admission to a degree.

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

(*b*) Arts Courses (Newcastle).*

(i) Full-time Courses—£30 per annum or £10 per term.

(ii) Part-time Courses—£30 per annum or £10 per term, or £10 per annum per subject where subjects taken are less than 3, with no term payment.

Higher Degrees.

	£
(*a*) Master of Science or of Engineering.	
(i) Qualifying Examination	5
(ii) Registration Fee	2
(iii) Internal full-time student annual fee	30
Internal full-time student term fee	10
(iv) Internal part-time student annual fee	15
Internal part-time student term fee	5
(v) External student annual fee	10
(vi) Final Examination	15
(*b*) Doctor of Philosophy.	
(i) Qualifying Examination	5
(ii) Registration Fee	2
(iii) Annual Fee	30
(iv) Final Examination	21

Research.

(*a*) One day per week—£10 per annum.

(*b*) Two or three days per week—£20 per annum.

(*c*) Four or five days per week—£30 per annum.

Deferred Examinations.

£2 for each paper.

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* Arts students at Newcastle are also required to pay the following fees for transmission to the University of New England—Matriculation Fee £3, Examination Fee £3 (annually), Graduation Fee £3.

Late Fees.

(*a*) Any student who enrols after the third week of any term, irrespective of whether he/she is responsible for the payment of his/her fees, shall be charged a late fee of £1 per term.

(*b*) The late fee will be increased to £2 in the case of enrolments effected after 31st March (1st term), 30th June (2nd term), and 30th September (3rd term).

University of Technology Students' Union.

Annual subscription, £1 1s. (compulsory for all registered students).

N.S.W. University of Technology Sports Association.

Annual subscription, 10s. (compulsory for all registered students).

General.

It is pointed out that fees are payable on a term basis. Students who find difficulty in paying the annual fee are advised—

(i) to pay the terminal fee by the appointed date;

(ii) that any application for extension of time in which to pay fees due (a maximum of one month may be permitted) must be submitted in writing to the Registrar *before* the date on which late fees are payable.

Student Hostel.

Single room accommodation is now available for approximately 200 students in a hostel on the University site at High Street, Kensington.

Terms are weekly in advance, the fee being £3 10s. per week. This fee covers full board and residence (excluding personal laundry).

Students wishing to reside at the hostel should make application to the Supervisor of Amenities, Major R. K. Wilthew, Amenities Office, Broadway.

Guidance Office.

Through the Guidance Office a general student educational and vocational counselling service is provided to all students and prospective students of the University. The activities of the Guidance Office may be indicated under the following headings:—

1. *Student Counselling Service.*

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

A guidance officer may thus assist in the choice of a career, firstly discussing with the prospective student the relation between his previous educational attainments, assessed abilities, special aptitudes and interests and the demands of the many University courses offering and, secondly, by facilitating contact with other sources of information and advice.

Each student of the University is therefore invited to discuss with a guidance officer at any time during his course, his methods of study, his general adjustment to the course and other factors complementary to the normal relationship existing between him and his lecturers and of significance to his progress in his chosen course—e.g., a distracting personal problem.

An appointment may be arranged personally or by telephone.

2. *Educational and Occupational Information Service.*

Information concerning training facilities within the University, the N.S.W. Department of Technical Education and other training institutions may be regarded as essential for a person's proper choice of, and adjustment and success in, a particular vocation. For this reason, the Guidance Office provides facilities for answering enquiries concerning—

(*a*) Courses of training offered, e.g. types, duration, entrance and occupational requirements, fees and special conditions applicable.

(*b*) Financial assistance in studies, e.g. scholarships, bursaries, exhibitions.

(*c*) Occupational Information.—Information booklets concerning a wide variety of occupations are also available. These cover such points as methods of entry, fees, methods of training, prospects, personal qualifications needed and descriptions of the actual work involved in a particular vocation. Quite often it is necessary for arrangements to be made for enquiries to be referred for detailed advice on particular vocations to experts in the respective teaching departments.

3. *Applications for Variations in Courses.*

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

4. *Service to Students from Overseas.*

(*a*) Initial Application for Enrolment—

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

Intending students who have not yet arrived in New South Wales are advised to address their enquiries to the Guidance Officer, New South Wales University of Technology, Broadway, Sydney, clearly stating details of their educational standing.

(*b*) Documentary Evidence—

It is desirable that students from overseas seeking admission to, or advanced standing within, a course should bring with them to the Guidance Office documentary evidence of all relevant subjects studied in other countries. This evidence might include diplomas, statements of examinations passed, course syllabuses and samples of examination papers. Where the original of a certificate is in a language other than English, the applicant should secure a translation of this document through his appropriate consular representative or from the N.S.W. Government Interpreter and Translator, Central Court of Petty Sessions, Liverpool Street, Sydney.

(*c*) English Language Test—

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

(*d*) Landing Permits—

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

5. *Location and Hours of Guidance Office.*

At *Sydney* the Guidance Office is located at 45-47 Broadway (ground floor) and is open from 9 a.m. to 9 p.m. daily. Telephone enquiries should be made to M0422, Extension 284.

At *Newcastle* the Guidance Office is located at the University College, Tighe's Hill—Telephone M1281.

Library.

The main library of the University is at present housed with the Sydney Technical College library at the corner of Mews and Thomas Streets, Broadway. A library will be established in the main building of the new University site at Kensington early in 1955 in order to service the courses conducted there. Libraries are also provided at Newcastle University College, and in the metropolitan and country technical colleges conducting degree and diploma courses, and all Schools have working collections of books and periodicals for the use of staff.

Each library provides a reference and lending service for staff and students, and is open in term during day and evening sessions.

The Sydney Technical College library includes in its dictionary catalogue entries for publications housed on the Kensington site.

REQUIREMENTS FOR ADMISSION.

1. A candidate for any degree of the New South Wales University of Technology must satisfy the conditions for admission set out hereunder *before* entering upon the prescribed course for a degree.

Candidates who have satisfactorily met the conditions for admission shall be classed as "registered students" of the University after enrolment.

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

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

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

(It should be noted that a number of subjects taken for the Leaving Certificate are *not* approved subjects for admission to the University of Technology.)

(ii) *General Requirements.*

The following general provisions apply:—

(A) Candidates must meet the requirements set out in section 2 (i) above at one examination provided that—

(*a*) neither Physics nor Chemistry be taken with the combined subject Physics and Chemistry;

(*b*) neither Botany nor Zoology be taken with Biology;

(*c*) neither Botany nor Zoology nor Biology be taken with Physiology;

(*d*) neither Mathematics I nor Mathematics II be taken with General Mathematics;

(*e*) a candidate who offers Mathematics and elects to take General Mathematics may not sit for Mathematics I or Mathematics II; a candidate who offers Mathematics and does not elect to take General Mathematics *must take both* Mathematics I and Mathematics II:

a pass in either Mathematics I or Mathematics II will count as a pass in one subject; a pass in both papers will count as passes in two subjects;

(*f*) Theory and Practice of Music is accepted only from March, 1946;

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

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

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

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

(B) Candidates who have presented themselves for the Leaving Certificate or equivalent examination in five or six subjects selected in accordance with the requirements prescribed in (A) and who have passed in English and a Mathematics and two other of the subjects shall be granted admission provided that they have been awarded "A" passes or passes with Honours in at least three of these four subjects.

(iii) *Examinations.*

Candidates may qualify for entry at the Leaving Certificate Examination held by the Department of Education, or the Matriculation Examination conducted by the University of Sydney, or the Qualifying or Qualifying (Deferred) examination of the Department of Technical Education.

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

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

3. Notwithstanding By-law 2 above, candidates may be accepted as "registered students" of the University of Technology under the following conditions, subject to the approval of the Professorial Board:—

(i) Any person who has satisfied the examination requirements for entrance to the diploma courses of the Department of Technical Education, New South Wales, since and including the Qualifying examinations of the Department of Technical Education held at the end of 1940 may be admitted as a "registered student" of the University of Technology, but this provision shall not apply to examinations held later than March, 1957.

(ii) Any person who holds a diploma from the New South Wales Department of Technical Education, or any other Technical College which may from time to time be recognised by the University of Technology, may be admitted to the University of Technology as a "registered student" with such status as the Board may determine, provided that, in the opinion of the Board, the applicant's qualifications are sufficient for entry into the Faculty nominated.

(iii) Persons of other than Australian education may be admitted as "registered students" of the University of Technology after examination as directed by the Board, provided they give evidence that satisfies the Board that they are of good fame and character.

(iv) The Board may admit as "registered students" in any Faculty with such status as the Board may determine in the circumstances—

(*a*) A graduate of any approved University.

(*b*) An applicant who presents a certificate from any University, showing that he is qualified for entrance to that University, and who, in addition, satisfies the Board that he has met the requirements of the University of Technology, provided that, in the opinion of the Board there is an acceptable correspondence between the qualifying conditions relied upon by the applicant and conditions laid down for ordinary entrance to the nominated Faculty of the New South Wales University of Technology.

4. Any person qualified to enter a degree course in the University of Technology in terms of the preceding By-laws shall become a "registered student" of the University of Technology after he has signed his name in the Student Register in the presence of the Registrar or other person appointed for the purpose by the Council, and has paid the first term fee.

5. (i) The Board may in special cases declare any person qualified to enter a Faculty as a "provisionally registered student" although he has not complied with the requirements set out above, and in so doing may prescribe the completion of certain requirements before confirming the person's standing as a "registered student". Students who satisfactorily complete these requirements will be permitted to count the courses so passed as qualifying for degree purposes.

(ii) Persons over the age of twenty-five years may be admitted to provisional status provided that—

(*a*) they have a meritorious pass at the Leaving Certificate Examination or an equivalent examination and have passed in at least five subjects at such examination, or

(*b*) they have satisfactorily completed an approved course of systematic study extending over at least three years after passing the Intermediate Certificate Examination, or

(*c*) they satisfy the Board that they have reached a standard of education sufficient to enable them profitably to pursue the first year of the proposed course.

(iii) Any applicant for provisional status may be required to take such examination as the Board may prescribe before such status is granted.

6. Any person desirious of attending lectures at the University of Technology may be granted permission to do so by the Board without satisfying the requirements for admission and without being a "registered student," on payment of such fee as the Council may from time to time direct, but such person shall not necessarily have the privileges of "registered students" and shall not be eligible to proceed to a degree.

SCHOLARSHIPS, BURSARIES, AND CADETSHIPS.

Following are particulars of scholarships, bursaries, cadetships, etc., tenable at the New South Wales University of Technology.

Many industrial organisations and Government Departments sponsor students at the University. Such students generally have their University fees paid by the employer and are employed at cadet rates of pay during their course.

Mining Scholarships.

A number of scholarships tenable in Mining Engineering are offered each year by the Joint Coal Board and the Combined Colliery Proprietors' Association.

The values of the scholarships are as follows:—

Joint Coal Board.

Basic Rate.*	Plus Allowance.				Total Value.
	Fees.	Books.	Instruments.	Students Residing Away from Home.	
	£	£	£	£	£ s. d.
1st year—£253 10s. 0d. ...	30	12	10	65	370 10 0
2nd year—£279 10s. 0d. ...	30	12	...	65	386 10 0
3rd year—£305 10s. 0d. ...	30	12	...	65	412 10 0
4th year—£331 10s. 0d. ...	30	12	...	65	438 10 0

Combined Colliery Proprietors' Association.

Basic Rate.*†	Plus Allowance.				Total Value.
	Fees.	Books.	Instruments.	Students Residing Away from Home.	
	£	£	£	£	£
1st year—£265	30	12	10	52	369
2nd year—£291	30	12	...	52	385
3rd year—£317	30	12	...	52	411
4th year—£343	30	12	...	52	437

* Weekly equivalent.

† Subject to some adjustment with variations in the basic wage.

Note.—The Joint Coal Board scholarships cover, in addition, fees for membership in Students' Union and Societies.

Particulars and application forms for these scholarships can be obtained from the Guidance Office, Broadway, Sydney.

Mining and Metallurgical Bursaries Fund.

1. The Mining and Metallurgical Bursaries Fund provides for the award of bursaries to students proceeding to the degree of Bachelor of Engineering in Mining or Metallurgy or Bachelor of Science with Geology as a major subject. The bursaries are each valued at £30 per annum up to a total value of £90, payable in annual instalments.

2. Candidates must be British subjects and must have completed the first year of their course for the degree of Bachelor of Engineering or Bachelor of Science.

3. The bursaries will be awarded by the Trustees of the Mining and Metallurgical Bursaries Fund, Melbourne, upon the recommendation of a local selection committee, consisting of representatives of the Trustees, the University and the Australasian Institute of Mining and Metallurgy.

4. The selection committee will base its recommendations on considerations of personality and scholarship, and candidates should submit evidence under both these headings. The committee will give chief consideration under the heading of scholarship to proficiency in subjects relating to mining engineering and metallurgy, respectively.

5. No recommendation will be made if, in the opinion of the selection committee, no candidate is qualified.

6. Candidates must lodge their applications and credentials, endorsed "Mining and Metallurgical Bursaries," with the Registrar of the University on or before 31st December.

7. Payments will be made during the first term of the second, third and fourth years. The payment of the second and third annual instalments of each bursary will be contingent on the holder having completed his second and third years, respectively, and on the decision of the selection committee that he has sufficiently distinguished himself in the subjects of the year.

In general, the attainment of distinction in two subjects or credit in three subjects will be accepted as evidence of sufficient distinction. Special consideration will be given to engineering and geological subjects in the case of a bursary in Mining and to engineering and chemical subjects in the case of a bursary in Metallurgy.

8. Bursars in any year desiring renewal of their bursaries for the following year must apply in writing for such renewal before 31st December.

Commonwealth Scholarships.

Students attending first degree or diploma courses at the New South Wales University of Technology are eligible to apply for Commonwealth scholarships. Open Entrance Scholarships are awarded at matriculation. In addition, a limited number of scholarships is awarded to students proceeding to second or later years of their course who have not failed either in the first year or in the year immediately preceding the award of the scholarship, and who have not previously received benefits under the Commonwealth Scholarship Scheme, the Commonwealth Financial Assistance Scheme or the Commonwealth Reconstruction Training Scheme. Mature Age Scholarships are also awarded, either in the first or later years of a course, to students between the ages of 25 and 30 years on the 1st of January of the year in which a scholarship is sought, who have resided in Australia for the two years immediately prior to that date, who have no previous professional or tertiary qualifications and who have not previously received assistance under the Commonwealth Scholarship Scheme, the Commonwealth Financial Assistance Scheme or the Commonwealth Reconstruction Training Scheme.

The award of Commonwealth scholarships will be made entirely on merit, and all students awarded Commonwealth scholarships will be entitled to the following benefits, irrespective of the means of their parents:—

(*a*) tuition fees;

(*b*) examination fees;

(*c*) degree fees;

(*d*) general service fees;

(*e*) other compulsory fees.

Winners of Commonwealth scholarships who undertake full-time courses on a full-time basis may also apply for living allowances, subject to a means test. The maximum living allowances are £169 per annum for a student living with his parents, and £240 10s. per annum for a student living away from his parents.

The maximum living allowances will be granted where the adjusted family income does not exceed £660 per annum. The adjusted family income is the income of the student and his parents for the financial year immediately preceding the year in which the scholarship is awarded less £100 for the first dependent child under 16 years of age (other than the applicant) and £50 for each other dependent child under 16 years of age. Where the adjusted family income exceeds £660, the amount of living allowance payable abates at the rate of £3 for every £10 by which the adjusted family income exceeds £660. Thus, if the living allowance is to be payable in any particular case the adjusted family income must be less than (i) £1,150 if the

student is living at home or (ii) £1,388 if the student is living away from home. In the case of Mature Age Scholarships the student is also permitted to earn some income from other sources without reduction of the maximum living allowance. A single scholar's permissible income is £1 11s. 6d. per week and the permissible income of a married scholar and his/her spouse is £3 1s. 6d. per week, with an additional allowance of 9s. a week for one child.

Any scholar may receive from other sources, without deduction from his living allowance, an income of up to £1 a week during short vacations and up to £3 a week during long vacations.

Apart from Mature Age Scholarships, an applicant should be under 21 years of age on 21st January of *the year in which the course is commenced*, but consideration will also be given to students between the ages of 21 and 25 years upon indication by them of the reasons preventing the commencement of a tertiary course before the age of 21.

The closing date for applications for all Commonwealth scholarships is 30th November of the year immediately preceding the year in 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 MW2911.)

New South Wales Public Service Board Traineeships.

The N.S.W. Public Service Board award a number of traineeships in Civil and Mechanical Engineering, Wool Technology and Applied Chemistry. Under these traineeships University fees are paid and also allowances at the following rates while the student is in attendance at the University:

1st and 2nd years—

£182 per annum if living at home,

£280 per annum if living away from home.

3rd and subsequent years—

£192 per annum if living at home,

£300 per annum if living away from home.

On reaching the age of 21 years, the trainee receives an allowance at the rate of £261 per annum if living at home or £390 per annum if living away from home.

Married students receive £400 per annum.

During industrial training periods salaries are paid in accordance with the appropriate agreement.

State Bursaries and Exhibitions.

A number of exhibitions and bursaries are awarded by the New South Wales Government on the results of the Leaving Certificate Examination and the Qualifying Examination of the Department of Technical Education. The award of an exhibition exempts the student from payment of fees. Bursaries are awarded subject to the applicant holding an exhibition and satisfying a means test. They are tenable for the duration of one first degree course, and provide a living allowance of £52 per annum (£75 per annum if the student is living away from home), and a book allowance of up to £7 10s. per annum. The permissible income of the applicant's family is £1,050 if there are three or fewer dependents, with an increase in the permissible family income of £80 for each additional dependent. 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/o. Department of Education, Bridge Street, Sydney.

Department of Railways, New South Wales Scholarships.

The Department of Railways, N.S.W., calls applications annually from its employees for scholarships to the degree courses in Civil, Mechanical, and Electrical Engineering.

The scholarships are available under the following conditions:—

Group 1—Cadets and apprentices under 19 years of age as at 31st January in the year in which the scholarships are to be awarded are eligible for consideration provided they have had at least one year's service and have satisfactorily completed the technical course set down for that period.

The applicant must be eligible for enrolment in the complete Stage I of the relevant diploma course and also be acceptable to the University as a student of a degree course.

Group 2—Cadets and apprentices or employees with previous training as cadets or apprentices, who are not over 23 years of age as at 31st January in the year in which the scholarships are to be awarded, who have completed Stages 1 and 2 of the relevant diploma course without post examinations and who obtain credit passes in the principal subjects of Stage 2 in the year prior to the award.

Group 3—Employees who have had at least one year's service, who are not over 25 years of age as at 31st January in the year in which the scholarships are to be awarded, who have completed the relevant diploma course in the Honours or Credit Grade, and who have the necessary qualifications for entry to the degree course.

General—Scholarship holders will have all fees paid, be paid full salary while at the University, retain all benefits as an employee of the Commissioner for Railways, and will be required to complete a bond with surety to cover the period of training and to remain in the Commissioner's service after completion of the training period for five years in the case of Group 3, and ten years in the case of Groups 1 and 2.

The John Heine Memorial Scholarship.

The Scholarship is awarded annually at the discretion of the Directors of the John Heine Memorial Foundation, and is designed to encourage the recipient to undertake *either* the final two years of the degree course *or* the conversion course in Mechanical, Electrical, or Chemical Engineering, Applied Chemistry, or Metallurgy. Applicants for the scholarship will be required to furnish evidence of being qualified for admission to the third year of the degree course (fourth year in the case of Chemical Engineering) or to the appropriate conversion course.

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

(i) Final two years of the degree courses—
First year of tenure £100
Second year of tenure £150

(ii) Conversion courses—

(*a*) Mechanical and Electrical Engineering—

One part-time year followed by one full-time year—£50 in the first year and £200 in the second year.

Three part-time years—£50 in each of the first and second years, £150 in the third year.

(*b*) Applied Chemistry, Chemical Engineering, and Metallurgy—

Two part-time years—£100 in the first year and £150 in the second year.

One full-time year, £250.

One part-time year, £150.

Applicants for the scholarship are required to furnish evidence of good character, personality and address and medical fitness. They must also be an employee of a member of the Metal Trades Employers' Association. The tenure of the scholarship is conditional upon satisfactory report as to the recipient's progress in the course being made by the appropriate University authorities.

Application should be made not later than the 31st January of each year to the Secretary, The John Heine Memorial Foundation, c/o the Metal Trades Employers' Association, 7 Wynyard Street, Sydney.

The A. E. Goodwin Memorial Scholarship.

The Directors of A. E. Goodwin Ltd. have made provision for the annual award of a scholarship in commemoration of the late A. E. Goodwin.

1. The scholarship shall be known as the A. E. Goodwin Memorial Scholarship.
2. The scholarship shall be open for award each year to students who are eligible to enrol in the second year of the Mechanical Engineering degree course, and, in making the award, consideration shall be given to scholarship, personality and aptitude for the engineering profession.
3. The total value of the scholarship shall be £90, payable in three equal amounts of £30 each at the beginning of the second, third and fourth years of the course.
4. Continued tenure of the scholarship shall be subject to satisfactory progress on the part of the holder.
5. Applications shall be made to the Registrar by 31st January in each year.

The Broadcasting, Radio, Electrical Industries Fellowship (B.R.E.I.F.) Club, Sydney, Scholarship.

Two scholarships may be awarded annually by the Broadcasting, Radio, Electrical Industries Fellowship Club (B.R.E.I.F.), Sydney. The scholarships will be tenable in the second, third or fourth year of the Electrical Engineering degree course and will exempt holders from payment of fees during the year of tenure. Applications should be made on the prescribed form obtainable from the Registrar and should be lodged by 31st January in each year.

The Imperial Chemical Industries of Australia and New Zealand Research Fellowship.

Imperial Chemical Industries of Australia and New Zealand has undertaken to provide a sum of £600 annually to establish a Fellowship to be known as the Imperial Chemical Industries of Australia and New Zealand Research Fellowship. The following conditions apply to the award:—

1. The Research Fellowship is to be used to promote knowledge in those fields which have some direct relation to the scientific interests and national responsibilities of ICIANZ, such as pure and applied chemistry, biochemistry, agricultural science, chemotherapy, pharmacology, physics, engineering, mining and metallurgy.

2. The appointment to a Fellowship is to be made by the University subject to agreement by ICIANZ and is to be open to any subject of a nation in the British Commonwealth who is a graduate of a recognised University.
3. The normal period of tenure will be two years.
4. It is a condition of the appointment that a Fellow should engage in teaching activities in the University in addition to research.
5. A Fellow will not be under any obligation to take out a higher degree.
6. It is intended that the grant should increase the output of research and not be used to relieve the burden on any other source of revenue.
7. The annual grant to the University is fixed at £600.
8. Where no suitable candidate applies in any year, the University may carry the grant forward.
9. Application should be made to the Registrar by 31st December in 1955 and each alternate year thereafter.

The Monsanto Research Scholarship.

Monsanto Chemicals (Australia) Ltd. has established a scholarship for research in Chemical Engineering to the value of £700 per annum. The scholarship will be awarded under the following rules:—

1. The scholarship shall be known as the Monsanto Research Scholarship.
2. It shall be open for award each year, normally in February, from applications lodged with the Registrar by December 31st of the previous year. Awards shall be made by the Professorial Board on the recommendation of the Professor of Chemical Engineering, after consultation with Monsanto Chemicals (Australia) Ltd.
3. The scholarship shall have an annual value of £700, of which a minimum of £550 shall be paid to the scholar as his emoluments and the remaining £150 to the scholar or to the University towards meeting the expenses connected with the scholar's work, this to be at the discretion of the University.
4. The scholarship shall be awarded for research in Chemical Engineering, the subject of the research to be approved by the Professor of Chemical Engineering and to be carried out under his direction.
5. The scholarship shall be tenable at the New South Wales University of Technology for a period of one year, but may

be re-awarded for a second, though not for a further year. The scholar's tenure shall at all times be subject to his work being satisfactory to the Professor of Chemical Engineering.

6. Scholars shall be required to devote their full time to research, save that they will be permitted to undertake a limited amount of demonstrating work at the University.

7. Candidates for the scholarship shall be graduates in science or engineering (preferably having completed a four-year course) of an Australian University or have at least equivalent qualifications. They should have a good scholastic record and show some aptitude for research. Personality and leadership qualities shall also be taken into consideration.

8. The scholar shall forward a copy of any written account of his research work to the library of Monsanto Chemicals (Australia) Ltd. and shall have the right to publish the results of his research.

Consolidated Zinc Metallurgical Scholarship.

One post-graduate Metallurgical research scholarship is awarded annually by Consolidated Zinc Proprietary Limited to graduates in metallurgy. The scholarship is of an annual value of £500, and has a maximum tenure of three years. The conditions of award are as follows:—

1. The scholarship is open to graduates of a recognised University.

2. Applications close on 30th November, and should be lodged with the Company at 95 Collins Street, Melbourne.

3. Applicants must state their age. marital status, and previous academic and practical experience.

4. The subject of the research must be described by the applicant, together with a short statement of the objects towards which the research is directed. It is intended that the research should have some bearing on the industry with which the Company is associated.

5. The suggested research must also be acceptable to the University as submission for a thesis towards a higher degree, and the applicant must reach agreement with the University to this effect before lodging his application with the Company.

6. Final choice of a selected applicant will be made by the Chairman of the Company acting on the recommendation of a chosen official or officials of the Company.

Wool Industry Fund Scholarships.

Two scholarships financed from the Wool Industry Fund established by the Commonwealth Government are available for students attending the Wool Technology degree course. The value of each scholarship is £300 per annum for four years, continued tenure being subject to satisfactory progress. Further information may be obtained from the Registrar, with whom applications should be lodged not later than 31st January.

Services Canteens Trust Fund Post-Graduate Scholarship.

The Trustees of the Services Canteens Trust Fund offer annually one post-graduate scholarship for study or research in Australia to an outstanding student whose father or mother served in the Australian Forces during the 1939-45 war.

The scholarship shall be valued at £600 per annum and shall be available for a period of up to three years.

The scholarship is open to a child (including step-child, adopted child or ex-nuptial child) of a person who was at any time between 3rd September, 1939, and 30th June, 1947—

(*a*) a member of the Naval, Military or Air Forces of the Commonwealth; or

(*b*) a member of any nursing service or women's service attached or auxiliary to any branch of the Defence Force of the Commonwealth;

including

(*c*) members of the Canteens Staff of any ship of the Royal Australian Navy, and any person duly accredited to any part of the Defence Force who served in an official capacity on full-time paid duty.

In awarding the scholarship the Trustees will take into account:

(i) Academic career of the applicant.

(ii) Ability for research work.

(iii) Character.

(iv) The future value to Australia of the subject of research selected.

Applications must be lodged with the General Secretary, Services Canteens Trust Fund, Victoria Barracks, St. Kilda Road, Melbourne, before 15th January.

Application forms and any further information may be obtained from the Regional Secretary, Services Canteens Trust Fund, 84 Pitt Street, Sydney.

CONDITIONS FOR THE AWARD OF DEGREE OF MASTER IN THE FACULTIES OF APPLIED SCIENCE AND ENGINEERING.

1. Applications to register for the degree of Master of Science or Master of Engineering shall be made on the prescribed form which shall be lodged with the Registrar at least one full calendar month before the commencement of the term in which the candidate desires so to register.

2. A candidate for the degree of Master shall have obtained the degree of Bachelor with Honours in the New South Wales University of Technology, or other approved University, in an appropriate department, save that a graduate who holds the degree of Bachelor without Honours may be admitted as a candidate if evidence is submitted to the satisfaction of the Professorial Board that such candidate has attained, by additional work and study since graduating, a standard not lower than Second Class Honours. The Board may require such applicants to sit for such examinations or carry out such prescribed work as the Board may determine before the student is accepted as a candidate for the degree.

3. (i) In exceptional cases persons may be admitted as candidates for the degree of Master if they submit evidence of such general and professional qualifications as may be approved by the Professorial Board.

(ii) The admission of diplomates of the New South Wales Department of Technical Education as candidates for the degree of Master shall be determined in each case by the Professorial Board. Normally such candidates shall be required to produce evidence of academic and professional progress over a period of five (5) years from the time of gaining the diploma.

4. A candidate approved by the Professorial Board shall register in one of the following categories:—

(i) Student in full-time attendance at the University.

(ii) Student in part-time attendance at the University.

(iii) Student working externally to the University.

5. An approved candidate shall be required to pay the undermentioned fees:

(i) a registration fee of £2:

(ii) the appropriate laboratory and supervision fee according to the category in which the candidate is registered;

(iii) a fee of £15 when submitting the thesis for examination.

The combined laboratory and supervision fee shall be—

(*a*) £30 p.a. for students in full-time attendance at the University;

(*b*) £15 p.a. for students in part-time attendance at the University;

(*c*) £10 p.a. for students working externally to the University.

Fees shall be paid in advance and no fees shall be refunded under any circumstances.

6. (i) Every candidate for the degree shall be required to submit a thesis embodying the results of an original investigation or design, to take such examinations and to perform such other work as may be prescribed by the Professorial Board. The candidate may submit also for examination any work he has published, whether or not such work is related to the thesis.

(ii) The thesis, investigation, design and other work as provided in paragraph (i) shall be conducted under the direction of a supervisor appointed by the Board or under such conditions as the Board may determine.

(iii) Every candidate shall submit three copies of the thesis as provided under paragraph (i) by 31st December of the year next preceding that in which the candidate may graduate. All copies of the thesis shall be in double-spaced typescript, shall include a summary of approximately 200 words in the nature of an abstract, and a certificate over the hand of the candidate to the effect that the work has not been submitted to any other University or institution for a Higher Degree and one of the three copies of the thesis shall be in accordance with the following specification:—

The size of the paper shall be quarto (approximately 10 in. x 8 in.) except for drawings and maps on which no restriction is placed. A margin of 1½ in. shall occur on the left-hand side of each page and the whole shall be bound in a cover to be supplied by the University.

(iv) Unless there is a specific arrangement to the contrary, the candidate understands that the University shall retain the three copies of the thesis and is free to allow the thesis to be consulted or borrowed or to be issued in whole or in part in photostat or microfilm or other copying medium.

7. No candidate shall be considered for the award of the degree until the lapse of six complete terms from the date of registration.

8. There shall be two examiners appointed by the Professorial Board, one of whom shall, if possible, be an external examiner.

CONDITIONS FOR THE AWARD OF DEGREE OF MASTER IN THE FACULTY OF ARCHITECTURE.

1. Applications to register for the degree of Master of Architecture shall be made on the prescribed form which shall be lodged with the Registrar at least one full calendar month before the commencement of the term in which the candidate desires so to register.

2. *Qualifications.*—Admission as candidate for the degree of Master of Architecture shall be decided in each case by the Professorial Board. Persons in one of the following categories may be admitted as registered candidates:

(i) Those holding the degree of Bachelor of Architecture with Honours in the New South Wales University of Technology or other approved University, in an appropriate department, save that a graduate who holds the degree of Bachelor of Architecture without Honours may be admitted as a candidate if evidence is submitted to the satisfaction of the Professorial Board that such candidate has attained, by additional work and study since graduating, a standard not lower than Second Class Honours. The Board may require such applicants to sit for such examinations or carry out such prescribed work as the Board may determine before the student is accepted as a candidate for the degree.

(ii) The admission of diplomates of the New South Wales Department of Technical Education as candidates for the degree of Master shall be determined in each case by the Professorial Board. Normally such candidates shall be required to produce evidence of academic and professional progress over a period of five (5) years from the time of gaining the diploma.

(iii) In exceptional cases persons may be admitted as candidates for the degree of Master if they submit evidence of such general and professional qualifications as may be approved by the Professorial Board.

3. *Registration.*—A candidate for registration for the degree of Master shall submit with his application, a certificate from the Head of the School of Architecture, stating that the candidate is a fit person to undertake a course of study or research leading to the degree of Master of Architecture and that the School is willing to undertake the responsibility of supervising the work of the candidate and of reporting to the Professorial Board at the end of the course on the merits of the candidate's performance.

4. A candidate approved by the Professorial Board shall register in one of the following categories:—

(i) Student working externally to the University;

(ii) Student in part-time attendance at the University;

(iii) Student in full-time attendance at the University.

5. *Fees.*—An approved candidate shall be required to pay the undermentioned fees:—

(i) A registration fee of £2.

(ii) the appropriate laboratory and studio and supervision fee, as follows—

(*a*) £10 p.a. for students working externally to the University;

(*b*) £15 p.a. for students in part-time attendance at the University;

(*c*) £30 p.a. for students in full-time attendance at the University.

(iii) a fee of £15 when submitting the thesis for examination.

Fees shall be paid in advance and no fees shall be refunded under any circumstances.

6. *Thesis*:

(i) Every candidate for the degree shall be required to submit a thesis embodying the results of original investigation or design or advanced study relative to Architecture or Building, to take such examinations and to perform such work as may be prescribed by the Professorial Board. The candidate may submit also for examination any other work he has undertaken or published, whether or not such work is related to the thesis.

(ii) The thesis, investigation, design and other prescribed work as provided in paragraph (i) shall be conducted under the guidance of a supervisor appointed by the Board or under such conditions as the Board may determine.

(iii) Every candidate shall submit three copies of the thesis (including any necessary plans and illustrations) as provided under paragraph (i) by 1st December of the year next preceding that in which the candidate may graduate. All copies of the thesis shall include a summary of approximately 200 words in the nature of an abstract, and a certificate over-

the hand of the candidate to the effect that the work has not been submitted to any other University or institution for a Degree, Diploma or any other qualification.

(iv) The thesis shall be in double-spaced typescript. Two copies shall be bound in such manner as allows their transmission to the examiners without possibility of disarrangement and the third copy shall be in accordance with the following specification:

The size of the paper shall be quarto (approximately 10 inches x 8 inches), except for drawings, plans and maps, on which no restriction is placed. A margin of 1½ inches to be left on the left-hand side of each page and the whole to be arranged in order for binding, but to be unbound.

(v) Unless there is a specific arrangement to the contrary, the candidate understands that the University shall retain the three copies of the thesis and is free to allow the thesis to be consulted or borrowed or to be issued in whole or in part in photostat or microfilm or other copying medium.

7. No candidate shall be considered for the award of the degree until the lapse of six complete terms from the date of registration.

8. There shall be two examiners appointed by the Professorial Board, one of whom shall, if possible, be an external examiner.

CONDITIONS FOR THE AWARD OF DEGREE OF DOCTOR OF PHILOSOPHY (Ph.D.).

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

Qualifications.

2. A candidate for registration for the degree of Ph.D. shall—

(i) hold an Honours degree from the New South Wales University of Technology; or

(ii) hold an Honours degree of equivalent standing from any other approved University; or

(iii) if he holds a degree without Honours from the New South Wales University of Technology or an approved University, have achieved by subsequent work and study a standard recognised by the Board as equivalent to Honours; or

(iv) in exceptional cases, submit such other evidence of general and professional qualifications as may be approved by the Professorial Board.

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

Registration.

4. A candidate for registration for a course of study leading to the degree of Ph.D. shall—

(i) apply to the Registrar on the prescribed form at least one calendar month before the commencement of the term in which he desires to register; and

(ii) submit with his application a certificate from the Head of the University School in which he proposes to study stating that the candidate is a fit person to undertake a course of study or research leading to the Ph.D. degree and that the School is willing to undertake the responsibility of supervising the work of the candidate and of reporting to the Professorial Board at the end of the course on the merits of the candidate's performance in the prescribed course of study.

Course of Study.

5. Subsequent to registration the candidate shall pursue a course of advanced study and research for at least nine academic terms, save that—

(i) a candidate who is not fully engaged in research work for his degree will be required to satisfy the Professorial Board on the amount of time he can devote to research work for the degree; and he may not proceed to the degree before the expiration of ten academic terms from the date of registration as a candidate;

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

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

7. The course, other than field work, must be carried out in a School of the University, under the direction of a supervisor appointed

by the Board, or under such conditions as the Board may determine, save that a candidate may be granted special permission by the Board to spend a period of not more than three academic terms in research at another institution approved by the Board.

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

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

Thesis.

10. On completing his course of study every candidate must submit a thesis which complies with the following requirements:—

(i) The greater proportion of the work described must have been completed subsequent to registration for the Ph.D. degree.

(ii) It must be a distinct contribution to the knowledge of the subject.

(iii) It must be written in English and reach a satisfactory standard of literary presentation.

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

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

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

14. Unless there is a specific arrangement to the contrary, the University will be free to allow the thesis to be consulted or borrowed or to be issued in whole or in part in photostat or micro-film or other copying medium.

Entry for Examination.

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

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

17. The thesis shall be in double-spaced typescript. Two copies shall be bound in such manner as allows their transmission to the examiners without possibility of disarrangement, and the third copy shall be in accordance with the following specification:

Size of paper, quarto (approximately 10 inches by 8 inches) except for drawings and maps on which no restriction is placed. A margin of 1½ inches to be left on the left-hand side of each page, the whole to be arranged in order for binding but to be unbound.

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

19. The Professorial Board shall appoint the examiners, one of whom shall normally be an external examiner.

20. After the examiners have read the thesis they may—

(i) without further test recommend the candidate for rejection;

(ii) request additional work on the thesis before proceeding further with the examination.

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

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

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

Fees.

24. The fee payable for an examination qualifying for registration shall be £5 5s.

25. An approved candidate shall pay—

(i) a registration fee of £2.

(ii) a supervision fee of £30 per annum.

(iii) a fee of £21 on application for the examination.

26. Fees shall be paid in advance and no fees shall be refunded under any circumstances.

SYLLABUSES FOR UNDERGRADUATE COURSES.

The syllabuses of the courses offered in the various schools are set out in detail below.

For purposes of reference each school within the University, except the School of Humanities and Social Sciences, utilizes a Roman numeral to distinguish the undergraduate courses of study leading to a degree which it mainly provides. Similarly the subjects provided by each school are distinguished by an Arabic number, the first figure in which corresponds with the Roman numeral utilized by that school.

Subjects given by the School of Humanities and Social Sciences carry the letter G followed by a distinguishing number.

School.	Distinguishing Numeral.	Subject Numbers.
Applied Physics	I	1.01 to 1.92
Applied Chemistry	II	2.01 to 2.97
Chemical Engineering	III	3.01 to 3.75
Metallurgy	IV	4.01 to 4.912
Mechanical Engineering	V	5.01 to 5.94
Electrical Engineering	VI	6.01 to 6.95
Mining Engineering and Applied Geology	VII	7.001 to 7.583
Civil Engineering	VIII	8.01 to 8.94
Wool Technology	IX	9.01 to 9.94
Mathematics	X	10.01 to 10.92
Architecture and Building	XI	11.01 to 11.96
Applied Psychology	XII	12.01 to 12.70
Humanities and Social Sciences		G1 to G51

The time given to each subject is shown in two parts, the first figure respresenting lecture hours per week, the second, laboratory tutorial or practical work in hours per week. These times represent the average distribution over the term or year, but may be varied from time to time according to the nature of the work. Lecture time may not always be used for formal instruction, but may be devoted to discussions, assignments in the library, film presentation, or other means of instruction.

Courses at Newcastle University College.

A list of subjects offered to students taking an Arts course at the Newcastle University College appears on pages 185 and 186 of this Calendar.

In general, the professional courses provided at Newcastle University College are identical with the courses as given at Sydney. Details of the courses available at Newcastle University College are given in the College Handbook.

SCHOOL OF APPLIED PHYSICS.

The course in Applied Physics is designed to equip students for research in industry and in the field of applied science generally. The course, which extends over four years, provides a thorough training in the fundamentals of physical science and in mathematics, and particular emphasis is placed on technological applications. The practical training includes courses in physical techniques (e.g., high vacuum, electronics, photometric photography) and courses in formal experimentation designed to develop the research outlook. The extra-mural training includes substantial periods in industry in each of the second and third years. On the mathematical side, not only is particular attention given to the formal training required by a physicist, but special courses are given in the application of statistical methods to industrial experimentation.

In addition to the day course in Applied Physics, which leads to the degree of Bachelor of Science (Pass or Honours), Conversion Courses in Applied Physics and Optometrical Science are offered, details of which are shown on pages 95 and 96 respectively.

COURSE I—APPLIED PHYSICS.

First Year.

(34 weeks day course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.11	Physics	3 — 3-1*	3 — 3-1*	3 — 3-1*
1.21	Physical Techniques I	0 — 2	0 — 4	0 — 0
2.21	Chemical Techniques	0 — 3	0 — 0	0 — 0
2.41A	General Chemistry	3 — 3	3 — 3	3 — 6
5.101	Eng. Drawing and Materials	1 — 0	1 — 0	1 — 3
10.11	Mathematics	4 — 2*	4 — 2*	0 — 0
10.11B	Mathematics	0 — 0	0 — 0	2 — 2*
G10	English	2 — 0	2 — 0	0 — 0
G20.1	History	1 — 0	1 — 0	0 — 0
		14 —14	14 —13	9 —15

Second Year.

(24 weeks day course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.
1.12	Physics	3 — 3-1*	3 — 3-1*
1.22	Physical Techniques II	0 — 3	0 — 3
2.32A	Physical Chemistry	2 — 0	1 — 2
4.12	Metallurgy	1 — 2	1 — 0
5.211A†	Workshop Processes and Practice	0 — 3	0 — 3
10.12	Mathematics	3 — 2*	3 — 2*
G20.2	History	2 — 0	0 — 0
G1	Logic	0 — 0	2 — 0
		11 —14	10 —14

* Tutorial.

THIRD YEAR.

(24 weeks day course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.
1.13	Physics	6 — 3–1*	6 — 3–1*
1.23A	Physical Techniques III	0 — 0	0 — 3
1.23B / 1.23C	Physical Techniques IV *or* Physical Techniques V	0 — 3	0 — 3
1.23D	Physical Techniques VI	0 — 2	0 — 2
6.83	Electrical Engineering	2 — 3	2 — 3
10.13	Mathematics	5 — 0	5 — 0
G2	Philosophy	2 — 0	0 — 0
	Minor Elective (Humanities)	0 — 0	2 — 0
		15 —12	15 —15

* Tutorial.

FOURTH YEAR.

(34 weeks day course.)

The fourth year is much more flexible than the earlier years in the allocation of time between lectures and laboratory and tutorial work, and the formal instruction is interspersed with colloquia and study group work. The following time-table is representative:

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.14	Physics	5 — 9–2*	5 — 9–2*	4 — 9–2*
10.14	Mathematics	6 — 0	6 — 0	6 — 0
	Major Elective (Humanities)	3 — 0	3 — 0	0 — 0
		14 —11	14 —11	10 —11

* Tutorial.

CONVERSION COURSE—Ic1—APPLIED PHYSICS.

Holders of a diploma in Physics who have completed the course of study set out in the current Handbook of the N.S.W. Department of Technical Education may qualify for the degree of Bachelor of Science in Applied Physics by—

*(*a*) Full-time attendance and successful completion of the fourth year of the degree course, with the following variation—

* Option (*a*) is available only to holders of the Physics diploma who have had at least one year's industrial experience in an occupation involving the application of physical principles, or who have equivalent occupational qualifications.

Portion of the syllabus already taken in the diploma course to be omitted and replaced by Engineering Metallurgy (4.912), and Humanities fourth year degree to be replaced by conversion Humanities ((i) English, History or Philosophy and (ii) Government, Psychology or Economics.)

Or

†(*b*) Successful completion of a part-time course of two years' duration as follows—

	Hours per week.	
	1st year.	2nd year.
Physics—Lectures	2½	2½
Physics—Laboratory	3	3
Mathematics	2	4
Metallurgy (or equivalent)	2¼	—
Conversion Humanities—		
English, History *or* Philosophy	2	—
Government, Psychology *or* Economics	—	2
	11¾	11½

CONVERSION COURSE Ic2—OPTOMETRICAL SCIENCE.

Associates of the Sydney Technical College in Optometry may qualify for the award of the degree of Bachelor of Science (Optometrical Science) by satisfactorily completing the requirements as set out below. In general, the requirements fall into two main categories as shown hereunder, but these may be varied by the Professorial Board in individual cases according to the record of the student.

A. Conversion Course for holders of 5-year Diploma
(1952 and subsequently).

Subject.	Hours per week.
Advanced Visual Physiology and Physiological Optics	5
Advanced Clinical Optometry	3
Mathematics and Statistics	2
Conversion Humanities—English, History *or* Philosophy *and* Psychology, Economics *or* Government	4
	14

To be taken in one year of full-time study, or two years of part-time study of approximately 7 hours per week.

† Option (*b*) is available only to holders of the Physics diploma who, at the conclusion of the conversion course, will have had at least three years' experience of the type mentioned in connection with option (*a*).

B. Conversion Course for holders of 4-year Diploma (1930-1951).

Subject.	Hours per week.
Optometry II	2
Clinical Optometry II	3
Theory of Optical Instruments	1
Psychology II	2
Optometry III	2
Advanced Visual Physiology and Physiological Optics	5
Advanced Clinical Optometry	3
Mathematics and Statistics	2
Conversion Humanities—English, History *or* Philosophy, *and* Psychology, Economics *or* Government	4
	24

To be taken in two or three years of part-time study, as elected by the student, of approximately 12 or 8 hours per week.

SCHOOL OF APPLIED CHEMISTRY.

The needs of the chemical industry for men competent to develop, design and operate new processes and to improve existing ones, make essential two different types of training. One need involves a general and fundamental education based on science for those who seek a career in some field in which a sound knowledge of chemistry is important; the other requires a similar training to which is added knowledge of the engineering principles basic to design, construction and operation of plant and equipment.

Training of the first type is provided by the courses in Applied Chemistry, in which students receive instruction in the principles of inorganic, analytical, organic and physical chemistry, supplemented by instruction in mathematics and physics and other scientific subjects. In his final year the student is given the opportunity of electing certain subjects so as to enable him to extend his knowledge in fields of special interest.

Training of the second type is provided by the courses in Chemical Engineering, details of which are given on pages 117 to 129. It should be noted that the work in chemistry, physics and mathematics taken in the first year of the full-time course, and in the first and second years of the part-time course in Applied Chemistry is identical with that taken in the same years of the courses in Chemical Engineering and Metallurgy. Students in any of these courses may transfer from one to another without loss of standing up to the end of the first year full-time, or second year part-time.

* 53122—4 K 137

In addititon to the courses in Applied Chemistry, the School of Applied Chemistry offers courses in General Science, Leather Chemistry and Applied Biology.

COURSE II—APPLIED CHEMISTRY.

This course extends over four years. The first and fourth years of the course each require full-time day attendance at the University for 34 weeks. The second and third years are spent in combined academic study and works practice, students attending the University on two half days and two evenings per week over 34 weeks in each year.

A student at the end of the third year may apply to take an Honours degree, the additional work for Honours being taken in the final year.

First Year.

(34 weeks day course.)

		Hours per week.		
		Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.11A	Physics	3 — 3	3 — 3	3 — 3
2.21	Chemical Techniques	0 — 3	0 — 0	0 — 0
2.41	General Chemistry	3 — 3	3 — 6	3 — 9
5.101	Eng. Drawing and Materials	2 — 0	1 — 3	0 — 0
5.211	Workshop Processes and Practice	0 — 0	0 — 0	0 — 3
10.11	Mathematics	4 — 2*	4 — 2*	0 — 0
10.11B	Mathematics	0 — 0	0 — 0	2 — 2*
G10	English	2 — 0	2 — 0	0 — 0
G20	History	1 — 0	1 — 0	2 — 0
		15 —11	14 —14	10 —17

* Tutorial.

Second Year.

(34 weeks of 2 half days and 2 evenings per week.)

		Hours per week.		
		Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.92	Physics	1½— 0	1½— 1½	1½— 1½
2.32	Physical Chemistry	1 — 2½	1 — 0	1 — 0
2.42	Inorganic Chemistry	1 — 0	1 — 0	1 — 2½
2.52	Quantitative Analysis	1 — 2½	1 — 2½	1 — 2½
2.62	Organic Chemistry	1 — 0	1 — 2½	1 — 0
2.72	Mathematical Chemistry	1 — 0	1 — 0	1 — 0
G1	Logic	0 — 0	2 — 0	0 — 0
G2	Philosophy	0 — 0	0 — 0	2 — 0
		6½— 5	8½— 6½	8½— 6½

Third Year.

(34 weeks of 2 half days and 2 evenings per week.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
2.33	Physical Chemistry	1 — 2	1 — 2½	1 — 2½
2.53	Quantitative Analysis	1 — 2½	1 — 2½	1 — 2
2.63	Organic Chemistry	1 — 2½	1 — 2	1 — 2½
2.73	Mathematical Chemistry	1 — 0	1 — 0	1 — 0
3.14*	Industrial Chemistry	1½— ½	1½— ½	1½— ½
	Minor Elective (Humanities) ...	1 — 0	1 — 0	0 — 0
		6½— 7½	6½— 7½	5½— 7½

* Includes Factory visits.

Fourth Year.

(34 weeks day course.)

		Hours per week Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
2.34	Physical Chemistry	1 — 4½	1 — 4½	1 — 4½
2.44	Inorganic Chemistry	1 — 4½	1 — 4½*	0 — 0
2.54	Quantitative Analysis	0 — 0	1 — 4½†	1 — 4½
2.64 *or* 2.64A‡	Organic Chemistry	1 — 4½	1 — 4½	1 — 4½
	Major Elective (Humanities) ...	3 — 0	3 — 0	0 — 0
		6 —13½	7 —13½	3 —13½

* First half of term. † Second half of term.

‡ 2.64A is to be taken by all students desiring to proceed to an Honours degree.

Additional for Honours.

(Students desiring to take Honours must apply to the Professor of Applied Chemistry not later than 31st December in the year in which the third year is completed.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
2.65A *or* 2.65B	Applied Organic Chemistry ...	1 — 3	1 — 3	1 — 3
	Research Project	0 — 7	0 — 7	0 — 7
		1 —10	1 —10	1 —10

COURSE IIB1—APPLIED CHEMISTRY.

Course IIB1 has been designed for students employed in the chemical industry. The programme of study is equivalent to that of Course II, but Course IIB1 extends over six or seven part-time years, depending on whether a Pass or Honours degree is taken.

FIRST YEAR.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.11D	Physics, Part I	2 — 1½	2 — 1½	2 — 1½
2.21	Chemical Techniques	2 — 4	2 — 4	2 — 4
2.41	General Chemistry, Part I			
10.11–B	Mathematics, Part I	2 — 1*	2 — 1*	2 — 1*
		6 — 6½	6 — 6½	6 — 6½

* Tutorial.

SECOND YEAR.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.11D	Physics, Part II	1½— 1½	1½— 1½	1½— 1½
2.41	General Chemistry, Part II	1 — 2½	1 — 2½	1 — 4
5.101	Eng. Drawing and Materials	2 — 0	1 — 3	0 — 0
10.11–B	Mathematics, Part II	2 — 2*	1 — 1*	1 — 2*
		6½— 6	4½— 8	3½— 7½

* Tutorial.

THIRD YEAR.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.92	Physics *	1½— 0	1½— 1½	1½— 1½
2.32	Physical Chemistry	1 — 0	1 — 0	1 — 2½
2.42	Inorganic Chemistry	1 — 2½	1 — 0	1 — 0
2.52	Quantitative Analysis	1 — 2½	1 — 2½	1 — 2½
2.62	Organic Chemistry	1 — 0	1 — 2½	1 — 0
2.72	Mathematical Chemistry	1 — 0	1 — 0	1 — 0
		6½— 5	6½— 6½	6½— 6½
* Alternative Subject—				
	Chemical Instrumentation	1 — 2 †	1½— 1	1½— 1

† As an alternative 2 hours per week laboratory work in Fire Assaying may be taken in Term 1, by a limited number of students.

Fourth Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
2.33	Physical Chemistry	1 — 2	1 — 2½	1 — 2½
2.53	Quantitative Analysis	1 — 2½	1 — 2½	1 — 2
2.63	Organic Chemistry	1 — 2½	1 — 2	1 — 2½
2.73	Mathematical Chemistry	1 — 0	1 — 0	1 — 0
3.14A	Industrial Chemistry*	1½— ½	1½— ½	1½— ½
		5½— 7½	5½— 7½	5½— 7½

* Includes Factory visits.

Fifth Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
Elective A—				
2.34D	Physical Chemistry	1 — 3	1 — 3	1 — 3
2.44D	Inorganic Chemistry	1 — 3	1 — 3*	0 — 0
2.54D	Quantitative Analysis	0 — 0	1 — 3†	1 — 3
2.64D	Organic Chemistry	1 — 3	1 — 3	1 — 3
		3 — 9	3 — 9	3 — 9

* First half of term. † Second half of Term.

Or,

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
Elective B—				
2.34D	Physical Chemistry	1 — 3	1 — 3	1 — 3
2.64A	Organic Chemistry	1 — 3	1 — 3	1 — 3
2.65A *or* 2.65B	Applied Organic Chemistry ...	1 — 3	1 — 3	1 — 3
		3 — 9	3 — 9	3 — 9

SIXTH YEAR.

(34 weeks part-time course.)

	Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
English, History *or* Philosophy	2 — 1*	2 — 1*	2 — 1*
and			
Psychology, Economics *or* Government	2 — 1*	2 — 1*	2 — 1*
	4 — 2	4 — 2	4 — 2

* Tutorial.

ADDITIONAL FOR HONOURS.

(Students desiring to take Honours must apply to the Professor of Applied Chemistry not later than 31st December in the year in which the fifth year is completed. The full programme of study may be taken over two part-time years or one full-time year.)

			Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
2.44D 2.54D	Inorganic Chemistry Quantitative Analysis	*.....	1 — 3	1 — 3	1 — 3
	Or				
2.65	Applied Organic Chemistry †		1 — 3	1 — 3	1 — 3
	Research Project		0 —10	0 —10	0 —10

* Unless taken in fifth year Elective A.

† If 2.44D Inorganic Chemistry and 2.54D Quantitative Analysis were taken in fifth year Elective A.

COURSE IIB2—GENERAL SCIENCE.

This course is being replaced by Course IISB—General Science (see page 112).

COURSE IIB3—LEATHER CHEMISTRY.

This part-time course provides advanced instruction in chemistry for persons employed in the Leather industry. The course may be taken over six years for a Bachelor of Science (Pass) degree, or over seven years for an Honours degree.

First Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.11D	Physics, Part I	2 — 1¼	2 — 1¼	2 — 1¼
2.21 2.41	Chemical Techniques General Chemistry, Part I } ...	2 — 4	2 — 4	2 — 4
10.11–B	Mathematics, Part I	2 — 1*	2 — 1*	2 — 1*
		6 — 6¼	6 — 6¼	6 — 6¼

* Tutorial.

Second Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.11D	Physics, Part II	1½— 1½	1½— 1½	1½— 1½
2.41	General Chemistry, Part II ...	1 — 2½	1 — 2½	1 — 4
10.11–B	Mathematics, Part II	2 — 1*	1 — 1*	1 — 1*
	Materials for Leather Manufacture	1 — 2	1 — 3	1 — 1
		5½— 7	4½— 8	4½— 7½

* Tutorial.

Third Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
2.32	Physical Chemistry	1 — 0	1 — 0	1 — 2½
2.42	Inorganic Chemistry	1 — 2½	1 — 0	1 — 0
2.52	Quantitative Analysis	1 — 2½	1 — 2½	1 — 2½
2.72	Mathematical Chemistry	1 — 0	1 — 0	1 — 0
	Light and Heavy Leather Manufacture	2 — ½	1 — 1½	1 — 1½
		6 — 5½	5 — 4	5 — 6½

Fourth Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
2.33	Physical Chemistry	1 — 2	1 — 2½	1 — 2½
2.53	Quantitative Analysis	1 — 2½	1 — 2½	1 — 2½
2.63	Organic Chemistry	1 — 2½	1 — 2	1 — 2½
	Science of Leather Chemistry...	1 — 0	1 — 0	1 — 0
	Analytical Chemistry of Leather Manufacture	1 — 0	1 — 0	1 — 0
		5 — 7	5 — 7	5 — 7½

Fifth Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
2.34D	Physical Chemistry			
	or	1 — 3	1 — 3	1 — 3
2.64D	Organic Chemistry			
2.94D	Biochemistry	0 — 0	2 — 3	2 — 3
	Leather Laboratory	0 — 7½	0 — 3	0 — 3
		1 —10½	3 — 9	3 — 9

Sixth Year.

(34 weeks part-time course.)

	Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
English, History *or* Philosophy	2 — 1*	2 — 1*	2 — 1*
and			
Psycho'ogy, Economics *or* Government	2 — 1*	2 — 1*	2 — 1*
	4 — 2	4 — 2	4 — 2

* Tutorial.

Additional for Honours.

Students desiring to take Honours must apply to the Professor of Applied Chemistry not later than 31st December in the year in which the fifth year is completed. The programme of study will be taken over two part-time years.

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
2.34D	Physical Chemistry ..... *or* 2.64D Organic Chemistry, depending on the subject taken in the fifth year	1 — 3	1 — 3	1 — 3
2.73	Mathematical Chemistry	1 — 0	1 — 0	1 — 0
	Microbiology Ia and the Bacteriology and Mycology of Leather	1 — 2	1 — 2	1 — 2
	Leather Project	0 — 6	0 — 6	0 — 6

COURSE IIB4—APPLIED BIOLOGY.

In order to meet the increasing demand in Australian industry for scientists trained to degree level in one or other of the biological sciences, a part-time course in Applied Biology is offered. In this course, biochemistry and/or microbiology are taken as major subjects. The course extends over six years for a Bachelor of Science (Pass) degree, and over seven years for an Honours degree.

First Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.11D	Physics, Part I	2 — 1¼	2 — 1¼	2 — 1¼
2.21 2.41	Chemical Techniques General Chemistry, Part I ...	2 — 4	2 — 4	2 — 4
10.11-B	Mathematics, Part I	2 — 1*	2 — 1*	2 — 1*
		6 — 6¼	6 — 6¼	6 — 6¼

* Tutorial.

Second Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.11D	Physics, Part II	1½ — 1½	1½ — 1½	1½ — 1½
2.41	General Chemistry, Part II	1 — 2½	1 — 2½	1 — 2½
2.911	Biology	2 — 4	2 — 4	2 — 4
		4½ — 8	4½ — 8	4½ — 8

Third Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
2.32D	Physical Chemistry	1 — 2½	1 — 2	1 — 2½
2.52	Quantitative Analysis †	1 — 2½	1 — 2½	1 — 2½
2.62	Organic Chemistry	1 — 0	1 — 2½	1 — 0
2.912	Biology	1 — 2–½*	1 — 2	1 — 2–½*
		4 — 7½	4 — 9	4 — 7½

* Tutorial.

† In special cases 10.11–B Mathematics, Part II, may be taken in place of 2.52 Quantitative Analysis.

Fourth Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
2.913	Physiology	1 — 2	1 — 2	1 — 2
2.95	Biochemistry I	1 — 2	1 — 2	1 — 2
	Plus two electives from—			
2.184	Botany	1 — 2	1 — 2	1 — 2
2.194	Zoology	1 — 2	1 — 2	1 — 2
2.33	Physical Chemistry	1 — 2	1 — 2½	1 — 2½
2.63 *or* 2.63A	Organic Chemistry	1 — 2½	1 — 2	1 — 2½
2.924	Microbiology I	1 — 2	1 — 2	1 — 2
		4 — 8–8½	4 — 8–8½	4 — 8–9

Fifth Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
Either—				
2.925 Microbiology II 2.926 Microbiology III	.....	2 — 4	2 — 4	2 — 4
2.96 Biochemistry II 2.97 Biochemistry III	.....	2 — 4	2 — 4	2 — 4
(Second and third stages of these subjects are run in the first half and second half of year respectively.)				
Or—				
2.925 Microbiology II *and* 2.926 Microbiology III *or* 2.96 Biochemistry II *and* 2.97 Biochemistry III	.....	2 — 4	2 — 4	2 — 4
Plus *two* of the following electives :—				
2.34 Physical Chemistry	.....	1 — 3	1 — 3	1 — 3
2.64 Organic Chemistry	.....	1 — 3	1 — 3	1 — 3
2.914 Physiology	.....	1 — 2	1 — 2	1 — 2
2.925 Microbiology II	.....	1 — 2	1 — 2	1 — 2
2.96 Biochemistry II (1st half of year) Chemistry and Analysis of Foods (2nd half of year).		2 — 4	2 — 4	2 — 4
		4 — 8–10	4 — 8–10	4 — 8–10

Elective subjects must be chosen with due regard to subjects already taken.

Sixth Year.

	Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
English, History, *or* Philosophy	2 — 1*	2 — 1*	2 — 1*
and			
Psychology, Economics *or* Government	2 — 1*	2 — 1*	2 — 1*
	4 — 2	4 — 2	4 — 2

* Tutorial.

ADDITIONAL FOR HONOURS.

Students desiring to take Honours must apply to the Professor of Applied Chemistry not later than 31st December in the year in which the fifth year is completed. The programme of study will be taken over two part-time years.

The topic of the research project, upon which a thesis is required to be submitted, may be chosen from one of the following fields: Biochemistry, Microbiology, Physiology.

CONVERSION COURSE IIc—APPLIED CHEMISTRY.

Holders of a diploma in Chemistry who completed the course of study prior to 1954 are required to complete the following additional subjects to qualify for the degree of Bachelor of Science:—

	Hours per week.
Diploma Mathematics II	2
Diploma Physics II	3
Conversion Humanities—English, History *or* Philosophy *and* Psychology, Economics *or* Government	2
	2
	9

Plus the presentation of a thesis which may involve advanced laboratory work, together with any special subjects prescribed in each case.

The student is required to attend full time for one academic year or for such other time as approved by the Professorial Board.

GENERAL SCIENCE.*

The General Science course is designed to meet the needs of students who desire a more broadly based course than is provided in the Applied Science courses (viz., Applied Physics, Optometrical Science, Applied Chemistry, Leather Chemistry, Applied Biology, Chemical Engineering, Industrial Chemistry, Food Technology, Metallurgy and Wool Technology).

No industrial experience is required. A Pass degree may be taken after three years of full-time study or an Honours degree after four years. The course may be taken by part-time study, requiring seven years for the Pass degree.

In 1955, the full-time course will be offered at Newcastle and the part-time course at Sydney and Newcastle.

*Students who commence the General Science course in 1955 or later years will follow the syllabus as here set out. Students who have completed a stage of the General Science course IIB2 prior to 1955 may, subject to normal progression, follow the syllabus set out in the 1954 Calendar.

Full-time Course.

Not all the subjects listed will be available immediately so that students will be required, until further notice, to select their courses from the following:—

FIRST YEAR.

Chemistry I.
Mathematics I.
Physics I.
Geology I.

SECOND YEAR.

Chemistry II.
Mathematics II.
Higher Mathematics II.
Physics II.
Geology I.

THIRD YEAR.

Chemistry III.
Mathematics III.
Higher Mathematics III.
Physics III.
Geology II.

Part-time Course.

The equivalent subjects of the above with the exception of Higher Mathematics II and III.

COURSE IIs—GENERAL SCIENCE.

FIRST YEAR.

(34 weeks day course.)

	Hours per week.		
	Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
G10 English	2 — 0	2 — 0	0 — 0
G20 History	1 — 0	1 — 0	2 — 0
PLUS three subjects from—			
Chemistry I	3 — 4	3 — 4	3 — 4
Mathematics I	4 — 2	4 — 2	4 — 2
Physics I	3 — 4	3 — 4	3 — 4
General Biology	3 — 4	3 — 4	3 — 4
General Mathematics	3 — 1	3 — 1	3 — 1
Geology I	3 — 4	3 — 4	3 — 4

provided that—

(i) students intending to take Chemistry, Physics or Mathematics in Third Year, must take Chemistry I, Mathematics I and Physics I in First Year;

(ii) students intending to take Biological Science as a major subject in Third Year, must take General Biology, Chemistry I, Physics I and General Mathematics in First Year;

(iii) students wishing to take Geology as a major subject in Third Year, must take Geology I, Chemistry I, and Mathematics I in First Year, and Physics I in Second Year;

(iv) a pass in General Mathematics does not qualify for admission to Mathematics II.

SECOND YEAR.

(34 weeks day course.)

		Hours per week.		
		Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
G1	Logic	2 — 0	0 — 0	0 — 0
G2	Philosophy	0 — 0	1 — 0	1 — 0
	Minor Elective Humanities	0 — 0	1 — 0	1 — 0
PLUS three subjects from the following—				
Group A—				
*	Chemistry II	4 — 8	4 — 8	4 — 8
†	Mathematics II	3 — 2	3 — 2	3 — 2
	Physics II	4 — 4	4 — 4	4 — 4
	Geology II	4 — 6	4 — 6	4 — 6
	Botany I	4 — 6	4 — 6	4 — 6
	Zoology I	4 — 6	4 — 6	4 — 6
Group B—				
	General Biology	3 — 4	3 — 4	3 — 4
	Geology I	3 — 4	3 — 4	3 — 4
	Physics I	3 — 4	3 — 4	3 — 4

provided that—

(i) at least two subjects are taken from Group A;

(ii) students taking Geology II must also take Physics I;

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*A modified Chemistry II (Chemistry IIA, 3-6, 3-6, 3-6) is available for students doing Biological Sciences as major subjects. This course includes Biochemistry in place of Analytical Chemistry and Inorganic Chemistry.

†A special Mathematics course (Higher Mathematics II) of seven hours per week is provided for students wishing to proceed to Honours in the School of Mathematics.

(iii) Mathematics II may be taken only by students who have completed Mathematics I;

(iv) Botany I and Zoology I may be taken only by students who have completed General Biology;

(v) students intending to take either Botany II or Zoology II in Third Year must take Chemistry IIA.

THIRD YEAR.

(34 weeks day course.)

	Hours per week.		
	Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
Major Elective Humanities	3 — 0	3 — 0	0 — 0
PLUS two subjects from the following—			
Group A—			
Chemistry III	4 —10	4 —10	4 —10
Mathematics III	5 — 0	5 — 0	5 — 0
Or			
Higher Mathematics III	10 — 0	10 — 0	10 — 0
Physics III	4 — 8	4 — 8	4 — 8
Botany II	3 —10	3 —10	3 —10
Zoology II	3 —10	3 —10	3 —10
Geology III	5 — 8	5 — 8	5 — 8
Group B—			
Biochemistry I	3 — 6	3 — 6	3 — 6
Biochemistry IA	3 — 6	3 — 6	3 — 6
Botany I	4 — 6	4 — 6	4 — 6
Zoology I	4 — 6	4 — 6	4 — 6
Geology II	4 — 6	4 — 6	4 — 6
Advanced Organic Chemistry	2 — 8	2 — 8	2 — 8
Physics II	4 — 4	4 — 4	4 — 4
Chemistry II	4 — 8	4 — 8	4 — 8
Advanced Inorganic Chemistry ...	2 — 8	2 — 8	2 — 8
Advanced Physical Chemistry	2 — 8	2 — 8	2 — 8

provided that—

(i) at least one subject is taken from Group A;

(ii) before proceeding to Physics III, a student must have completed Mathematics II;

(iii) students who wish to be considered for admission to the Honours course in Physics will be required to complete a course in Physical Techniques in the Third Year (approximately seven hours per week);

(iv) Biochemistry may be taken only with Chemistry III and by students who have completed General Biology;

(v) Advanced Organic, Inorganic or Physical Chemistry may be taken only with Chemistry III;

(vi) Botany I and Zoology I may be taken only by students who have completed General Biology;

(vii) Biochemistry IA may be taken only in conjunction with Botany II or Zoology II;

(viii) Higher Mathematics III may be taken only by students who have completed Higher Mathematics II.

FOURTH YEAR (HONOURS).

Suitably qualified candidates may be admitted to an Honours course during the Fourth Year in one of the following subjects:—

(*a*) Botany.

(*b*) Chemistry (Biochemistry, Inorganic, Organic, Physical, Analytical).

(*c*) Geology.

(*d*) Mathematics.

(*e*) Physics.

(*f*) Zoology.

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

(ii) Students proceeding to Honours in Physics will be required to have completed Mathematics I, II and III, Physics I, II and III, and a course in Physical Techniques.

(iii) Students proceeding to Honours in Mathematics must have completed Higher Mathematics II and Higher Mathematics III.

(iv) Students who have completed Higher Mathematics III and Physics III may elect to proceed to Honours in Theoretical Physics.

COURSE IISB—GENERAL SCIENCE.

The various subjects of the full-time course are divided into sections so that the requirements for a Pass degree may be satisfied in seven years of part-time study each with a minimum attendance of 12 hours per week. The course is so arranged that students can transfer from full-time to part-time study without loss of status at the end of any year.

It is not proposed to set out all the possible combinations of subjects which could be selected but rather to set down courses leading to a major in the Physical sciences (Chemistry, Physics and Mathematics), Geology, and the Biological sciences (Botany and Zoology). The rules governing sequence of subjects in the full-time course apply also to the part-time course.

In determining a part-time programme, the student is advised to select his sequence of subjects on the basis of the full-time course and to make the necessary transposition into part-time subjects observing the rules as applying to the full-time course.

A. Physical Sciences (Chemistry, Physics and Mathematics as major subjects):

	Hours per week.		
	Term 1	Term 2	Term 3
Stage 1—	lec. lab./tut.	lec. lab./tut.	lec. lab./tut.
G10 English	1 — 0	1 — 0	2 — 0
Chemistry I, Part I	2 — 2	2 — 2	2 — 2
Mathematics I, Part I	2 — 1	2 — 1	2 — 1
Physics I, Part I	1 — 2	1 — 2	1 — 2
Stage 2—			
G20 History	1 — 0	1 — 0	2 — 0
Chemistry I, Part II	1 — 2	1 — 2	1 — 2
Mathematics I, Part II	2 — 1	2 — 1	2 — 1
Physics I, Part II	2 — 2	2 — 2	2 — 2

The above two stages complete 1st year of the full-time course.

Stages 3, 4 *and* 5—

The subjects of the 2nd year of the full-time course are divided into sections but not arranged in sequence. This procedure is adopted because of the number of possible combinations of subjects :—

(i) Humanities—			
G1 Logic	1 — 0	1 — 0	0 — 0
G2 Philosophy	0 — 0	1 — 0	1 — 0
Minor Elective (Humanities)	0 — 0	1 — 0	1 — 0
(ii) Chemistry II	4 — 8	4 — 8	4 — 8
Chemistry II, Part I	2 — 4	2 — 4	2 — 4
Chemistry II, Part II	2 — 4	2 — 4	2 — 4
(iii) Mathematics II	3 — 2	3 — 2	3 — 2
Mathematics II, Part I	2 — 1	2 — 1	2 — 1
Mathematics II, Part II	1 — 1	1 — 1	1 — 1
(iv) Physics II	4 — 4	4 — 4	4 — 4
Physics II, Part I	2 — 2	2 — 2	2 — 2
Physics II, Part II	2 — 2	2 — 2	2 — 2
(v) General Biology	3 — 4	3 — 4	3 — 4
General Biology, Part I	1 — 2	1 — 2	1 — 2
General Biology, Part II	2 — 2	2 — 2	2 — 2

A. Physical Sciences—*continued.*

	Hours per week.		
	Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
(vi) Geology I	3 — 4	3 — 4	3 — 4
Geology I, Part I	2 — 1½	2 — 1½	2 — 1½
Geology I, Part II	1 — 2½	1 — 2½	1 — 2½

Stages 6 and 7—

The subjects of the third year of the full-time course are divided into sections.

(i) Humanities	3 — 0	3 — 0	0 — 0
Major Elective, Part I	1 — 0	1 — 0	0 — 0
Major Elective, Part II	2 — 0	2 — 0	0 — 0
(ii) Chemistry III	4 —10	4 —10	4 —10
Chemistry III, Part I	2 — 5	2 — 5	2 — 5
Chemistry III, Part II	2 — 5	2 — 5	2 — 5
(iii) Mathematics III	5 — 0	5 — 0	5 — 0
Mathematics III, Part I	2 — 0	2 — 0	2 — 0
Mathematics III, Part II	3 — 0	3 — 0	3 — 0
(iv) Physics III	4 — 8	4 — 8	4 — 8
Physics III, Part I	2 — 4	2 — 4	2 — 4
Physics III, Part II	2 — 4	2 — 4	2 — 4
(v) Geology II	4 — 6	4 — 6	4 — 6
Geology II, Part I	2 — 3	2 — 3	2 — 3
Geology II, Part II	2 — 3	2 — 3	2 — 3
(vi) Zoology I	4 — 6	4 — 6	4 — 6
Zoology I, Part I	2 — 2	2 — 2	2 — 2
Zoology II, Part II	2 — 4	2 — 4	2 — 4
(vii) Botany I	4 — 6	4 — 6	4 — 6
Botany I, Part I	2 — 2	2 — 2	2 — 2
Botany I, Part II	2 — 4	2 — 4	2 — 4
(viii) Biochemistry	3 — 6	3 — 6	3 — 6
Biochemistry, Part I	2 — 4	2 — 4	2 — 4
Biochemistry, Part II	1 — 2	1 — 2	1 — 2
(ix) Advanced Organic Chemistry	2 — 8	2 — 8	2 — 8
Advanced Organic Chemistry, Part I	1 — 4	1 — 4	1 — 4
Advanced Organic Chemistry, Part II	1 — 4	1 — 4	1 — 4
(x) Advanced Inorganic Chemistry	2 — 8	2 — 8	2 — 8
Advanced Inorganic Chemistry, Part I.	1 — 4	1 — 4	1 — 4
Advanced Inorganic Chemistry, Part II.	1 — 4	1 — 4	1 — 4
(xi) Advanced Physical Chemistry	2 — 8	2 — 8	2 — 8
Advanced Physical Chemistry, Part I.	1 — 4	1 — 4	1 — 4
Advanced Physical Chemistry, Part II.	1 — 4	1 — 4	1 — 4

B. Geology as Major Subject.

	Hours per week.		
	Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
Stage 1—			
G10 English	1 — 0	1 — 0	2 — 0
Chemistry I, Part I	2 — 2	2 — 2	2 — 2
Mathematics I, Part I	2 — 1	2 — 1	2 — 1
Geology I, Part I	2 — 1½	2 — 1½	2 — 1½
Stage 2—			
G20 History	1 — 0	1 — 0	2 — 0
Chemistry 1, Part II	1 — 2	1 — 2	1 — 2
Mathematics I, Part II	2 — 1	2 — 1	2 — 1
Geology I, Part II	1 — 2½	1 — 2½	1 — 2½
Stages 3, 4 *and* 5—			
As for Physical Sciences but including Geology II and Physics I.			
Geology II, Part I	2 — 3	2 — 3	2 — 3
Geology II, Part II	2 — 3	2 — 3	2 — 3
Physics I, Part I	1 — 2	1 — 2	1 — 2
Physics I, Part II	2 — 2	2 — 2	2 — 2
Stages 6 *and* 7—			
As for Physical Sciences but including Geology III.			
Geology III, Part I	2 — 4	2 — 4	2 — 4
Geology III, Part II	3 — 4	3 — 4	3 — 4

C. Biological Sciences.

Stage 1—			
G10 English	1 — 0	1 — 0	2 — 0
Chemistry I, Part I	2 — 2	2 — 2	2 — 2
Physics I, Part I	1 — 2	1 — 2	1 — 2
General Mathematics, Part I	2 — 1	2 — 1	2 — 1
	6 — 5	6 — 5	7 — 5
Stage 2—			
G20 History	1 — 0	1 — 0	2 — 0
Chemistry I, Part II	1 — 2	1 — 2	1 — 2
Physics I, Part II	2 — 2	2 — 2	2 — 2
General Mathematics, Part II	1 — 0	1 — 0	1 — 0
General Biology, Part I	1 — 2	1 — 2	1 — 2
	6 — 6	6 — 6	7 — 6

C. Biological Sciences—*continued.*

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
Stage 3—				
G1	Logic	1 — 0	1 — 0	0 — 0
	General Biology, Part II	2 — 2	2 — 2	2 — 2
	Chemistry IIA, Part I	2 — 4	2 — 4	2 — 4
		5 — 6	5 — 6	4 — 6
Stage 4—				
G2	Philosophy	0 — 0	1 — 0	1 — 0
	Chemistry IIA, Part II	1 — 2	1 — 2	1 — 2
	Botany I, *or* Zoology I, Part I	2 — 2	2 — 2	2 — 2
	Geology I, Part I	2 — 1	2 — 1	2 — 1
		5 — 5	6 — 5	6 — 5
Stage 5—				
	Minor Elective (Humanities)	0 — 0	1 — 0	1 — 0
	Botany I, *or* Zoology I, Part II	2 — 4	2 — 4	2 — 4
	Geology I, Part II	1 — 3	1 — 3	1 — 3
		3 — 7	4 — 7	4 — 7
Stages 6 *and* 7—				
As for Physical Sciences but including the following subjects :				
(i)	Botany II or Zoology II	3 —10	3 —10	3 —10
	Part I	1 — 5	1 — 5	1 — 5
	Part II	2 — 5	2 — 5	2 — 5
(ii)	Biochemistry IA	3 — 6	3 — 6	3 — 6
	Part I	2 — 4	2 — 4	2 — 4
	Part II	1 — 2	1 — 2	1 — 2

SCHOOL OF CHEMICAL ENGINEERING.

The courses in Chemical Engineering, Industrial Chemistry and Food Technology are planned to give students a broad training in the fundamentals of science, chemistry and engineering, and knowledge of the engineering principles basic to design, construction and operation of plant and equipment. The work in chemistry, physics and mathematics is the same as that given in the Applied Chemistry and the Metallurgy courses in the first year of the full-time courses and in the first and second years of the part-time courses. In subsequent years students in the School of Chemical Engineering take, in addition to the fundamental studies, courses in mechanical, electrical and chemical engineering and industrial chemistry.

COURSE III—CHEMICAL ENGINEERING.

This course may be taken at Pass or Honours standard. The Pass course extends over four years of 34 weeks each and the additional work for Honours may be taken in one full-time or two part-time years as set out in Course IIIB1.

The course in Chemical Engineering is closely linked with practical training in industry. It is arranged so that the second and third years are spent in combined academic study and works practice. During these years students attend the University on two half days and two evenings per week.

FIRST YEAR.

(34 weeks day course.)

		Hours per week.		
		Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.11A	Physics	3 — 3	3 — 3	3 — 3
2.21	Chemical Techniques	0 — 3	0 — 0	0 — 0
2.41	General Chemistry	3 — 3	3 — 6	3 — 9
5.101	Engineering Drawing and Materials	2 — 0	1 — 3	0 — 0
5.211	Workshop Processes and Practice	0 — 0	0 — 0	0 — 3
10.11	Mathematics	4 — 2*	4 — 2*	0 — 0
10.11B	Mathematics	0 — 0	0 — 0	2 — 2*
G10	English	2 — 0	2 — 0	0 — 0
G20	History	1 — 0	1 — 0	2 — 0
		15 —11	14 —14	10 —17

* Tutorial.

Second Year.

(34 weeks of 2 half days and 2 evenings per week.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.92	Physics	1½ — 0	1½ — 1½	1½ — 1½
2.32	Physical Chemistry	1 — 0	1 — 2½	1 — 0
2.42	Inorganic Chemistry	1 — 0	1 — 0	1 — 2½
2.62	Organic Chemistry	1 — 2½	1 — 0	1 — 0
8.132	Materials and Structures	0 — 0	2 — 1	2 — 1
10.22	Mathematics	1 — 0	1 — 0	1 — 0
G1	Logic	0 — 0	2 — 0	0 — 0
G2	Philosophy	0 — 0	0 — 0	2 — 0
		5½ — 2½	9½ — 5	9½ — 5

Third Year.

(34 weeks of 2 half days and 2 evenings per week.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut
2.33	Physical Chemistry	1 — 2	1 — 3	1 — 3
2.52A	Quantitative Analysis	1 — 3	1 — 2	1 — 0
2.63	Organic Chemistry	1 — 2	1 — 2	1 — 3
10.23	Mathematics	2 — 0	2 — 0	2 — 0
	Minor Elective (Humanities)	1 — 0	1 — 0	0 — 0
		6 — 7	6 — 7	5 — 6

Fourth Year.

(34 weeks day course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
3.14	Industrial Chemistry*	1½ — 2½	1½ — 2½	1½ — 2½
3.24	Chem. Eng. Unit Operations	3 — 3	3 — 3	3 — 3
3.34	Chemical Engineering Design	2 — 3	2 — 3	2 — 3
3.44	Chemical Engineering Calculations	2 — 0	2 — 0	2 — 0
3.54	Chemical Engineering Materials	2 — 0	2 — 0	2 — 0
5.94	Mechanical Engineering	2 — 1	2 — 1	2 — 1
6.94	Electrical Engineering	1 — 2	1 — 2	1 — 2
	Major Elective (Humanities)	3 — 0	3 — 0	0 — 0
		16½—11½	16½—11½	13½—11½

* Includes Factory visits.

ADDITIONAL FOR HONOURS.

Students desiring to take Honours must apply to the Professor of Chemical Engineering not later than the 31st December of the year in which the fourth year is completed. The undermentioned additional courses must be taken.

FIFTH YEAR.

(34 weeks day course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
3.25	Chem. Eng. Unit Operations ...	4 — 3	4 — 3	4 — 3
3.35	Advanced Chemical Engineering Design	2 — 3	2 — 3	2 — 3
3.55	Chemical Engineering Materials	1 — 0	1 — 0	1 — 0
3.65	Chemical Engineering (Thermodynamics and Kinetics)	3 — 0	3 — 0	3 — 0
3.75	Chemical Engineering Project ...	0 — 7	0 — 7	0 — 7
6.95	Electrical Engineering	2 — 3	2 — 3	2 — 3
		12 —16	12 —16	12 —16

The Honours year may be taken in two part-time years as set out under the part-time course, except that the Humanities subjects of the seventh year are not required, a design project being substituted. Four additional hours per week are required on the design project.

COURSE IIIA—FOOD TECHNOLOGY.

Course IIIA may be taken at Pass or Honours standard. The Pass course extends over four years of 34 weeks each, and the additional work for Honours may be taken in one full-time year or two part-time years. During the second and third years, students attend the University part-time, while gaining practical experience in a related occupation in the food industry. For the first year, students follow the same course as full-time Chemical Engineering, and later specialize in methods of food preservation and related biological sciences.

FIRST YEAR.

(34 weeks full-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.11A	Physics	3 — 3	3 — 3	3 — 3
2.21	Chemical Techniques	0 — 3	0 — 0	0 — 0
2.41	General Chemistry	3 — 3	3 — 6	3 — 9
5.101	Engineering Drawing and Materials	2 — 0	1 — 3	0 — 0
5.211	Workshop Processes and Practice	0 — 0	0 — 0	0 — 3
10.11	Mathematics	4 — 2*	4 — 2*	0 — 0
10.11B	Mathematics	0 — 0	0 — 0	2 — 2*
G10	English	2 — 0	2 — 0	0 — 0
G20	History	1 — 0	1 — 0	2 — 0
		15 —11	14 —14	10 —17

* Tutorial.

Second Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut
2.32	Physical Chemistry	1 — 0	1 — 0	1 — 2½
2.42	Inorganic Chemistry	1 — 2½	1 — 0	1 — 0
2.52A	Quantitative Analysis	1 — 3	1 — 2	1 — 0
2.62	Organic Chemistry	1 — 0	1 — 2½	1 — 0
10.22	Mathematics	1 — 0	1 — 0	1 — 0
	Industrial Botany, Entomology and Statistics	1 — 1	1 — 2½	1 — 2
G1	Logic	0 — 0	2 — 0	0 — 0
G2	Philosophy	0 — 0	0 — 0	2 — 0
		6 — 6½	8 — 7	8 — 4½

Third Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
2.33	Physical Chemistry	1 — 2	1 — 2½	1 — 2½
2.63A	Organic Chemistry	1 — 2½	1 — 2	1 — 2½
2.924	Microbiology	1 — 2	1 — 2	1 — 2
2.95	Biochemistry	1 — 2	1 — 2	1 — 2
	Minor Elective (Humanities)	1 — 0	1 — 0	0 — 0
		5 — 8½	5 — 8½	4 — 9

Fourth Year.

(34 weeks full-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
2.925	Microbiology	1 — 2	1 — 2	1 — 2
5.94	Mechanical Engineering	2 — 1	2 — 1	2 — 1
	Food Technology I	1 — 2	1 — 2	1 — 2
2.65A	Applied Organic Chemistry	1 — 2	1 — 2	1 — 2
3.34D	Chemical Engineering	3 — 2½	3 — 2½	3 — 2½
	Food Technology II	2 — 4	2 — 4	2 — 4
	Major Elective (Humanities)	3 — 0	3 — 0	0 — 0
		13 —13½	13 —13½	10 —13½

Additional for Honours.

Students desiring to take Honours must apply to the Professor of Chemical Engineering not later than 31st December of the year in which the third year is completed. The undermentioned additional courses must be taken. Portion of the additional work may be combined with the fourth year and the remainder completed in a fifth year.

		Hours per week. Term 1	Term 2	Term 3
3.54	Chemiesl Engineering Materials ...	2	2	2
	Advanced Food Technology	8	8	8
	Food Technology Project	10	10	10

COURSE IIIB1—CHEMICAL ENGINEERING.

Course IIIB1 has been designed for students in appropriate employment in the chemical industry. The programme of study is equivalent to that of Course III but in Course IIIB1 attendance is required over seven part-time years for a Pass degree and over eight part-time years for an Honours degree.

First Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. — lab./tut.	Term 2 lec. — lab./tut.	Term 3 lec. — lab./tut.
1.11D	Physics, Part I	2 — 1½	2 — 1½	2 — 1½
2.21	Chemical Techniques	2 — 4	2 — 4	2 — 4
2.41	General Chemistry, Part I ...			
10.11–B	Mathematics, Part I	2 — 1*	2 — 1*	2 — 1*
		6 — 6½	6 — 6½	6 — 6½

* Tutorial.

Second Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. — lab./tut.	Term 2 lec. — lab./tut.	Term 3 lec. — lab./tut.
1.11D	Physics, Part II	1½ — 1½	1½ — 1½	1½ — 1½
2.41	General Chemistry, Part II	1 — 2½	1 — 2½	1 — 4
5.101	Engineering Drawing and Materials	2 — 0	1 — 3	0 — 0
5.211	Workshop Processes and Practice	0 — 0	0 — 0	0 — 3
10.11–B	Mathematics, Part II	2 — 1*	1 — 1*	1 — 1*
		6½ — 5	4½ — 8	3½ — 9½

* Tutorial.

Third Year.

(34 weeks part-time course.)

		Hours per week.		
		Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.92	Physics	1½ — 0	1½ — 1½	1½ — 1½
2.32	Physical Chemistry	1 — 0	1 — 0	1 — 2½
2.42	Inorganic Chemistry	1 — 2½	1 — 0	1 — 0
2.62	Organic Chemistry	1 — 0	1 — 2½	1 — 0
8.132	Materials and Structures	0 — 0	2 — 1	2 — 1
10.22	Mathematics	1 — 0	1 — 0	1 — 0
		5½ — 2½	7½ — 5	7½ — 5

Fourth Year.

(34 weeks part-time course.)

		Hours per week.		
		Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
2.33	Physical Chemistry	1 — 2	1 — 2½	1 — 2½
2.52A	Quantitative Analysis	1 — 3	1 — 2	1 — 0
2.63	Organic Chemistry	1 — 2½	1 — 2	1 — 2½
10.23	Mathematics	2 — 0	2 — 0	2 — 0
		5 — 7½	5 — 6½	5 — 5

Fifth Year.

(34 weeks part-time course.)

		Hours per week.		
		Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
3.14	Industrial Chemistry*	1½ — 2½	1½ — 2½	1½ — 2½
3.44	Chemical Engineering Calculations	2 — 0	2 — 0	2 — 0
5.94	Mechanical Engineering	2 — 1	2 — 1	2 — 1
6.94	Electrical Engineering	1 — 2	1 — 2	1 — 2
		6½ — 5½	6½ — 5½	6½ — 5½

* Includes Factory visits.

Sixth Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut
3.24D	Chem. Eng. Unit Operations ...	3 — 2½	3 — 2½	3 — 2½
3.34D	Chemical Engineering Design ...	2 — 2½	2 — 2½	2 — 2½
3.54	Chemical Engineering Materials	2 — 0	2 — 0	2 — 0
		7 — 5	7 — 5	7 — 5

Seventh Year.

(34 weeks part-time course.)

	Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
English, History *or* Philosophy	2 — 1*	2 — 1*	2 — 1*
and			
Psychology, Economics *or* Government	2 — 1*	2 — 1*	2 — 1*
	4 — 2	4 — 2	4 — 2

* Tutorial.

Additional for Honours.

Students desiring to take Honours must apply to the Professor of Chemical Engineering not later than 31st December of the year in which the sixth year is completed. The undermentioned additional courses must be taken. The first year of the additional work may be combined with the normal seventh year or taken separately. In either case two years' part-time attendance is required.

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
3.25	Chem. Eng. Unit Operations ...	4 — 3	4 — 3	4 — 3
3.35	Advanced Chemical Engineering Design	2 — 3	2 — 3	2 — 3
3.75	Chemical Engineering Project...			
3.55	Chemical Engineering Materials	1 — 0	1 — 0	1 — 0
3.65	Chemical Engineering Thermodynamics and Kinetics	3 — 0	3 — 0	3 — 0
6.95	Electrical Engineering	2 — 3	2 — 3	2 — 3

COURSE IIIB2—INDUSTRIAL CHEMISTRY.

This course provides part-time instruction for students in appropriate employment in the chemical industry. Students are given a sound general background of fundamental sciences, with particular emphasis on analytical chemistry, and are then trained in the broad aspects of plant and process development. The course may be taken at Pass or Honours standard. Students taking a Pass degree may complete the course in six years, while those attempting Honours take additional work in the sixth year and are required to complete a seventh year.

First Year.

(34 weeks part-time course.)

		Hours per week.		
		Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.11D	Physics, Part I	2 — 1¼	2 — 1¼	2 — 1¼
2.21	Chemical Techniques	2 — 4	2 — 4	2 — 4
2.41	General Chemistry, Part I			
10.11-B	Mathematics, Part I	2 — 1*	2 — 1*	2 — 1*
		6 — 6¼	6 — 6¼	6 — 6¼

* Tutorial.

Second Year.

(34 weeks part-time course.)

		Hours per week.		
		Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.11D	Physics, Part II	1½— 1½	1½— 1½	1½— 1½
2.41	General Chemistry, Part II	1 — 2½	1 — 2½	1 — 4
5.101	Engineering Drawing and Materials	2 — 0	1 — 3	0 — 0
10.11-B	Mathematics, Part II	2 — 2*	1 — 1*	1 — 2*
		6½— 6	4½— 8	3½— 7½

* Tutorial.

Third Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term lec. lab./tut.
1.92	Physics *	1½ — 0	1½ — 1½	1½ — 1½
2.32	Physical Chemistry	1 — 0	1 — 0	1 — 2½
2.42	Inorganic Chemistry	1 — 2½	1 — 0	1 — 0
2.52	Quantitative Analysis	1 — 2½	1 — 2½	1 — 2½
2.62	Organic Chemistry	1 — 0	1 — 2½	1 — 0
2.72	Mathematical Chemistry	1 — 0	1 — 0	1 — 0
		6½ — 5	6½ — 6½	6½ — 6½
	* Alternative subjects—			
	Chemical Instrumentation	1 — 0	1½ — 1	1½ — 1
	Fire Assaying	0 — 2	0 — 0	0 — 0

Fourth Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
2.33	Physical Chemistry	1 — 2	1 — 2½	1 — 2½
2.53	Quantitative Analysis	1 — 2½	1 — 2½	1 — 2
2.73	Mathematical Chemistry	1 — 0	1 — 0	1 — 0
3.14	Industrial Chemistry	1½ — 2½	1½ — 2½	1½ — 2½
		4½ — 7	4½ — 7½	4½ — 7

Fifth Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
2.34D	Physical Chemistry	1 — 3	1 — 3	1 — 3
3.15	Industrial Chemistry	1 — 3	1 — 3	1 — 3
3.44	Chemical Engineering Calculations	2 — 0	2 — 0	2 — 0
3.54	Chemical Engineering Materials	2 — 0	2 — 0	2 — 0
		6 — 6	6 — 6	6 — 6

Sixth Year.

(34 weeks part-time course.)

	Hours per week.		
	Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
English, History *or* Philosophy	2 — 1*	2 — 1*	2 — 1*
and			
Psychology, Economics *or* Government	2 — 1*	2 — 1*	2 — 1*
	4 — 2	4 — 2	4 — 2

* Tutorial.

Additional for Honours.

Students desiring to take Honours must apply to the Professor of Chemical Engineering not later than 31st December of the year in which the fifth year is completed. The undermentioned additional courses must be taken. Portion of the additional work may be combined with the normal sixth year and the remainder completed in the seventh year.

		Hours per week.		
		Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
3.55	Chemical Engineering Materials	1 — 0	1 — 0	1 — 0
	Industrial Safety (General)	1½— 0	1½— 0	1½— 0
	Advanced Industrial Chemistry	3 — 0	3 — 0	3 — 0
	Industrial Chemistry Project ...	0 —12	0 —12	0 —12

COURSE IIIB3—FOOD TECHNOLOGY.

This course has been designed for students already gaining practical experience in a related occupation in the food industry. The course extends over seven years for a Pass degree and over eight years for an Honours degree.

Students in this course follow the same syllabus as Chemical Engineers for the first three years and thereafter specialise in methods of food preservation. A study is also made of the biological sciences, a knowledge of which is necessary for the successful plant control of a food industry.

First Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.11D	Physics, Part I	2 — 1½	2 — 1½	2 — 1½
2.21	Chemical Techniques	2 — 4	2 — 4	2 — 4
2.41	General Chemistry, Part I			
10.11–B	Mathematics, Part I	2 — 1*	2 — 1*	2 — 1*
		6 — 6½	6 — 6½	6 — 6½

* Tutorial.

Second Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.11D	Physics, Part II	1½ — 1½	1½ — 1½	1½ — 1½
2.41	General Chemistry, Part II	1 — 2½	1 — 2½	1 — 4
5.101	Engineering Drawing and Materials	2 — 0	1 — 3	0 — 0
5.211	Workshop Processes and Practice	0 — 0	0 — 0	0 — 3
10.11–B	Mathematics, Part II	2 — 1*	1 — 1*	1 — 1*
		6½ — 5	4½ — 8	3½ — 9½

* Tutorial.

Third Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
2.32	Physical Chemistry	1 — 0	1 — 0	1 — 2½
2.42	Inorganic Chemistry	1 — 2½	1 — 0	1 — 0
2.52A	Quantitative Analysis	1 — 3	1 — 2	1 — 0
2.62	Organic Chemistry	1 — 0	1 — 2½	1 — 0
10.22	Mathematics	1 — 0	1 — 0	1 — 0
	Industrial Botany, Entomology and Statistics	1 — 1	1 — 2½	1 — 2
		6 — 6½	6 — 7	6 — 4½

Fourth Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
2.33	Physical Chemistry	1 — 2	1 — 2½	1 — 2½
2.63A	Organic Chemistry	1 — 2½	1 — 2	1 — 2½
2.924	Microbiology	1 — 2	1 — 2	1 — 2
2.95	Biochemistry	1 — 2	1 — 2	1 — 2
		4 — 8½	4 — 8½	4 — 9

Fifth Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
2.925	Microbiology	1 — 2	1 — 2	1 — 2
5.94	Mechanical Engineering	2 — 1	2 — 1	2 — 1
	Food Technology I	1 — 2	1 — 2	1 — 2
2.65A	Applied Organic Chemistry	1 — 2	1 — 2	1 — 2
		5 — 7	5 — 7	5 — 7

Sixth Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
3.34D	Chemical Engineering	3 — 2½	3 — 2½	3 — 2½
	Food Technology II	2 — 4	2 — 4	2 — 4
		5 — 6½	5 — 6½	5 — 6½

Seventh Year.

(34 weeks part-time course.)

	Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
English, History *or* Philosophy *and* Psychology, Economics *or* Government	2 — 1*	2 — 1*	2 — 1*
	2 — 1*	2 — 1*	2 — 1*
	4 — 2	4 — 2	4 — 2

* Tutorial.

ADDITIONAL FOR HONOURS.

Students desiring to take Honours must apply to the Professor of Chemical Engineering not later than 31st December of the year in which the sixth year is completed. The undermentioned additional courses must be taken. Portion of the additional work may be combined with the normal seventh year and the remainder completed in the eighth year.

		Hours per week.		
		Term 1	Term 2	Term 3
3.54	Chemical Engineering Materials	2	2	2
	Advanced Food Technology ...	8	8	8
	Food Technology Project	10	10	1

CONVERSION COURSE IIIc—CHEMICAL ENGINEERING.

Holders of a diploma in Chemical Engineering who completed the course of study prior to 1954 are required to complete the following additional work in order to qualify for the degree of Bachelor of Science.

	Hours per week.
Diploma Mathematics II	2
Conversion Physics (or Diploma Physics II)	3
Conversion Humanities—English, History *or* Philosophy *and* Psychology, Economics *or* Government	2
	2
	9

Plus advanced laboratory work on a specified project and the presentation of a thesis, together with such special subjects as are prescribed in each case.

The student is required to attend either for one full-time academic year in accordance with the dates prescribed for the normal final year of the undergraduate course, or for such other time as approved by the Professorial Board.

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SCHOOL OF METALLURGY.

The courses in Metallurgy have been designed to prepare students for employment in metallurgical industries and research institutions and involve a general training in basic sciences and engineering. These fundamental principles are then applied to problems relating to the extraction, refining, working, fabrication and use of metals.

Two main courses in Metallurgy are available. In Course IV, which leads to the degree of Bachelor of Science (Pass or Honours), students study full-time during the day and may complete the course in four years. Between the third and fourth years they are expected to obtain a full-time position in industry. Course IVB, which leads to the degree of Bachelor of Science (Pass degree), is primarily for students employed in metallurgical industries and instruction is given mainly in the evenings.

The first year of the full-time course and the first and second years of the part-time course are identical with those of the Applied Chemistry and Chemical Engineering courses.

COURSE IV—METALLURGY.

This course extends over four years and students study full-time during the day as follows:—

First Three Years.—34 weeks over three terms from late February to November (excluding examinations and vacations) full-time study, five days per week.

Fourth Year.—22 weeks over two terms from early June (excluding examinations and vacations) full-time day study, five days per week.

The degree of Bachelor of Science, Pass or Honours, is awarded depending on the degree of success of the student during the course. As will be seen above, the fourth year of the course commences at the beginning of the second University term so as to provide a six-months period between the third and fourth years in which a student must obtain industrial experience. Lecture and laboratory work during this period cease completely so that students may travel to other centres for their industrial training.

Provision is made in the course for a limited amount of specialisation of the student's own choice in the final year.

First Year.

(34 weeks day course.)

		Hours per week. Term 1 lec. — lab./tut.	Term 2 lec. — lab./tut.	Term 3 lec. — lab./tut.
1.11A	Physics	3 — 3	3 — 3	3 — 3
2.21	Chemical Techniques	0 — 3	0 — 0	0 — 0
2.41	General Chemistry	3 — 3	3 — 6	3 — 9
5.101	Engineering Drawing and Materials	2 — 0	1 — 3	0 — 0
5.211	Workshop Processes and Practice	0 — 0	0 — 0	0 — 3
10.11	Mathematics	4 — 2	4 — 2	0 — 0
10.11B	Mathematics	0 — 0	0 — 0	2 — 2
G10	English	2 — 0	2 — 0	0 — 0
G20	History	1 — 0	1 — 0	2 — 0
		15 —11	14 —14	10 —17

Second Year.

(34 weeks day course.)

		Hours per week. Term 1 lec. — lab./tut.	Term 2 lec. — lab./tut.	Term 3 lec. — lab./tut.
1.92	Physics	1½— 0	1½— 1½	1½— 1½
2.32	Physical Chemistry	1 — 0	1 — 0	1 — 2½
2.42	Inorganic Chemistry	1 — 0	1 — 0	1 — 0
2.52	Quantitative Analysis	1 — 2½	1 — 2½	1 — 2½
2.72	Mathematical Chemistry	1 — 0	1 — 0	1 — 0
4.12	General Metallurgy	1 — 0	1 — 0	1 — 0
4.22	Metallurgical Engineering	1 — 2–1*	3 — 3†–1*	2 — 2–1*
4.32	Physical Metallurgy I	1 — 3	2 — 3	2 — 3
7.513A	Mineralogy and Crystallography	1 — 1½	1 — 1½	1 — 0
8.92C	Properties of Materials‡	0 — 0	1 — 1½	1 — 1½
G1	Logic	0 — 0	2 — 0	0 — 0
G2	Philosophy	0 — 0	0 — 0	2 — 0
		9½—10	15½—14	14½—14

* Tutorial. † Includes one hour report writing.
‡ This course begins in the sixth week of first term and runs for two terms.

Third Year.

(34 weeks day course.)

		Hours per week. Term 1 lec. — lab./tut.	Term 2 lec. — lab./tut.	Term 3 lec. — lab./tut.
2.33	Physical Chemistry	1 — 2	1 — 2½	1 — 2½
2.73	Mathematical Chemistry	1 — 0	1 — 0	1 — 0
4.23	Metallurgical Engineering	1 — 3	1 — 3	2 — 6
4.33	Physical Metallurgy	2 — 3½	2 — 3½	2 — 3½
4.54	Metallurgy Seminar, Part I	0 — 1*	0 — 0	0 — 0
5.94	Mechanical Engineering	2 — 1	2 — 1	2 — 1
6.94	Electrical Engineering	1 — 2	1 — 2	1 — 2
7.034	Preparation of Minerals	2 — 3	2 — 3	0 — 0
	Minor Elective (Humanities)	1 — 0	1 — 0	0 — 0
		11 —15½	11 —15	9 —15

* Discussion on report and paper presentation. Seminars will be conducted jointly by *part-time* students in sixth year and *full-time* students in fourth year.

Fourth Year.

(22 weeks day course.)

2nd and 3rd terms only—Vacation and 1st term in industry.

		Hours per week. Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
4.24	Metallurgical Engineering	2 — 0	1 — 0
4.34	Physical Metallurgy	1 — 6	1 — 3
4.44	Industrial Metallurgy	2 — 3	2 — 3
4.64	Metallurgical Thermodynamics	1 — 0	1 — 0
4.54	Metallurgy Seminar, Part II	0 — 2*	0 — 2†
	Major Elective (Humanities)	3 — 0	3 — 0
	Experimental Project (Metallurgy)	0 — 6+	0 —12+
		9 —17+	8 —20+

* Taken jointly with sixth year students in *part-time* course.

† Portion of this period will be used for discussion of "industrial experience" reports.

During the second, third and fourth years of the course, excursions will be made to various metallurgical works. Detailed reports of some of these visits will be required.

A detailed report of the student's activities during his six months' period in industry after the third year will be required, and will be taken into consideration during classification for the honours list.

COURSE IVB—METALLURGY.

The part-time course, which leads to the degree of Bachelor of Science (Pass degree), extends over seven years of three terms each. Students are required to have at least three years' experience in a metallurgical industry or institution before completing the course.

First Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.11D	Physics, Part I	2 — 1½	2 — 1½	2 — 1½
2.21	Chemical Techniques	0 — 3	0 — 0	0 — 0
2.41	General Chemistry, Part I	3 — 0	2 — 4	1 — 5
10.11-B	Mathematics, Part I	2 — 1*	2 — 1*	2 — 1*
		7 — 5½	6 — 6½	5 — 7½

* Tutorial.

Second Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.11D	Physics, Part II	1½ — 1½	1½ — 1½	1½ — 1½
2.41	General Chemistry, Part II	1 — 2½	1 — 2½	1 — 4
5.101	Engineering Drawing and Materials	2 — 0	1 — 3	0 — 0
5.211	Workshop Processes and Practice	0 — 0	0 — 0	0 — 3
10.11–B	Mathematics, Part II	2 — 1*	1 — 1*	1 — 1*
		6½ — 5	4½ — 8	3½ — 9½

* Tutorial.

Third Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.92	Physics	1½ — 0	1½ — 1½	1½ — 1½
2.32	Physical Chemistry	1 — 2½	1 — 0	1 — 0
2.52	Quantitative Analysis	1 — 2½	1 — 2½	1 — 2½
2.72	Mathematical Chemistry	1 — 0	1 — 0	1 — 0
4.12	General Metallurgy	1 — 0	1 — 0	1 — 0
8.92C	Properties of Materials (equivalent time)	1 — 1½	1 — 1½	0 — 0
		6½ — 6½	6½ — 5½	5½ — 4

Fourth Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
2.33	Physical Chemistry	1 — 1	1 — 1	1 — 1
2.42	Inorganic Chemistry (lecture course)	1 — 0	1 — 0	1 — 0
2.73	Mathematical Chemistry	1 — 0	1 — 0	1 — 0
4.32	Physical Metallurgy	1 — 3	2 — 3	2 — 3
7.513A	Mineralogy and Crystallography	1 — 1½	1 — 1½	1 — 0
		5 — 5½	6 — 5½	6 — 4

Fifth Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
4.22	Metallurgical Engineering	2 — 3†–1*	2 — 2–1*	2 — 2–1*
4.33	Physical Metallurgy	2 — 3½	2 — 3½	2 — 3½
		4 — 7½	4 — 6½	4 — 6½

* Tutorial. † Includes one hour report writing.

Sixth Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
4.23	Metallurgical Engineering and Project	1 — 3	1 — 3	2 — 6
4.44A	Industrial Metallurgy*	2 — 1	2 — 1	1 — 0
4.54	Metallurgy Seminar†	1 — 0	0 — 2	0 — 0
5.94	Mechanical Engineering I	2 — 1	2 — 1	2 — 1
	or			
6.94	Electrical Engineering I	* 1 — 2	1 — 2	1 — 2
		5–6—5–6	4–5—7–8	4–5—7–8

* Includes Factory visits.

† Report and paper presentation covered in first term, then joint seminar in second term with full-time students.

Seventh Year.

(34 weeks part-time course.)

	Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
English, History *or* Philosophy	2 — 1*	2 — 1*	2 — 1*
and			
Psychology, Economics *or* Government	2 — 1*	2 — 1*	2 — 1*
	4 — 2	4 — 2	4 — 2

* Tutorial.

CONVERSION COURSES—METALLURGY.

Students who hold current diplomas of the Sydney Technical College in Metallurgy or Secondary Metallurgy may apply for permission to take a conversion course which will enable them to qualify for the degree of Bachelor of Science. Details of the conversion courses are as shown below—

CONVERSION COURSE IVc1—METALLURGY.

Conversion course to Bachelor of Science (Pass) from current Secondary Metallurgy diploma course (Sydney).

		Hours per week
1.92	Physics	2½
2.72	Mathematical Chemistry	1
2.73	Mathematical Chemistry	1
	Conversion Humanities—	
	English, History *or* Philosophy	2
	and Psychology, Economics *or* Government	2
4.54	Metallurgy Seminar	1
		9½

Together with any special subjects prescribed.

CONVERSION COURSE IVc2—METALLURGY.

Conversion course to Bachelor of Science (Pass) from current Metallurgy diploma course (Newcastle and Wollongong).

		Hours per week.
2.72	Mathematical Chemistry	1
2.73	Mathematical Chemistry	1
	Conversion Physics	3
	Conversion Humanities—	
	English, History *or* Philosophy	2
	and Psychology, Economics *or* Government	2
4.54	Metallurgy Seminar	1
		10

Together with any special subjects prescribed.

SCHOOL OF MECHANICAL ENGINEERING.

The courses in Mechanical Engineering are planned to provide a sufficient foundation of basic science applied to engineering methods and techniques to prepare the graduate to enter any industry dealing with heat, power, materials and machinery. The course does not attempt to teach current commercial practice nor specialised knowledge of the product of any one industry. On the contrary, undergraduates are expected to obtain their practical experience by direct service in industry.

In general, instruction by lectures is paralleled by laboratory work in which the student is given opportunity, not only to familiarise himself with materials, engines and machinery, but also to develop his ability to apply theory to the analysis of their characteristics.

Three courses are provided leading to the degree of Bachelor of Engineering (Pass or Honours): Course V, a four years day course; Course VB, a part-time course extending over seven years; and Conversion Course VC, to enable Associates of Sydney Technical College in Mechanical Engineering to qualify for the degree.

COURSE V—MECHANICAL ENGINEERING.*

Course V is of four years' duration. The first three years of the course each require attendance at the University for twenty-four weeks. For the remainder of each of these years the student gains practical experience in industry. The fourth year requires full-time day attendance for thirty-four weeks.

During the first two years the fundamental subjects which are the basis of the student's later professional work are studied, viz., mathematics, chemistry, physics and applied mechanics, a thorough knowledge of which is essential in all branches of mechanical engineering. The student is also trained in elements of the more important mechanical processes in order that he may acquire the knowledge of modern machine tools, foundry practice, forging and welding, necessary for the successful designer of machinery. This knowledge is further enlarged by five-month periods in industry between the various academic sessions.

The professional work of the third and fourth years includes the study of the mechanics of fluids and of rigid and elastic bodies with applications to design. The study of thermodynamics is applied to heat engineering, and to the analysis and design of power plants,

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* Course V was revised in 1953. The first, second and third years of the revised course, set out below, will operate in 1955. Students in the fourth year of Course V in 1955 will follow the course described in the 1953 Calendar.

turbines, steam and internal combustion engines, industrial heating, and to refrigeration and air-conditioning systems. Engineering processes are considered in relation to design for production; and work on metrology, gauges and fixtures, tool design, tolerances and inspection is introduced.

The professional elective subjects in the fourth year permit students to choose a broad phase of mechanical engineering as a special study. In this way the student learns to use libraries and technical journals, and is made to realise how fully the knowledge he has gained during his course is used in engineering development and practice. The preparation of a thesis provides a training in report-writing and in technical exposition.

First Year.
(24 weeks day course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.
1.41	Physics	3 — 3	3 — 3
2.111	Chemistry	3 — 3	3 — 0
5.11	Engineering Drawing	0 — 3*	0 — 3*
5.21	Mechanical Technology	2½ — 0	2½ — 0
5.41	Descriptive Geometry	1 — 2½*	1 — 2½*
8.11	Engineering Mechanics	1 — 1*	1 — 1*
10.11	Mathematics	4 — 2*	4 — 2*
G10	English	2 — 0	2 — 0
G20.1	History	1 — 0	1 — 0
		17½—14½	17½—11½

* Tutorial.

Second Year.
(24 weeks day course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.
1.42	Physics	2 — 1½–1*	2 — 1½–1*
2.122	Engineering Chemistry	1½ — 2	1½ — 2
4.912	Engineering Metallurgy		
5.22	Mechanical Technology	3 — 0	3 — 0
5.32	Engineering Mechanics	1½ — 1*	1½ — 1*
5.52	Fluid Mechanics	1 — ½–½*	1 — ½–½*
5.72	Thermodynamics	1 — 1–1*	1 — 1–1*
8.112	Theory of Structures	1½ — 1*	1½ — 1
8.92	Properties of Materials	0 — 0	1 — 2
10.12	Mathematics	3 — 2*	3 — 2*
G1	Logic	0 — 0	2 — 0
G20.2	History	2 — 0	0 — 0
		16½—11½	17½—13½

* Tutorial.

Third Year.

(24 weeks day course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.
5.13	Mechanical Engineering Design	0 — 6*	0 — 6*
5.23	Mechanical Technology	1½— 0	1½— 0
5.33	Theory of Machines	1½— 1*	1½— 1*
5.53	Fluid Mechanics	1 — 1½–½*	1 — 1½–½*
5.73	Thermodynamics	1 — 1½–½*	1 — 1½–½*
6.83	Electrical Engineering	1 — 3–1*	1 — 3–1*
8.123	Structures (Theory and Design)	2 — 3*	2 — 3*
8.33	Engineering Computations	1½— 0	1½— 0
G2	Philosophy	2 — 0	0 — 0
	Minor Elective (Humanities)	0 — 0	2 — 0
		11½—18	11½—18

* Tutorial.

Note.—A survey camp of one week's duration will be held in the third week of third term.

Fourth Year.

(34 weeks day course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
5.14	Mechanical Engineering Design...	0 — 6*	0 — 6*	.....
5.34	Theory of Machines	1 — 2*	1 — 2*	.....
5.54	Fluid Mechanics	1 — 1½–1½*	1 — 1½–1½*	.....
5.74	Thermodynamics	1½— 1½–1*	1½— 1½–1*	.....
6.84	Electrical Engineering	1 — 2½–½*	0 — 0	.....
	Professional Elective I	1 — 2	1 — 2	.....
	Professional Elective II	1 — 2	1 — 2	.....
	Seminar	0 — 0	0 — 0	2 — 0
	Thesis Work	0 — 0	0 — 0	0 —26
	Major Elective (Humanities) ...	3 — 0	3 — 0	.....
		9½—20½	8½—17½	2 —26

* Tutorial.

COURSE VB—MECHANICAL ENGINEERING.

Course VB has been designed for students employed in an appropriate position in industry. The work undertaken is equivalent to that covered in Course V, but Course VB extends over seven part-time years, satisfactory completion of which, together with the necessary occupational experience, qualifies for the degree of Bachelor of Engineering (Pass or Honours).

First Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.41D	Physics	1¼ — 1½–½*	1¼ — 1½–½*	1¼ — 1½–½*
2.111	Chemistry	2 — 1	2 — 1	2 — 1
5.11D 5.41D	Engineering Drawing Descriptive Geometry } †	0 — 3*	0 — 3*	0 — 3*
8.11D	Engineering Mechanics	1 — 0	1 — 0	1
10.11	Mathematics, Part I	1½ — ½*	1½ — ½*	1½ — ½*
		5¾ — 6½	5¾ — 6½	5¾ — 6½

* Tutorial.

† 1st half Year—Descriptive Geometry. 2nd Half Year—Engineering Drawing.

Second Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
2.122D 4.912D	Engineering Chemistry Engineering Metallurgy }	1 — 1½	1 — 1½	1 — 1½
5.21D	Mechanical Technology	1 — 0	1 — 0	1 — 0
5.22D	Mechanical Technology	2¼ — 0	2¼ — 0	0 — 0
8.112D	Theory of Structures	1 — ½*	1 — ½*	1 — ½*
8.92D	Properties of Materials	0 — 0	0 — 0	1 — 2
10.11	Mathematics, Part II	1½ — ½*	1½ — ½*	1½ — ½*
**G10	English, Part I (Language)	1 — 0	1 — 0	1 — 0
G10	English, Part II (Literature)	1 — 0	0 — 0	0 — 0
G20B	History	0 — 0	1½ — 0	1½ — 0
		8¾ — 2½	9¼ — 2½	8 — 4½

* Tutorial.

** Students attending second year in 1955, and who have completed G10 English Part I (Language) in their first year in 1954, will take 8.11D Engineering Mechanics in their second year.

Third Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
5.13D	Mechanical Engineering Design...	0 — 3*	0 — 3*	0 — 3*
5.23D	Mechanical Technology	1½ — 0	1½ — 0	1½ — 0
5.32D	Engineering Mechanics	1 — ½*	1 — ½*	1 — ½*
5.72D	Thermodynamics	1 — 1*	1 — 1*	0 — 2
6.83D	Electrical Engineering	1 — 1½*	1 — 1½	1 — 1½
10.12	Mathematics, Part I	1 — ½*	1 — ½*	1 — ½*
		5½ — 6½	5½ — 6½	4½ — 7½

* Tutorial.

Fourth Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
5.33D	Theory of Machine	1 — 1*	1 — 1*	1 — 1*
5.52	Fluid Mechanics	1 — ½–½*	1 — ½–½*	0 — 0
5.73	Thermodynamics	1 — 0	1 — 1½*	0 — 2½
6.84D	Electrical Engineering	½ — 1–½*	½ — 1–½*	½ — 1–½*
8.123D	Structures (Theory and Design)	1½ — 1½*	1½ — 1½*	1½ — 1½*
8.42A	Land Surveying†	0 — 0	0 — 0	1 — 0
		5 — 5	5 — 6½	4 — 6½

* Tutorial.

† Includes four six-hour periods on Saturdays for fieldwork.

Fifth Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
5.14D	Mechanical Engineering Design ..	0 — 3*	0 — 3*	0 — 3*
5.53D	Fluid Mechanics	1 — 1½–1*	1 — 1½–1*	0 — 0
5.74D	Thermodynamics	1 — 1*	1 — 1*	1 — 2½
	Seminar	1½ — 0	1½ — 0	0 — 0
		3½ — 6½	3½ — 6½	1 — 5½

* Tutorial.

Sixth Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.42D	Physics	1½ — 1½	1½ — 1½	2½ — 1½
5.34D	Theory of Machines	1 — ½*	1 — ½*	1 — ½*
8.33	Engineering Computations	1 — 0	1 — 0	1 — 0
10.12	Mathematics, Part II	1 — ½*	1 — ½*	1 — ½*
G8	Philosophy	1½ — 0	1½ — 0	1½ — 0
		6 — 2½	6 — 2½	7 — 2½

* Tutorial.

Seventh Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
5.54D	Fluid Mechanics	1 — 2*	1 — 2	1 — ½*
	Professional Elective I	1 — 2	1 — 2	0 — 0
	Professional Elective II	1 — ½	1 — ½	0 — 3
	Thesis Work	0 — 0	0 — 0	0 — 3
	Major Elective (Humanities)	2 — 0	2 — 0	2 — 0
		5 — 4½	5 — 4½	3 — 6½

* Tutorial.

CONVERSION COURSE Vc—MECHANICAL ENGINEERING.

Holders of a diploma in Mechanical Engineering who have completed the course of study as set out in the 1954 Handbook of the N.S.W. Department of Technical Education are required to complete the following additional work in order to qualify for the Bachelor of Engineering degree.

1. Satisfactorily complete the following subjects in the evening as one year courses over three terms.

	Hours per week.
Conversion Mathematics	3
Conversion Physics	3
Conversion Strength of Materials	1
Conversion Humanities—	
English, History *or* Philosophy	2
and/or Psychology, Economics *or* Government	2
	9–11

2. On completion of the work prescribed under (1) above, the student may—

(*a*) enrol for the fourth year of the normal degree course less the Humanities subject and with the substitution of 8.33 Engineering Computations for 5.14 Mechanical Engineering Design *or*

(*b*) enrol for the following programme of part-time study over two years.

FIRST YEAR.

	Hours per week.
Fluid Mechanics	3
*Engineering Surveying I	1
†Automatic Control Engineering	2
†Engineering Computations	1
‡Conversion Humanities—	
English, History *or* Philosophy	2
and/or Psychology, Economics *or* Government	2
	9–11

* Plus seven periods of six hours spent in Surveying Fieldwork.

† Subjects marked thus will be given in special evening classes for conversion students.

‡ Unless otherwise taken.

SECOND YEAR.

	Hours per week.
One Professional Elective Subject	3
*Production Engineering Design	3
*Electrical Engineering	1½
Seminars	2
	9½

* Subjects marked thus will be given in special evening classes for conversion students.

NOTE.—A thesis will be required of conversion students. In determining its nature and content the student's diploma thesis will be taken into consideration.

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 the problems in electrical engineering.

There are three main branches of electrical engineering, viz:—(a) Electric Power—concerned mainly with electrical machinery, power generation, transmission and distribution and public power utilities; (b) Electronics and High Frequency—concerned mainly with radio communications, radar and other navigational devices, television, and a growing range of industrial applications and measuring instruments; (c) Line Communications—concerned with telegraph and telephone public utilities. By allowing advanced students to choose, with the approval of the Professor, two major elective subjects from a range of five, covering all three branches, the curriculum has been made flexible enough to meet the growing demands resulting from modern technological advance and to meet the student's individual needs. However, the early years of the course allow no choice, thus ensuring that all students receive a grounding in the fundamentals of circuit work, electric power work and electronics.

Further, the subject Industrial Electronics and Control is compulsory for all students. This subject is a link between electronics and electric power work covering motor controls, servomechanisms, special machines such as amplidynes, electronic devices such as polyphase mercury arc rectifiers, and other common subjects such as regulators, speed control, welding control, etc.

Each student is required to work on a project under the guidance of a member 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.

Five courses are provided leading to the degree of Bachelor of Engineering (Pass or Honours):—

Course VI, a four years day course.

Course VIB, a part-time course extending over seven years.

Conversion Course VIc1 for Associates of Sydney Technical College in both Electrical and Radio Engineering.

Conversion Course VIc2 for Associates of Sydney Technical College in Electrical Engineering.

Conversion Course VIc3 for Associates of Sydney Technical College in Radio Engineering.

(The Conversion courses allow the completion of requirements for the degree of Bachelor of Engineering.)

COURSE VI—ELECTRICAL ENGINEERING.*

Course VI is of four years' duration. The first three years of the course each require attendance at the University for twenty-four weeks. For the remainder of each of these years the student gains practical experience in industry. The fourth year requires full-time day attendance for thirty-four weeks.

First Year.

(24 weeks day course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.
1.41	Physics	3 — 3	3 — 3
2.111	Chemistry	3 — 3	3 — 0
5.11	Engineering Drawing	0 — 3*	0 — 3*
5.21	Mechanical Technology	2½ — 0	2½ — 0
5.41	Descriptive Geometry	1 — 2½*	1 — 2½*
8.11	Engineering Mechanics	1 — 1*	1 — 1*
10.11	Mathematics	4 — 2*	4 — 2*
G10	English	2 — 0	2 — 0
G20.1	History	1 — 0	1 — 0
		17½—14½	17½—11½

Second Year.

(24 weeks day course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.
1.12	Physics	4 — 3	4 — 3
2.122	Engineering Chemistry	1½— 2	1½— 2
4.912	Engineering Metallurgy		
5.32	Engineering Mechanics	1½— 1*	1½— 1*
5.72	Thermodynamics	1 — 1-1*	1 — 1-1*
6.12	Electric Circuit Theory	1½— 0	1½— 2
8.112	Theory of Structures	1½— 1*	1½— 1*
8.92B	Properties of Materials	½— 1	½— 1
10.12	Mathematics	3 — 2*	3 — 2*
G20.2	History	2 — 0	0 — 0
G1	Logic	0 — 0	2 — 0
		16½—12	16½—14

* Tutorial.

* Course VI was revised in 1953. The first, second and third years of the revised course, set out below, will operate in 1955. Students in the fourth year of Course VI in 1955 will follow the course described in the 1953 Calendar.

Third Year.

(24 weeks day course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.
5.52	Fluid Mechanics	1 — ½–½*	1 — ½–½*
5.73	Thermodynamics	1 — 1½–½*	1 — 1½–½*
6.13	Electric Circuit Theory	3 — 3	3 — 0
6.23	Electric Power Engineering	3 — 3	3 — 6
6.303	Electronics	3 — 3	3 — 3
10.33	Mathematics	2 — 0	2 — 0
G2	Philosophy	2 — 0	0 — 0
	Minor Elective (Humanities)	0 — 0	2 — 0
		15 —12	15 —12

* Tutorial.

NOTE.—A survey camp of one week's duration will be held in the third week of third term.

Fourth Year.

(34 weeks day course.)

	First Two Terms.	Hours per week.
	Two Major Elective Subjects	14
6.304	Industrial Electronics and Control	3 — 4
	One Professional Elective Subject	3
	Major Elective (Humanities)	3 — 0
		27

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.

A course of special lectures 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.

Major Elective Subjects.

		Hours per week. lec. lab./tut.
6.214	Electric Power Engineering A	3 — 4
6.224	Electric Power Engineering B	3 — 4
6.314	High Frequency Engineering A	4 — 4
6.324	High Frequency Engineering B	3 — 4
6.334	Line Communication Engineering	3 — 4

Professional Elective Subjects.

Specialised subjects will be offered as found desirable. In 1955 Electrical Measurements will be given.

NOTE.—An opportunity is given to final year students to attend practical wiring classes towards qualifying for an Electrician's Licence.

COURSE VIB—ELECTRICAL ENGINEERING.

Course VIB has been designed for students employed in appropriate positions in industry. The work undertaken is equivalent to that covered in Course VI, but Course VIB extends over seven part-time years, satisfactory completion of which, together with the necessary occupational experience, qualifies for the degree of Bachelor of Engineering (Pass or Honours).

FIRST YEAR.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.41D	Physics	1¼ — 1½–½*	1¼ — 1½–½*	1¼ — 1½–½*
2.111	Chemistry	2 — 1	2 — 1	2 — 1
5.11D	Engineering Drawing	0 — 3*	0 — 3*	0 — 3*
5.41D	Descriptive Geometry			
10.11	Mathematics, Part I	1½ — ½*	1½ — ½*	1½ — ½*
		4¾ — 6½	4¾ — 6½	4¾ — 6½

SECOND YEAR.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.42D	Physics	1 — 1½–½*	1 — 1½–½*	2 — 1½–½*
6.12D	Electric Circuit Theory	1 — 1½–1*	1 — 1½–1*	1 — 1*
8.132D	Materials and Structures	1 — 1	1 — 1	1 — 1
10.11	Mathematics, Part II	1½ — ½*	1½ — ½*	1½ — ½*
		4½ — 6	4½ — 6	5½ — 4½

* Tutorial.

Third Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
5.32D	Engineering Mechanics	1 — ½*	1 — ½*	1 — ½*
6.13A	Electric Circuit Theory	1 — 1½–½*	1 — 1½–½*	1 — 1½–½*
6.23A 6.303A	Electric Power Engineering ... Electronics	1 — 1½–½*	1 — 1½–½*	1 — 1–1*
10.12	Mathematics Part I	1 — ½*	1 — ½*	1 — ½*
G10	English, Part I (Language) ...	1 — 0	1 — 0	1 — 0
		5 — 5	5 — 5	5 — 5

Fourth Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
6.13B	Electric Circuit Theory	1 — 1*	1 — 1*	1 — 1*
6.23B	Electric Power Engineering ...	1 — 1½–½*	1 — 1½–½*	1 — 1½–½*
6.303B	Electronics	1 — 1½–½*	1 — 1½–½*	1 — 1½–½*
10.33	Mathematics	1 — 1	1 — 1	1 — 1
G10	English, Part II (Literature) ...	1 — 0	0 — 0	0 — 0
G20B	History	0 — 0	1½— 0	1½— 0
		5 — 6	5½— 6	5½— 6

Fifth Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
2.122D 4.912D	Engineering Chemistry ..... Engineering Metallurgy	1 — 1½	1 — 1½	1 — 1½
5.72	Thermodynamics	1 — 1*	1 — 1*	1 — 1*
6.304A	Industrial Electronics & Control	1 — 1–1*	1 — 1–1*	1 — 1–1*
	Major Elective— (*a*) Power ..... (*b*) Radio ..... (*c*) Line Communication	1 — 2	1 — 2	1 — 2
G8	Philosophy	1½— 0	1½— 0	1½— 0
		5½— 6½	5½— 6½	5½— 6½

* Tutorial.

Sixth Year.

(34 weeks part-time course.)

	Hours per week.		
	Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
5.52 Fluid Mechanics	1 — ½–½*	1 — ½–½*	0 — 0
5.331D Theory of Machines	0 — 0	1 — ½*	1 — 1*
6.304B Industrial Electronics & Control	1 — 1*	1 — 1*	1 — 1*
Major Elective—			
(*a*) Power (*b*) Radio (*c*) Line Communication	1 — 2	1 — 2	1 — 2
Professional Elective	1 — 1	1 — 1	1 — 1
Major Elective (Humanities)	2 — 0	2 — 0	2 — 0
	6 — 5	7 — 5½	6 — 5

* Tutorial.

Seventh Year.

(34 weeks part-time course.)

	Hours per week.		
	Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
Major Electives—			
(*a*) Power	3 — 3–2*	3 — 3–2*	3 — 3–2*
(*b*) Radio	3 — 4–1*	3 — 4–1*	3 — 4–1*
(*c*) Line Communication	3 — 3–2*	3 — 3–2*	3 — 3–2*
Professional Elective (Thesis)	0 — 4	0 — 4	0 — 4
	3 — 9	3 — 9	3 — 9

* Tutorial.

CONVERSION COURSES—ELECTRICAL ENGINEERING.

COURSE VIc1—(For diplomates in both Electrical and Radio Engineering).

Diplomates in both Electrical and Radio Engineering who have completed the courses of study as set out in the 1954 Handbook of the N.S.W. Department of Technical Education are required to complete the following subjects in order to qualify for the degree of Bachelor of Engineering.

		Hours per week for 34 weeks.
5.33D	Theory of Machines	1½
5.52	Fluid Mechanics	1½
6.304A	Industrial Electronics	3
6.304B	Industrial Electronics	2
10.33	Mathematics	2
G.10	English, Part I (Language)	1
G.10	English, Part II (Literature)	1 (Term 1)
G20B	History	1½ (Terms 2 & 3)
G8	Philosophy	1½
	Major Elective (Humanities)	2
	Professional Elective	2
	Thesis	4
		21½—22

This work would normally be completed in two years, but could be spread over a longer period.

COURSE VIc2—(For diplomates in Electrical Engineering).

Diplomates in Electrical Engineering who have completed the course of study as set out in the 1954 Handbook of the N.S.W. Department of Technical Education are required to complete the following additional work for the degree of Bachelor of Engineering.

		Hours per week for 34 weeks.
1.42	Physics (if not already completed)	3½
5.33D	Theory of Machines	1½
5.52	Fluid Mechanics	1½
6.13B	Electric Circuit Theory	2
6.304A	Industrial Electronics	3
6.304B	Industrial Electronics	2
*10.12	Mathematics Part II	1½
10.33	Mathematics	2
G.10	English, Part I (Language)	1
G.10	English, Part II (Literature)	1 (Term 1)
G.20B	History	1½ (Terms 2 & 3)
G8	Philosophy	1½
	Major Elective (Humanities)	2
	Professional Elective	2
	Thesis	4
		28½—29

* To be taken by diplomates of later than 1951 as a prerequisite to 10.33 Mathematics. Diplomates of 1951 or earlier may be required to take conversion Mathematics in lieu of 10.12 Mathematics Part II.

This work would normally be completed in three years, but could be spread over a longer period.

COURSE VIc3—(For diplomates in Radio Engineering).

Diplomates in Radio Engineering who have completed the course of study as set out in the 1954 Handbook of the N.S.W. Department of Technical Education are required to complete the following additional work for the degree of Bachelor of Engineering.

		Hours per week for 34 weeks.	
2.122	Engineering Chemistry	} 2½	
4.912	Engineering Metallurgy		
5.33D	Theory of Machines	1½	
5.52	Fluid Mechanics	1½	
5.72	Thermodynamics	2	
6.23B	Electric Power Engineering	3	
6.304A	Industrial Electronics	3	
6.304B	Industrial Electronics	2	
10.33	Mathematics	2	
G.10	English, Part I (Language)	1	
G.10	English, Part II (Literature)	1 (Term 1)	
G.20B	History	1½ (Terms 2 & 3)	
G8	Philosophy	1½	
	Major Elective (Humanities)	2	
	Professional Elective	2	
	Thesis	4	
		29—29½	

This work would normally be completed in three years, but could be spread over a longer period.

SCHOOL OF MINING ENGINEERING AND APPLIED GEOLOGY.

Two courses leading to the degree of Bachelor of Engineering (Pass or Honours) are offered in the School of Mining Engineering and Applied Geology. The courses provided are:—

Course VII—Mining Engineering, a four years day course.

Conversion Course VIIc—Mining Engineering, for Associates of Sydney Technical College in Metalliferous Mining Engineering who desire to qualify for the degree of Bachelor of Engineering.

Two courses leading to the degree of Bachelor of Engineering (Geology) are also offered in this School. These courses are:—

Course VIIA—Applied Geology, a four years day course.

Course VIIB—Applied Geology, a part-time course extending over seven years.

COURSE VII—MINING ENGINEERING.

Technical developments in the mining industry are such as to demand increasing engineering proficiency from various grades of mining officials. These developments require that those who are being trained for the management of the industry shall receive firstly, a sound training in mechanical, electrical and some branches of civil engineering, and secondly, the application of these developments to the mining of coal and other minerals. A knowledge of the basic subjects, mathematics, physics, chemistry, etc., is also essential in order that such auxiliary subjects as coal cleaning, preparation of minerals, gases and atmospheric conditions in mines, etc., may be properly understood. Hence in the construction of the Mining Engineering course the object has been to produce mining engineers having a sound training in engineering subjects and well versed in the application of engineering principles in the mining industry.

In the first two years of the course, the subjects taught are the basic science subjects, together with the primary engineering subjects and an introduction to mining technology. Mining subjects proper are introduced in the second year, and are developed in the third and fourth years of the course, concurrently with the engineering subjects. Subjects which are important to mining engineers, such as surveying, preparation of minerals and geology are given their proper place in the course.

The training in mining is aimed at giving students a thorough foundation in such subjects as mine ventilation; mine drainage; mine lighting; winding, haulage and transport; these subjects being common to practically all branches of mining work. The specialised

application of these subjects to coal and metalliferous mining is dealt with in the final year of the course. Thus, although the course is designed to give students a sound training in mining, it also permits them to specialise in either coal or metalliferous mining.

Specialisation is taken a stage further in the fourth year of the course by the provision of elective subjects for the preparation of theses. Preparatory work for the theses will commence during the practical training period following the third year of academic studies and will be continued by reading in the first and second terms of the fourth year. The whole of the third term in the fourth year will be spent on further practical investigations and in the preparation of theses.

The students in the Mining Engineering course are required to spend five months of each year in obtaining practical experience at mines, this training being based on a prepared programme designed to provide a comprehensive training in many aspects of mining work. This training is important in its relation to the academic training and in relation to the Mines Department's requirements of practical training for candidates for Statutory Certificates of Competency.

First Year.

(24 weeks day course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.
1.41	Physics	3 — 3	3 — 3
2.111	Chemistry	3 — 3	3 — 0
5.11	Engineering Drawing	0 — 3*	0 — 3*
5.41	Descriptive Geometry	1 — 2½*	1 — 2½*
7.001	Mining Processes and Practice	1 — 0	1 — 1
8.11	Engineering Mechanics	1 — 1*	1 — 1*
10.11	Mathematics	4 — 2*	4 — 2*
G10	English	2 — 0	2 — 0
G20.1	History	1 — 0	1 — 0
		16 —14½	16 —12½

* Tutorial.

Note.—A survey camp of one week's duration will be conducted in the third week of third term.

Second Year.

(24 weeks day course.)

		Hours per week. Term 1 lec.	lab./tut.	Term 2 lec.	lab./tut.
1.42	Physics	2	1½–1*	2	1½–1*
2.122	Engineering Chemistry	1½	2	1½	2
4.912	Engineering Metallurgy				
5.32	Engineering Mechanics	1	1½*	1	1½*
5.72	Thermodynamics	1	1–1*	1	1–1*
7.002	Mining	3	0	3	0
7.502	Geology	2	1	2	1
8.112	Theory of Structures	1½	1*	1½	1*
8.92	Properties of Materials	0	0	1	2
10.12	Mathmatics	3	2*	3	2*
G20.1	History	2	0	0	0
G1	Logic	0	0	2	0
		17	—12	18	—14

* Tutorial.

Note.—Field excursions will be arranged on several Saturdays in connection with the instruction in Geology.

Third Year.

(24 weeks day course.)

		Hours per week. Term 1. lec.	lab./tut.	Term 2. lec.	lab./tut.
5.52	Fluid Mechanics	1	½–½*	1	½–½*
6.83	Electrical Engineering	2	3	2	3
7.003	Mining	2	3	2	3
7.013	Metalliferous Mining	2		2	
7.553	Geology	2	3	2	3
8.122	Structures	1	2	1	2
8.43	Surveying	1½	2	1	2
G2	Philosophy	2	0	0	0
	Minor Elective (Humanities)	0	0	2	0
	First Aid	1	0	1	0
		14½	—14	14	—14

* Tutorial.

Note.—A survey camp of one week's duration will be conducted in the third week of third term and will be followed by a Geology excursion also of one week's duration.

FOURTH YEAR.

(34 weeks day course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.
7.004	Mining	3½ — 2½	3 — 0
7.014	Coal Mining	2 — 3	2 — 3
	or		
7.024	Metalliferous Mining		
7.034	Preparation of Minerals	2 — 3	2 — 3
7.554	Geology	1 — 2	1 — 2
8.44	Surveying	2 — 2	2 — 2
	Major Elective (Humanities)	3 — 0	3 — 0
		13½—12½	13 —10

The third term of fourth year is devoted to work on the professional elective subjects and thesis.

NOTE.—A survey camp of one week's duration will be conducted in the third week of third term. Practical work connected with Astronomy and Geodesy will be conducted on several evenings during the course. A Geology excursion will be conducted during the third term.

COURSE VIIA—APPLIED GEOLOGY.

The development of natural resources and the allied engineering activities make essential a type of training for geologists which embraces basic geological instruction and various features of its application in practice. The structure and syllabus of this course is designed so as to enable the graduates to enter immediately upon various aspects of applied geology and to play an effective part in associated engineering practice.

In the early part of the course students receive instruction in the allied fundamental sciences and basic engineering subjects as well as introductory geology. Later geological instruction is developed and emphasis is placed progressively on engineering application and on economic aspects of geology.

The applied nature of the course is indicated by the inclusion of descriptive geometry, drawing and design, strength of materials, civil and mining engineering practice, soil mechanics, etc. Detailed treatment is given to various aspects of applied geology—engineering geology, mining geology, photogeology and geochemistry. Surveying and geophysics are also included.

Attendance at the University for students taking the full-time course is for two terms during the first three years and for three terms during the fourth year. All students will be required to complete satisfactorily a course of approved practical training during vacations. The part-time course (Course VIIB) is of six years' duration and is designed for students already engaged on work allied to the subject matter of the course.

First Year.
(24 weeks day course.)

		Hours per week. Term 1 lec. — lab./tut.	Term 2 lec. — lab./tut.
1.41	Physics	3 — 3	3 — 3
2.111	Chemistry	3 — 3	3 — 0
5.11	Engineering Drawing and Materials	0 — 3*	0 — 3*
5.41	Descriptive Geometry	1 — 2½*	1 — 2½*
7.001	Mining Processes and Practice	1 — 0	1 — 1
10.11	Mathematics	4 — 2*	4 — 2*
G10	English	2 — 0	2 — 0
G20.1	History	1 — 0	1 — 0
		15 —13½	15 —11½

* Tutorial.

Second Year.
(24 weeks day course.)

		Hours per week. Term 1 lec. — lab./tut.	Term 2 lec. — lab./tut.
1.42	Physics	2 — 1½–1*	2 — 1½–1*
2.32A	Physical Chemistry	2 — 0	1 — 2
2.52A	Quantitative Analysis	1 — 3	1 — 3
7.052	Mining Engineering Practice	2 — 0	2 — 0
7.502	Geology	2 — 1	2 — 1
8.43	Surveying	1½— 2	1 — 2
10.12	Mathematics	3 — 2*	3 — 2*
G1	Logic	0 — 0	2 — 0
G20.2	History	2 — 0	0 — 0
		15½—10½	14 —12½

* Tutorial.

Note.—Six geological excursions will be held on Saturdays during first and second terms.

A survey camp of one week's duration will be conducted in the third week of third term.

Third Year.
(24 weeks day course.)

		Hours per week. Term 1 lec. — lab./tut.	Term 2 lec. — lab./tut.
7.034	Preparation of Minerals	2 — 2	1 — 3
7.503	Petrology	2 — 3	2 — 3
7.513	Mineralogy and Crystallography	2 — 2	2 — 2
7.523	Stratigraphy and Palaeontology	2 — 2	2 — 2
7.533	Economic Geology	2 — 2	2 — 2
7.543	Geophysics and Geotectonics	1 — 2	1 — 2
8.63A	Engineering Construction	1 — 0	1 — 0
8.73H	Soil Mechanics and Hydrology	1 — 1½	1 — 0
G2	Philosophy	2 — 0	0 — 0
	Minor Elective (Humanities)	0 — 0	2 — 0
		15 —14½	14 —14

Field Instruction.

(i) One week of general surveying will be taken with the Mining and Civil Engineering III students.

(ii) One week of geological surveying.

(iii) Week-end field work on geophysical surveying.

FOURTH YEAR.
(34 weeks day course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.
7.504	Advanced Mineralogy and Petrology	1 — 2	0 — 0
7.514	Mining Geology Mineral Economics Mine Valuation	2 — 2	3 — 3
7.524	Photogrammetry, Photogeology and Military Geology	1 — 3	0 — 0
7.534	Advanced Engineering Geology	2 — 2	0 — 0
7.544	Geology of Fuels	2 — 2	0 — 0
8.641	Engineering Administration	1 — 0	0 — 0
	Elective Subjects	0 — 0	2 — 6
	Major Elective (Humanities)	3 — 0	3 — 0
		12 —11	8 — 9

Third Term: Mainly devoted to advanced study in Professional Elective subjects and to the preparation of a thesis.

Seminars: To be arranged during the course of the year.

Field Work: Excursions to mining centres, dam sites, etc.

Professional Elective Subjects: The formal lectures and laboratory hours included in the fourth year will be supplemented by a study of some selected phase of the course to an advanced stage, and the preparation of a thesis.

Elective subjects include:

1. Industrial Mineralogy and Petrology.
2. Structural Geology and Geophysics.
3. Mining and Economic Geology.
4. Engineering Geology.

COURSE VIIB—APPLIED GEOLOGY.

Course VIIB has been designed for students already employed in an appropriate position in industry. The work undertaken is equivalent to that covered in Course VIIA, but Course VIIB extends over six part-time years, satisfactory completion of which, together with the necessary occupational experience, qualifies for the degree of Bachelor of Engineering (Geology).

First Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.41D	Physics	1¼ — 1½–½*	1¼ — 1½–½*	1¼ — 1½–½*
2.111	Chemistry	2 — 1	2 — 1	2 — 1
5.11D	Engineering Drawing	0 — 1½*	0 — 1½*	0 — 1½*
5.41D	Descriptive Geometry	0 — 1½*	0 — 1½*	0 — 1½*
10.11	Mathematics, Part I	1½ — ½	1½ — ½	1½ — ½
G10	English, Part I (Language)	1 — 0	1 — 0	1 — 0
		5¾ — 6½	5¾ — 6½	5¾ — 6½

* Tutorial.

Second Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
2.32	Physical Chemistry	2 — 2½	2 — 2½	2 — 2½
2.52	Quantitative Analysis			
7.502	Geology	1 — 1	1 — 1	2 — 0
8.43D	Surveying	1 — 0	1 — 0	1 — 0 (½ term)
10.11	Mathematics, Part II	1½ — ½*	1½ — ½*	1½ — ½*
G10	English, Part II (Literature)	1 — 0	0 — 0	0 — 0
G20B	History	0 — 0	1½ — 0	1½ — 0
		6½ — 4	7 — 4	7–8 — 3

* Tutorial.

NOTE.—Six geological excursions will be held on Saturdays during first and second terms.

A survey camp of one week's duration will be conducted in the third week of third term.

Third Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.42D	Physics	1 — 1½–½*	1 — 1½–½*	1 — 1½–½*
7.21	Mining Processes and Practice	1 — 0	1 — 0	1 — 0
7.503A	Petrology	1 — 2	1 — 2	1 — 2
7.523A	Stratigraphy and Palaeontology			
7.513	Mineralogy and Crystallography	1 — 1½	1 — 2	1 — 2
10.12	Mathematics, Part I	1 — ½*	1 — ½*	1 — ½*
		5 — 6	5 — 6½	5 — 6½

* Tutorial.

Fourth Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
7.052	Mining Engineering Practice ...	1 — 0	1 — 1	0 — 1
7.503B	Petrology	1 — 2	1 — 2	1 — 2
7.504	Advanced Mineralogy and Petrology			
7.523B	Stratigraphy and Palaeontology	1 — 3	0 — 0	0 — 0
7.533A	Economic Geology	0 — 0	0 — 0	1 — 1
7.543A	Geophysics and Geotectonics ...	0 — 0	1 — 2	0 — 0
7.544	Geology of Fuels	0 — 0	1 — 1	1 — 1
10.12	Mathematics, Part II	1 — ½*	1 — ½*	1 — ½*
		4 — 5½	5 — 6½	4 — 5½

* Tutorial.

Fifth Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
7.524	Photogrammetry	0 — 0	1 — 1	1 — 1
	Photogeology			
	Military geology			
7.533B	Economic Geology	2 — 2	1 — 1	0 — 0
7.543B	Geophysics and Geotectonics ...	0 — 0	0 — 0	1 — 2
7.64	Preparation of Minerals	1 — 2	1 — 2	1 — 2
8.63A	Engineering Construction	1 — 0	1 — 0	1 — 0
8.641	Engineering Administration ...	1 — 0	0 — 0	0 — 0
8.73D	Soil Mechanics	1 — 0	1 — 0	1 — 0
G8	Philosophy	1½— 0	1½— 0	1½— 0
		7½— 4	6½— 4	6½— 5

Sixth Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
7.514	Mining Geology	2 — 2	2 — 2	1 — 1
	Mineral Economics			
	Mine Valuation			
7.534	Advanced Engineering Geology	1 — 1	1 — 1	0 — 0
	Major Electives (Humanities) ...	2 — 0	2 — 0	2 — 0
	Electives and Thesis†	1 — 2	1 — 2	8
		6 — 5	6 — 5	12

† For details see page 156.

CONVERSION COURSE VIIc—MINING ENGINEERING.

Holders of a diploma in Metalliferous Mining Engineering who have completed the course of study given at Broken Hill as set out in the 1953 Handbook of the New South Wales Department of Technical Education are required to complete the following additional work:—

Satisfactorily complete—

Diploma Mathematics II, after which they will be permitted to enter a two-year full-time course under the Professor of Mining Engineering at Sydney.

This requires attendance in Sydney full-time from March to September in the first year, after which they will return to work in the mines till the following March. The second year requires full-time attendance in Sydney from March to November.

The syllabus of work for the first year of this two-year course will consist of some of the normal degree course second-year subjects and some of the third-year subjects as follows:—

		Hours per Week.
1.42	Physics	4½
	(Exemption may be granted if the student has completed Diploma Physics II.)	
8.122	Structures	3
5.52	Fluid Mechanics	2
7.002	Mining	2
7.003	Mining	5
10.12	Mathematics	5
	Conversion Humanities—	
	English, History *or* Philosophy	2
	and Psychology, Economics *or* Government	2
		25½

The second year syllabus will be the normal course set out for the fourth year of the degree course, less the Humanities subject.

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

*Course VIII was revised in 1953. The first, second, and third years of the revised course, set out below, will operate in 1955. Students in the fourth year of course VIII in 1955 will follow the course described in the 1953 Calendar.

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 organizational in their nature.

Three courses leading to the degree of Bachelor of Engineering (Pass or Honour) are offered in the School of Civil Engineering. The courses provided are:

Course VIII, requiring four years' day attendance at the University, and including three periods of practical training in industry.

Course VIIIB, requiring seven years' part-time attendance, together with at least three years of satisfactory experience in industry.

Course VIIIC, for Associates of Sydney Technical College in Civil Engineering. This course may be completed by three years' part-time study, or by one year's part-time and one year's full-time study.

The courses in Civil Engineering are arranged so that all students receive training in the basic principles of mathematics and science and in the fundamentals of engineering applications of such work to surveying, hydraulics, foundation engineering, structural design, and constructional work in the field. Ancillary subjects from other branches of engineering are also included, such as electrical engineering, mechanical engineering, engineering chemistry and the like. Satisfactory practical experience in industry, concurrent with academic training, is a feature of all courses, and detailed reports of such experience must be submitted by all degree students.

Provision is made in the final year for the student to carry out further work adapted to his special interests by electing one of the following options:—

Option I.—Civil Engineering Design.

Emphasis is given to the design aspects of civil engineering works which follow up the initial survey and investigation and precede the actual construction of the project.

Option II.—Civil Engineering Construction and Administration.

The attention of the student is directed to the problems associated with the actual construction of major civil engineering

projects of all types such as the planning of construction methods and the study of administrative, social and economic aspects of major projects.

Option III.—Surveys and Investigations.

Stress is laid in this option upon the preliminary investigation necessary for large civil engineering projects with special study of such subjects as photogrammetry, hydrology, soil mechanics and geology.

Option IV.—Materials.

The study of both the fundamentals of material behaviour and the experimental analysis of engineering materials and structures is a rapidly expanding branch of applied science. This option deals with the civil engineering aspects of this field.

COURSE VIII—CIVIL ENGINEERING.

First Year.

(24 weeks day course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.
1.41	Physics	3 — 3	3 — 3
2.111	Chemistry	3 — 3	3 — 0
5.11	Engineering Drawing	0 — 3*	0 — 3*
5.41	Descriptive Geometry	1 — 2½*	1 — 2½*
8.11	Engineering Mechanics	1 — 1*	1 — 1*
10.11	Mathematics	4 — 2*	4 — 2*
G10	English	2 — 0	2 — 0
G20.1	History	1 — 0	1 — 0
		15 —14½	15 —11½

* Tutorial.

Note.—A survey camp of one week's duration must be attended in the third week of third term. Cadets in permanent employment may be exempted from the camp.

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Second Year.

(24 weeks day course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.
1.42	Physics	2 — 1½–1*	2 — 1½–1*
2.122	Engineering Chemistry	1½— 2	1½— 2
4.912	Engineering Metallurgy		
5.52	Fluid Mechanics	1 — ½–½*	1 — ½–½*
5.72	Thermodynamics	1 — 1–1*	1 — 1–1*
7.502	Geology	2 — 1	2 — 1
8.112	Theory of Structures	1½— 1*	1½— 1*
8.122	Structures	1 — 2	1 — 2
8.92	Properties of Materials	1 — 2	0 — 0
10.12	Mathematics	3 — 2*	3 — 2*
G1	Logic	0 — 0	2 — 0
G20.2	History	2 — 0	0 — 0
		16 —15½	15 —13½

* Tutorial.

Note—Field excursions will be arranged on several Saturdays in connection with the instruction in Geology.

Third Year.

(24 weeks day course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.
5.12	Mechanical Engineering Design	1 — 2	1 — 2
6.83	Electrical Engineering	1 — 3–1*	1 — 3–1*
7.583	Engineering Geology	1 — 0	0 — 0
8.113	Structures	1½— 2	1½— 2
8.23	Materials of Construction	2 — 2	2 — 2
8.33	Engineering Computations	1½— 0	1½— 0
8.43	Surveying	1½— 2	1 — 2
8.53	Fluid Mechanics	1 — 1½	1 — 0
8.63A	Engineering Construction	1 — 0	1 — 0
8.63B	Hydrology	0 — 0	1½— 0
8.73	Soil Mechanics	1 — 1½	1 — 1½
10.43	Mathematics	1½— 0	1 — 0
G2	Philosophy	2 — 0	0 — 0
	Minor Elective (Humanities)	0 — 0	2 — 0
		16 —15	15½—13½

* Tutorial.

Note—A survey camp of one week's duration must be attended in the third week of third term. Field excursions in Engineering Geology will be conducted at week-ends in the first term.

Fourth Year.

(34 weeks day course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.
8.114	Structures	2 — 3	2 — 3
8.44	Surveying	2 — 2	2 — 2
8.54	Applied Hydraulics	1 — 1*	1 — 1*
8.64C	Public Health Engineering	1 — 0	1 — 0
8.64D	Road Engineering	1 — 0	1 — 0
8.64E	Railway Engineering	1 — 0	0 — 0
8.64F	Harbours and Rivers Engineering	0 — 0	1 — 0
8.64G	Irrigation Engineering	1 — 0	0 — 0
8.64H	Hydro-Electric Engineering	0 — 0	1 — 0
8.64I	Engineering Administration	1 — 0	0 — 0
8.64J	Engineering Construction	2 — 0	0 — 0
8.84	Town and Country Planning	2 — 0	0 — 2
8.94	Properties of Materials	0 — 0	1 — 2
11.82A	Theory of Architecture	One hour per week 3rd term.	
	Professional Elective A Professional Elective B	Six hours per week for 3 terms consisting of 2 hours lecture and 4 hours laboratory, drawing office or tutorial.	
	Major Elective (Humanities)	3 — 0	3 — 0
		19 —10	15 —14

* Tutorial.

Note—A survey camp of one week's duration must be attended in the third week of third term.

The third term of fourth year is mainly devoted to directed laboratory and research work on Professional Elective Subjects, with special reading and study associated with the preparation of a thesis. Each student will also read a paper in a seminar session.

Professional Elective Subjects.

Throughout fourth year each student is required to pursue work adapted to his special interest and abilities by electing to take one of the following options. Within each option the student is required to select two subjects with the approval of the Head of the School. The work in these electives will be mainly carried out on the tutor

system. Students may be instructed to attend certain lectures given by learned societies and other educational authorities during the year. The electives within each option are as follows:—

Option 1— *Civil Engineering Design.*

(*a*) Theory and Design of Structures.
(*b*) Soil Mechanics and Foundation Engineering.
(*c*) Hydrology.
(*d*) Hydraulics.
(*e*) Advanced Mathematics.
(*f*) Modern Foreign Language.

Option 2—*Civil Engineering Construction and Administration.*

(*a*) Construction Equipment and Methods.
(*b*) Geology.
(*c*) Management.
(*d*) Road Engineering.
(*e*) Public Health Engineering.

Option 3—*Surveys and Investigations.*

(*a*) Astronomy and Geodesy.
(*b*) Topographical Surveying, Aerial Surveying and Photogrammetry.
(*c*) Soil Mechanics.
(*d*) Hydrology.
(*e*) Hydraulics.
(*f*) Geology.

Option 4—*Materials.*

(*a*) Soil Mechanics.
(*b*) Concrete Technology.
(*c*) Advanced Mechanics of Materials.
(*d*) Photoelasticity and Experimental Stress Analysis.
(*e*) Advanced Mathematics.
(*f*) Modern Foreign Language.

COURSE VIIIB—CIVIL ENGINEERING.

This course provides students who are suitably employed during the day with the opportunity of obtaining the degree of Bachelor of Engineering by seven years of evening study.

The total content of the course is the same as that of the **day** course except that slightly less formal class time is provided in certain subjects in which the student's study is supplemented by his practical experience in industry.

First Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
1.41D	Physics	1¼ — 1½–½*	1¼ — 1½–½*	1¼ — 1½–½*
2.111	Chemistry	2 — 1	2 — 1	2 — 1
5.11D	Engineering Drawing	0 — 3*	0 — 3*	0 — 3*
5.41D	Descriptive Geometry†			
8.11D	Engineering Mechanics	1 — 0	1 — 0	1 — 0
10.11	Mathematics, Part I	1½ — ½*	1½ — ½*	1½ — ½*
		5¾ — 6½	5¾ — 6½	5¾ — 6½

* Tutorial.

† First half year—Descriptive Geometry; Second half year—Engineering Drawing.

Second Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
2.122D	Engineering Chemistry	1 — 1½	1 — 1½	1 — 1½
4.912D	Engineering Metallurgy			
7.502	Geology	1 — 1	1 — 1	2 — 0
8.112D	Theory of Structures	1 — ½*	1 — ½*	1 — ½*
10.11	Mathematics, Part II	1½ — ½*	1½ — ½*	1½ — ½*
**G10	English, Part I (Language)	1 — 0	1 — 0	1 — 0
G10	English, Part II (Literature)	1 — 0	0 — 0	0 — 0
G20B	History	0 — 0	1½ — 0	1½ — 0
		6½ — 3½	7 — 3½	8 — 2½

* Tutorial.

** Students attending second year in 1955, and who have completed **G10** English Part I (Language) in their first year in 1954, will take **8.11D** Engineering Mechanics in their second year.

NOTE—Field excursions will be arranged on several Saturdays in connection with instruction in Geology.

THIRD YEAR.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term lec. lab./tut.
5.52	Fluid Mechanics	1 — ½–½*	1 — ½–½*	0 — 0
5.72D	Thermodynamics	1 — 1	1 — 1	0 — 2
8.122	Structures	1 — 1	1 — 1	1 — 1
8.43D	Surveying	1 — 0	1 — 0	1 — 0 (½term)
8.92	Properties of Materials ...	0 — 0	0 — 0	1 — 2
10.12	Mathematics, Part I ...	1 — ½*	1 — ½*	1 — ½*
G8	Philosophy	1½— 0	1½— 0	1½— 0
		6½— 3½	6½— 3½	4½–5½—5½

* Tutorial.

NOTE—Seven Saturdays (a total of 42 hours) will be devoted to Surveying field work. Third year students may apply to attend the survey camp of one week's duration to be held in the third week of third term.

FOURTH YEAR.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
5.12D	Mechanical Engineering Design	0 — 2	0 — 2	0 — 0
8.113	Structures	1 — 1½	1 — 1½	1 — 1½
8.23D	Materials of Construction ...	1 — 1½	1 — 1½	1 — 1½
8.53	Fluid Mechanics	1 — 0	1 — 0	0 — 1½
8.63A	Engineering Construction ...	1 — 0	1 — 0	0 — 0
8.73D	Soil Mechanics	1 — 0	1 — 0	0 — 3
10.43	Mathematics	1 — 0	1 — 0	1 — 0(½term)
		6 — 5	6 — 5	2 – 3—7½

FIFTH YEAR.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut
6.83D	Electrical Engineering	1 — 1½	1 — 1½	1 — 1½
8.63B	Hydrology	1½— 0	0 — 0	0 — 0
8.64C	Public Health Engineering ...	0 — 0	1 — 0	1 — 0
8.64D	Road Engineering	0 — 0	1 — 0	1 — 0
8.64E	Railway Engineering	1 — 0	0 — 0	0 — 0
8.64F	Harbours and Rivers Engineering	1 — 0	0 — 0	0 — 0
8.64G	Irrigation Engineering	0 — 0	0 — 0	1 — 0
8.64H	Hydro-Electric Engineering	1 — 0	0 — 0	0 — 0
8.64I	Engineering Administration ...	0 — 0	1 — 0	0 — 0
8.84	Town and Country Planning ...	2 — 0	0 — 2	0 — 0
8.94	Properties of Materials	0 — 0	0 — 0	1 — 2
	Seminar	1 — 0	1 — 0	1 — 0
		8½— 1½	5 — 3½	6 —3½

Sixth Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3. lec. lab./tut.
1.42D	Physics	1 — 2	1 — 2	2 — 2
7.583	Engineering Geology	1 — 0	0 — 0	0 — 0
8.44D	Surveying	1½ — 0	1½ — 0	1½ — 0
8.54	Applied Hydraulics	1½ — 0	1 — 1*	1 — 0
10.12	Mathematics, Part II	1 — ½*	1 — ½*	1 — ½*
	Major Elective (Humanities)	2 — 0	2 — 0	2 — 0
		8 — 2½	6½ — 3½	7½ — 2½

* Tutorial.

Note—Seven Saturdays (a total of 42 hours) will be devoted to Surveying field work. In addition, the survey camp of one week's duration to be held in the third week of third term must be attended.

Seventh Year.

(34 weeks part-time course.)

		Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
8.114	Structures	2 — 1½	2 — 1½	2 — 1½
8.33	Engineering Computations	1 — 0	1 — 0	1 — 0
8.64J	Engineering Construction	1 — 0	1 — 0	0 — 0
	Professional Elective A	1 — 2	1 — 2	1 — 2
	Professional Elective B	1 — 2	1 — 2	1 — 2
	Thesis	0 — 3	0 — 3	0 — 3
		6 — 8½	6 — 8½	5 — 8½

CONVERSION COURSE VIIIc—CIVIL ENGINEERING.

Holders of the diploma in Civil Engineering granted by the N.S.W. Department of Technical Education, who wish to proceed to the degree of Bachelor of Engineering may qualify upon satisfactory completion of the following conversion course.

First Year.

(34 weeks evening course.)

	Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
Conversion Physics	1½— 1½	1½— 1½	1½— 1½
† Conversion Theory of Structures	1 — 0	1 — 0	1 — 0
Conversion Soil Mechanics	0 — 3	0 — 0	0 — 0
Conversion Materials of Construction	0 — 0	0 — 2	0 — 2
Conversion Mathematics	3 — 0	3 — 0	3 — 0
Conversion Humanities (English, History *or* Philosophy)	2 — 0	2 — 0	2 — 0
	6½–7½—4½	6½–7½—3½	6½–7½—3½

† Students may be exempted from this subject on the basis of their performance in the subject of Engineering Design, provided such subject was taken under the revised syllabus (1947 and subsequently).

Second Year.

(34 weeks evening course.)

	Hours per week. Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
Engineering Computations	1 — 0	1 — 0	1 — 0
Applied Hydraulics	1 — 0	1 — 0	1 — 0
Railways, Irrigation and Harbours and Rivers	1½— 0	1½— 0	1½— 0
Public Health Engineering and Hydrology*	1½— 0	1½— 0	1½— 0
Road Engineering*	1½— 0	1½— 0	1½— 0
Town Planning*	2 — 0	0 — 2	0 — 0
Hydro-Electric Engineering	0 — 0	1 — 0	0 — 0
Engineering Administration	1 — 0	0 — 0	0 — 0
Mathematics	1 — 0	1 — 0	1 — 0
Conversion Humanities (Psychology, Economics *or* Government)	2 — 0	2 — 0	2 — 0
	9 — 0	9	8 — 0

* Students will be exempted from corresponding subjects completed in the diploma course. The total of hours shown is based upon 50 per cent. exemption. In addition to the above, students will be required to attend certain lectures and carry out certain assignments in 8.44 Surveying and 8.114 Structures.

THIRD YEAR.

(34 weeks evening course.)

	Hours per week.		
	Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
Properties of Materials	1 — 2	0 — 0	0 — 0
Elective A	1 — 2	1 — 2	1 — 2
Elective B	1 — 2	1 — 2	1 — 2
Thesis	0 — 3	0 — 3	0 — 3
	3 — 9	2 — 7	2 — 7

NOTE—Students who have completed the first year of the evening conversion course may attend for 34 weeks full-time in the following year and complete in one year of day study the work of the second and third years of the evening conversion course.

GRADUATE COURSES.

The School of Civil Engineering is offering in 1955 a number of graduate courses in individual topics. The courses are of two types, day and evening.

(a) *Day Courses,* for qualified engineers who wish to follow a one year full-time day programme, consisting of a selection of several of the following courses:

(i) Modern Developments in Structural Analysis.
(ii) Engineering Computations.
(iii) Analysis of Concrete Shell Roofs.
(iv) Prestressed Concrete.
(v) Hydrology.
(vi) Applied Hydraulics.
(vii) Soil Mechanics.
(viii) Experimental Stress Analysis.

(b) *Evening Courses,* for qualified engineers who wish to attend lectures on one or two evenings per week throughout the year. The courses are complete in themselves but involve less work on projects and laboratory work than do the corresponding day courses:

(i) Engineering Computations.
(ii) Analysis of Concrete Shell Roofs.
(iii) Hydrology.

(iv) Applied Hydraulics.
(v) Soil Mechanics.
(vi) Experimental Stress Analysis.
(vii) Prestressed Concrete.

The numbers of students offering will determine whether a particular course will be conducted. The courses will commence at the beginning of the first term. Details of syllabuses, times of classes and fees may be obtained upon written application to the Head of the School.

SCHOOL OF WOOL TECHNOLOGY.

To meet a potential threat from cheaply produced man-made fibres, wool producers, by the implementation of the Wool Use Promotion Act of 1945 and subsequent legislation, have taken decisive action to change from the empirical development of Australia's pastoral resources. A programme of planned improvement of efficiency through research, increased extension services, and adequate publicity for wool is already under way. The full development of this plan will require specialist personnel trained to give service to the pastoral industry.

In the past, research workers, teachers, extension workers, agricultural journalists, valuers, managers of estates and other professional workers for the pastoral industry, have been in part drawn from university courses in traditional subjects such as Pure Science, Engineering, Agriculture and Veterinary Science. More often, their training has been at Diploma and Certificate level in agricultural and technical colleges without matriculation standard of entry. In far too many cases senior workers have had no opportunity for tertiary education, and their knowledge, usually highly specialised, comes from long practical experience and from personal contacts in the industry. This is especially true in the field of Wool Commerce, where men aspiring to the highest positions in wool broking and wool buying must get a substantial part of their training outside of formal instruction, or spend a year or more in an overseas wool centre such as Bradford, Leeds or Boston.

The course aims to provide a pool of graduates in whom has been inculcated a liberal scientific outlook, and the habit of exact and logical thought. These men will be familiar with the latest developments in fields relating to wool production, wool commerce, and wool utilisation. They will also be good practical wool men, capable of handling wool and recognising its technical characteristics, through facility in the use of subjective appraisal on which the whole wool trade is based. A recent report, prepared by an expert of the Australian Wool Realisation Commission, emphasises the lack of sufficient

liaison between experts in wool growing, the selling of wool and wool manufacture, and personnel of scientific organisations. One broad aim of this course is to link producers, buyers and users of wool. Trainees, for example, will be given opportunity, on machines of the Textile Department, of following particular lots of wool through all processing operations, and observing for themselves the effect in manufacture of characteristics apparent in the raw material.

The course consists of four years full-time study, but the second and third years each provide for a period of approximately six months approved work in the industry to gain practical experience.

The first year of the course consists of a basic training in general science; vocational subjects essential to all branches of the wool industry are given in the second and third years, and in the final year provision is made for students who wish to specialise in either wool production or wool commerce. The fourth year work will include a project which will give each student opportunity to express initiative and originality. By association with lecturers and teachers who are engaged in research already under way in this School, we aim to provoke both curiosity and interest in students who will themselves spend effort in contributing to the advance of efficiency. The greater part of the first and second year work will be common to the degree in Textile Technology when this is established.

Requirements for Industrial Training.

Each student is required to complete satisfactorily twelve months' practical work on approved sheep properties. The twelve months need not necessarily be consecutive, and in the case of a student who has done practical work before entering the course this may be taken into consideration in determining any further time required.

In order to obtain recognition of practical work carried out, students shall:—

1. Make application for the approval of the properties where they intend to carry out the required practical work, such application to contain a brief description of the property and to be in the hands of the Head of the School at the earliest possible date. Students should endeavour to obtain experience on extensive, marginal and intensive properties.

2. At the conclusion of the work, produce certificates from employers stating periods of employment and reporting on the quality of the student's work.

3. Supply reports as hereunder:

(i) On work carried out in the long vacation—

(*a*) Monthly interim reports setting out briefly the nature of work engaged in, with any notes of topical interest. The first interim report shall include a description of the property, including details of farm buildings, dip and yards, plant and equipment, stock numbers (in age and sex groups), and such features as water supplies, improved pastures, crops, etc. A sketch plan of the property should also be included.

(*b*) A final report to be submitted within a month of resumption of lectures. The final report should embody a report on a district basis in general and the property on which the student has worked in particular. The development of farming practices, the salient features of management in relation to the environment, pasturage, rainfall and distribution, water supplies, types of stock and breeding policies, statistics, etc., should receive consideration. The size and capacity of the farm buildings should be given particular note, and sketch plans with the principal measurements will be of value. Photographs will also be of value in illustrating features. Where applicable, details of pasture mixtures, rate of sowing for crops and manurial treatment should be recorded, as should also labour performances (both manual and with machines) and costs.

(ii) On work carried out in short vacations—A brief report to be submitted within one week of the resumption of the term.

(iii) By students who carry out twelve consecutive months on a property or properties—

(*a*) Interim reports to be submitted every two months.

(*b*) Final reports to be submitted by 31st March in the year of resumption of studies. The nature of the interim and final reports shall be as required for work carried out in the long vacation.

NOTE: Students will find that a loose-leaf notebook suitably indexed will be of great value for recording factual material, costs, material requirements for various jobs, etc.

Students are also encouraged to submit questions relating to any problems they may meet with in the course of their practical work.

COURSE IX—WOOL TECHNOLOGY.

First Year.

(34 weeks day course.)

		Hours per week. Terms 1 and 2 lec. — lab./tut.	Term 3 lec. — lab./tut.
1.41	Physics	3 — 3	0 — 0
2.41B	General Chemistry	3 — 6	3 — 6
2.911	Biology	2 — 3	2 — 3
2.91	Biochemistry	0 — 0	2 — 4
10.91	Mathematics	4 — 2*	2 — 2*
G10	English	2 — 0	0 — 0
G20.1	History	1 — 0	0 — 0
		15 —14	9 —15

* Tutorial.

Second Year.

(24 weeks day course.)

		Hours per week. Terms 1 and 2 lec. — lab./tut.	
2.912	Biology (Physiology)	2 — 3	
2.92	Biochemistry	2 — 3	
9.12	Sheep Husbandry (Breeds and Management)	3 — 0	
9.22	Agronomy	3 — 0	
9.42	General Textiles (Yarns)	1 — 2	
9.52	Wool	1 — 6	
10.92	Mathematics	1 — 1*	
G20.2	History	2 — 0	(Term 1)
G1	Logic	2 — 0	(Term 2)
		15 —15	

* Tutorial.

21 weeks for remainder of year to be spent in activites concerned with wool production.

Third Year.

(24 weeks day course.)

		Hours per week. Terms 1 and 2 lec. lab./tut.	
2.913	Physiology	2 — 3	
9.13	Sheep Husbandry—		
	(*a*) Sheep Production	3 — 0	
	(*b*) Sheep Health	3 — 0	
9.33	Economics	2 — 0	
9.43	General Textiles (Fabrics)	1 — 3	
9.53	Wool	0 — 9	
G2	Philosophy	2 — 0	(Term 1)
	Minor Elective (Humanities)	2 — 0	(Term 2)
		13 —15	

21 weeks for remainder of year to be spent in activities concerned with wool production.

Fourth Year.

(34 weeks day course.)

		Hours per week. Terms 1, 2 and 3. lec. lab./tut.
9.74	Fibre Science	2 — 2
9.84	Project	0 — 5
	Major Elective (Humanities)	3 — 0 (Terms 1 and 2)
		2-5 — 7

Plus elective subjects of either Option I or Option II.

Option I:

		Hours per week. Terms 1,2 and 3 lec. lab./tut.
9.94	Genetics	2 — 1
9.104	Nutrition	3 — 2
9.114	Farm Livestock	2 — 0
9.24	Pastoral Agronomy	2 — 2
9.124	Farm Management and Mechanisation	3 — 0
		12 — 5

Option II:

		Hours per week. Terms 1, 2 and 3 lec. lab./tut.
9.134	Accountancy	2
9.34	Banking, Currency, Foreign Exchange	1½
9.144	Commercial Law	1½
9.44	Yarn Manufacture (Wool)	6
9.54	Wool	5
9.154	Synthetic Fibres	1
		17

SCHOOL OF ARCHITECTURE AND BUILDING.

The architect is occupying an increasingly important position in the development of Australia. His contribution to society is primarily that of a planner; it includes understanding of the building needs of communities and individuals, skill in the effective and orderly disposition of interior space and communication, and the design of economic and durable structures. In this he is concerned with research into functional needs and the best methods of construction. His main work as an artist is to fuse functional planning and scientific structure into an aesthetic unity which gives lasting pleasure. In architecture, science and art are one: they are absolutely inter-dependent and complementary. These ideas have been kept in mind in planning the syllabus of work.

The special feature of this course is that the three main essentials —architecture as an art, architecture as a science, and architecture as a practical profession—are all given prominence.

The early stages provide a fundamental training in the basic sciences underlying building technology. This is a feature of the course which is most important for modern architects who are called upon to use new materials and new building methods and express new ideas in the present scientific age. Instruction in the principles of chemistry and physics as they affect the architect is included as a foundation to the studies in building science. All students receive and undertake a certain amount of theoretical and practical training in the building trades and crafts. A further feature of the course is a basic training in modern structures—with the relevant amount of mathematics—followed by further optional study in advanced structures in the later years for those students who wish to concentrate more on structural design in steel and reinforced concrete.

Concurrently with these scientific and structural subjects, the aesthetic sensibilities and creative abilities of the student are developed from the beginning with visual design and colour (included in Architectural Studies and Design) and later with more advanced work on architectural design and construction, civic design, etc.

Further, two principles established by the University of Technology as relating to all courses have been applied, viz., that practical experience in employment of a planned nature is to be a feature of all courses, and secondly that social and cultural needs must be catered for if a professional man is to take his rightful place in the community. Practical employment is included during the third term of first year, and throughout all the subsequent years, and the lectures in the Humanities and the Fine Arts are an integral part of the course.

COURSE XI—ARCHITECTURE.

The course in Architecture was revised as from 1952. The revised course replaces the original course stage by stage commencing with the first year in 1952. Details of the original course may be found in the 1951 Calendar.

First Year.

(24 weeks full-time course covering first and second terms and 12 weeks part-time course of two half days and two or three evenings per week covering third term.)

		Hours per week.					
		Term 1		Term 2		Term 3	
		Lect.	Pract.	Lect.	Pract.	Lect.	Pract.
11.81	A series of lectures by the Professor of Architecture entitled "Introduction to Architecture and Building."						
1.91	Physics	2	2	2	2	0	0
2.131	Chemistry	2	2	2	2	0	0
10.51	Mathematics	2	0	2	0	0	0
11.101	Theory of Structures I	1	0	1	0	1	0
11.11	Descriptive Geometry	0	2	0	2	0	2
11.21	Freehand Drawing and Presentation I	0	5½	0	5½	0	2½
11.31	Architectural Studies and Design I	0	1½	0	0	0	1½
11.41	History of Architecture I	1	0	1	0	1	0
11.51	Building Science I	0	0	1	0	0	0
11.61	Building Trades and Crafts (Equiv. time)	0	1½	0	1½	0	1½
11.71	Building Construction I	1	4	1	3	1	2
G10	English	2	0	2	0	0	0
G20.1	History	1	0	1	0	0	0
		12	18½	13	16	3	9½

For the subject "Building Trades and Crafts," groups of students will be formed, studying for the equivalent time stated.

Second Year.

(34 weeks part-time course over three terms requiring attendance for two half days or one full day and three evenings per week.)

		Hours per week. Term 1 Lect. Pract.	Term 2 Lect. Pract.	Term 3 Lect. Pract.
8.22	Materials of Construction (Equivalent time)	0 — 1	1 — 1	1 — 3
8.42	Land Surveying (Equiv. time)	1 — 0	0 — 1	0 — 1
11.102	Theory of Structures II	1 — 0	1 — 0	1 — 0
11.22	Freehand Drawing and Presentation II	0 — 2½	0 — 2½	0 — 2½
11.32	Architectural Studies and Design II	½— 1	½— 1	½— 1
11.42	History of Architecture II	1 — 0	1 — 0	1 — 0
11.52	Building Science II	1 — 0	0 — 0	0 — 0
11.72	Building Construction II	1 — 1	1 — 2	1 — 2
11.82	Theory of Architecture A	1 — 0	1 — 0	1 — 0
G1	Logic	0 — 0	2 — 0	0 — 0
G20.2	History	2 — 0	0 — 0	0 — 0
		8½— 5½	7½— 7½	5½— 9½

For the subject "Land Surveying," groups of students will be formed, studying for 12 hours theory in the school and 24 hours practical outdoor on Saturday mornings. Time stated is equivalent time per week.

Third Year.

(34 weeks part-time course requiring attendance for two half days or one full day and three evenings per week.)

		Term 1 Lect. Pract.	Term 2 Lect. Pract.	Term 3 Lect. Pract.
7.502A	Geology	1 — 0	1 — 0	0 — 4
11.103	Theory of Structures III	1 — 0	1 — 0	1 — 0
11.203	Building Services and Equipment A	1 — 0	1 — 0	1 — 0
11.43	History of Architecture III	1 — 0	1 — 0	1 — 0
11.73	Building Construction III	1 — 1	1 — 1	1 — 1
11.83	Theory of Architecture B	1 — 0	1 — 0	1 — 0
11.93	Architectural Design and Construction A	0 — 5	0 — 5	0 — 5
G2	Philosophy	2 — 0	0 — 0	0 — 0
G60	Painting, Sculpture and Allied Arts	1 — 0	1 — 0	0 — 0
		9 — 6	7 — 6	5 —10

Fourth Year.

(34 weeks part-time course requiring attendance for one half day and three evenings per week in terms 1 and 2 and three evenings per week in term 3.)

		Hours per week. Term 1 Lect. Pract.	Term 2 Lect. Pract.	Term 3 Lect. Pract.
8.124	Structures			
	or	0 — 2	0 — 2	0 — 2
11.114	Architectural Research			
11.154	Interior Furnishing and Decoration	0 — 0	0 — 0	1 — 0
11.164	Acoustics and Sound Insulation	1 — 0	0 — 0	0 — 0
11.204	Building Services and Equipment B	2 — 0	2 — 0	2 — 0
11.94	Architectural Design and Construction B	0 — 3	0 — 3	0 — 3
	Major Elective (Humanities)	3 — 0	3 — 0	0 — 0
		6 — 5	5 — 5	3 — 5

Fifth Year.

(34 weeks part-time course requiring attendance for three evenings per week.)

		Hours per week. Term 1 Lect. Pract.	Term 2 Lect. Pract.	Term 3 Lect. Pract.
8.125	Structural Design			
	or	0 — 2	0 — 2	0 — 2
11.115	Planning Research			
11.125	Professional Practice	1 — 0	1 — 0	1 — 0
11.135	Specifications	1 — 0	1 — 0	1 — 0
11.145	Building Research Review	0 — 0	1 — 0	0 — 0
11.215	Estimating	1 — 0	1 — 0	1 — 0
11.95	Architectural Design and Construction C	0 — 3	0 — 3	0 — 3
		3 — 5	4 — 5	3 — 5

Sixth Year.

(34 weeks course requiring attendance for twelve weeks full-time for one term, and part-time attendance for two evenings for two terms.)

The hours given are for normal attendance at the school. They do not give the total hours involved on the research or design projects.

		Hours per week. Term 1 Lect. Pract.	Term 2 Lect. Pract.	Term 3 Lect. Pract.
11.126	Professional Practice (Advanced)	0 — 0	0 — 0	2 — 0
11.176	Architectural Science and Research Thesis	1 —24	0 — 0	0 — 0
11.186	Civic Architecture	0 — 0	0 — 3	0 — 0
11.196	Town Planning	2 — 0	0 — 2	0 — 0
11.96	Architectural Design and Construction D	0 — 3	0 — 0	0 — 0
		3 —27	0 — 5	2 — 0

CONVERSION COURSE XIc—ARCHITECTURE.

Holders of the diploma in Architecture are required to complete the following additional work in order to qualify for the degree of Bachelor of Architecture.

		Hours per week.	
1.	Conversion Humanities—English, History *or* Philosophy	2	
	and Psychology, Economics *or* Government	2	
2.	11.176 Architectural Science and Research Thesis*	24	(Term 1)
3.	Any two of the following :—		
	1.91 Physics	4	(Terms 1 and 2)
	2.131 Chemistry	4	(Terms 1 and 2)
	10.51 Mathematics	2	(Terms 1 and 2)
	8.22 Materials of Construction	2	
	7.502 Geology	1	(Terms 1 and 2)
	7.502 Geology	4	(Term 3)

* In special circumstances a student may apply to complete this subject by part-time study over three terms. The holder of a diploma with Credit or Honours of three or more years' standing may apply to be exempted from this subject, provided that—

(*a*) he gained the Architecture diploma prior to 1950;

(*b*) he gained a Credit or Distinction for the research or design thesis in the diploma course;

(*c*) he provides evidence to the Faculty that in his professional career he has pursued some aspect of study in Architectural Science and Research which, together with the diploma thesis, is regarded as equivalent to the subject of 11.176 Architectural Science and Research thesis.

SCHOOL OF APPLIED PSYCHOLOGY.

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

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

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

The elective in Industrial Psychology is intended to meet the demand for students who will engage in personnel work in industry. It involves a study of the individual worker and the organisations in which he works. It is concerned with the study of job success and failure, job satisfaction and dissatisfaction, industrial motivation, employer-employee relations, acquisition of job skill, conditions affecting job efficiency and the like. These will be the subject of both theory and practical work.

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

The courses will be part-time, of five years' duration and lead to the degree of Bachelor of Science in Psychology. Lectures will be held in the evenings for 10-12 hours per week. Students wishing to qualify for an Honours degree are required to take an extra year's study.

COURSE XII—APPLIED PSYCHOLOGY.

First Year.

(34 weeks part-time course.)

		Hours per week.		
		Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
10.91	Mathematics I (by special arrangement more advanced Mathematics may be substituted)	3 — 1	3 — 1	3 — 1
12.01	Psychology I	2 — 1	2 — 1	3 — 0
G13c	English	2 — 0	2 — 0	2 — 0
		7 — 2	7 — 2	8 — 1

Second Year.

(34 weeks part-time course.)

		Hours per week.		
		Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
2.911	Biology (by special arrangement Physics I or advanced Mathematics may be substituted) ...	2 — 4	2 — 4	2 — 4
12.02	Psychology II	2 — 2	2 — 2	2 — 2
G22	History	2 — 0	2 — 0	2 — 0
		6 — 6	6 — 6	6 — 6

Third Year.

(34 weeks part-time course.)

		Hours per week.		
		Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
12.03	Psychology III	3 — 1	3 — 1	3 — 1
12.10	Psychological Assessment I.....	1 — 2	1 — 2	1 — 2
G7c	Philosophy	2 — 0	2 — 0	2 — 0
	Organisation of Australian Industry	1 — 0	1 — 0	1 — 0
		7 — 3	7 — 3	7 — 3

Fourth Year.

(34 weeks part-time course.)

Industrial Course Elective.

		Hours per week.		
		Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
12.20	Psychology IV (Social)	3 — 0	3 — 0	3 — 0
12.30	Industrial Psychology	2 — 0	2 — 0	2 — 0
12.11	Psychological Assessment II (Industry)	1 — 2	1 — 2	1 — 2
	Industrial and Labour Relations	3 — 0	3 — 0	3 — 0
		9 — 2	9 — 2	9 — 2

Counselling Course Elective.

		Hours per week.		
		Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
12.70	Psychology IVb (Principles of Counselling)	2 — 2	2 — 2	2 — 2
12.11A	Psychological Assessment IIa (Counselling)	1 — 2	1 — 2	1 — 2
12.20	Psychology IV (Social)	3 — 0	3 — 0	3 — 0
		6 — 4	6 — 4	6 — 4

Fifth Year.

(34 weeks part-time course.)

Industrial Course Elective.

		Hours per week.		
		Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
12.21	Psychology V (Applied Social)...	2 — 2	2 — 2	2 — 2
12.40	Personnel Techniques (including Field Work)	1 — 3	1 — 3	1 — 3
12.50	Research Seminar.....	1 — 0	1 — 0	1 — 0
		4 — 5	4 — 5	4 — 5

Counselling Course Elective.

		Hours per week.		
		Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
12.40A	Psychology Vb (Counselling Techniques including Field Work)	2 — 4	2 — 4	2 — 4
12.43	Professional Relations	1 — 0	1 — 0	1 — 0
12.44	Occupational Information	1 — 0	1 — 0	1 — 0
12.50	Research Seminar	1 — 0	1 — 0	1 — 0
		5 — 4	5 — 4	5 — 4

SIXTH YEAR (HONOURS).

(34 weeks part-time course.)

(*Industrial or Counselling.*)

		Hours per week.		
		Term 1 lec. lab./tut.	Term 2 lec. lab./tut.	Term 3 lec. lab./tut.
12.31	Psychology VI—Current Issues in Applied Psychology	3 — 0	3 — 0	3 — 0
12.60	History of Psychology	1 — 0	1 — 0	1 — 0
12.51	Research Seminar	1 — 0	1 — 0	1 — 0
		5 — 0	5 — 0	5 — 0

SCHOOL OF HUMANITIES AND SOCIAL SCIENCES.

All undergraduates of the University must take several courses in the fields of Humanities and Social Sciences. Courses in English, History and Philosophy are required to be taken by all undergraduates; in addition, there is offered a range of elective subjects which includes those just mentioned, together with Government, Economics and Psychology. Progression by undergraduates from year to year of their courses, and the final award of a degree, depends upon successful completion of the subjects prescribed in this field.

The detailed requirements for students in the several Schools are set out hereunder; fuller descriptions of the several courses will be found on page 306 and the succeeding pages. The complete programme in the Humanities and Social Sciences is similar for all undergraduate courses, except for conversion students. The programme in the different years of the respective courses is as follows:

GROUP A—APPLIED PHYSICS; ENGINEERING (MECHANICAL, ELECTRICAL, MINING, CIVIL); APPLIED GEOLOGY; WOOL TECHNOLOGY; ARCHITECTURE

		Hours per week. Term 1.	Term 2.	Term 3.
	FIRST YEAR.			
G10	English	2	2	0
G20.1	History	1	1	0
	SECOND YEAR.			
G20.2	History	2	0	0
G1	Logic	0	2	0
	THIRD YEAR.			
G2	Philosophy	2	0	0
	Minor Elective†*	0	2	0
	FOURTH YEAR.			
	Major Elective‡	3	3	0

GROUP B—APPLIED CHEMISTRY; CHEMICAL ENGINEERING; METALLURGY.

		Hours per week. Term 1.	Term 2.	Term 3.
	FIRST YEAR.			
G10	English	2	2	0
G20	History	1	1	2
	SECOND YEAR.			
G1	Logic	0	2	0
G2	Philosophy	0	0	2
	THIRD YEAR.			
	Minor Elective †	1	1	0
	FOURTH YEAR.			
	Major Elective ‡	3	3	0

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† The full range of Minor Electives is :—

G3	Philosophy of Science.	G30	Government.
G11.1	English.	G40	Psychology.
G11.2	English.	G41	Psychology.
G21.1	History.	G50	Economics.
G21.2	History.		

‡ The full range of Major Electives is :—

G6	Philosophy.	G31	Government.
G12	English.	G42	Psychology.
G22	History.	G51	Economics.

* In the third year of Course XI Architecture, G60 Painting, Sculpture and Allied Art taken in lieu of Humanities Minor Elective.

GROUP C—CONVERSION COURSES.

Students must take *two* courses, *one* to be chosen from the following three:—

		Hours per week.		
		Term 1.	Term 2.	Term 3.
G7c	Philosophy	2	2	2
G13c	English	2	2	2
G22c	History	2	2	2

and *one* also to be chosen from the following three:—

G31c	Government	2	2	2
G42c	Psychology	2	2	2
G51c	Economics	2	2	2

The two courses chosen may be taken concurrently or in different years.

GROUP D—PART-TIME COURSES.

(i) *Faculty of Science.*—Students (except those in General Science) will take Humanities in the final, or final two stages of a part-time course; *two* courses of three hours per week for three terms, *one* to be chosen from the following subjects:—

English, History, Philosophy;

and *one* from Economics, Psychology, Government.

Students in a part-time General Science course will take the Humanities subjects shown hereunder in the following order:—

G10 English.
G20 History.
G1 Logic.
G2 Philosophy.

One Minor Elective and one Major Elective from the following:

English, History, Philosophy, Economics, Psychology, Government.

(ii) *Faculty of Engineering.*—Students will take four courses of Humanities in a part-time course in engineering. The pattern varies somewhat between schools, but all the schools will take the courses in the following order:

G10 English.

G20B History.

G8 Philosophy.

One Major Elective from the following:

English, History, Philosophy, Economics, Psychology, Government.

GROUP E—ARTS COURSES (NEWCASTLE UNIVERSITY COLLEGE).

In 1955 the following courses preparatory to a degree in Arts will be offered at Newcastle.

Group 1 (Language and Literature).	English I and II.
	French I and II.
	German I and II.
	Latin I.
Group 2 (Historical, Mental and Social Science).	History I and II.
	Philosophy I and II.
	Psychology I and II.
	Economics I and II.
	Education I.
Group 3.	Mathematics I and II.
	Geography I and II.

DESCRIPTION OF SUBJECTS OF INSTRUCTION.

The description of subjects given below is meant to indicate the nature of the work dealt with in the individual subjects comprising the various courses.

The list as given below is subject to change without notice.

Physics.

Subjects 1.01 to 1.92.

1.11, 1.11A AND 1.11D PHYSICS.

Mechanics and properties of matter.

Mass, length, time, derived units. Elementary statics. Elementary dynamics of a particle, circular motion, simple pendulum. Elementary rigid dynamics. Friction. Stress, strain, moduli. Elements of hydrostatics, surface tension, capillarity, viscosity, Bernoulli's theorem. Periodic motion and propagation of waves.

Light.

Elements of geometrical optics, simple optical instruments, the eye. Elements of physical optics, absorption, dispersion, interference, diffraction. Photometry.

Magnetism and electricity.

Elementary magnetism. The earth as a magnet. Electric currents, magnetic, thermal, mechanical and chemical effects of currents. Elementary circuits and measurements. Electro-magnetic induction. Introduction to electrostatics: potential, capacity, dielectrics.

Heat.

Temperature, thermometry. Expansion. Gas laws. Calorimetry. Mechanical equivalent of heat. Vapour pressure, humidity, hygrometry. Heat transference. Introductory kinetic theory.

Advanced mechanics and properties of matter.

Elements of dimensional analysis. Surface tension. Viscosity: Poiseuille's and Stokes' laws. Bending and torsion. Rigid dynamics. Gyroscopic motion, precession. Newton's law of gravitation, elements of planetary motion. Rockets. Elementary stress analysis, and measurements of strain.

Sound.

Vibration of strings, rods, columns or air. Velocity of sound. Resonance. Pitch. Generation, transmission and reception of sound. Doppler effect. Beats and interference.

1.12 Physics.

Electricity and magnetism.

Gauss' theorem in electrostatics and applications. Systems of conductors and condensers. Properties of dielectrics. Ferromagnetism and magnetic hysteresis. The magnetic circuit. Magnetic effect of currents. Galvonometers. Kirchhoff's laws and Thévénin's theorem. Resistivity and temperature coefficient of resistance. Self and mutual induction. Theory of transient currents. Alternating current theory.

Light.

Wave theory and Huyghens' principle. Interference. Elementary interferometry. Diffraction by slit. Diffraction grating. Polarised light. Circular and elliptical polarisation. Strain birefringence. Rotation of the plane of polarisation.

Introduction to atomic physics.

Elementary particles, charge and mass of electron. Ions. Isotopes, mass spectra. Quanta. Thermionic emission and photo-emission of electrons. Rutherford-Bohr atom and radiation. X-rays. Radioactivity.

Heat.

Elementary kinetic theory. First law of thermodynamics. Specific heats of gases. Second law: efficiency of heat engines, thermodynamic scale of temperature, entropy. Radiant heat and radiation pyrometry.

1.13 Physics.

Electric circuit theory and electrical measurements.

Fundamental notions of response. Superposition, operational methods. Transformation theorems. Iterative network, resonance, electro-mechanical circuits. A.C. bridges, transformers, valve circuits. Non-linear elements. Fundamental electrical standards.

Electronics and electron optics.

Phenomena and laws of electronic emission. Diode, triode, tube characteristics. Amplification. Multielectrode tubes, oscillators, voltmeters. CRO multiplier tubes, X-ray tubes, betatron, cyclotron, electron microscope. Gas-discharge devices. Elementary noise theory.

Advanced wave motion and radiation.

Analytical treatment of plane and spherical waves. Velocity of propagation. Waves in elastic media. Genesis and propagation of electromagnetic waves. Reflexion, refraction, dispersion, group velocity.

Light.

Interference, multiple reflexions, thin films, coated surfaces, interferometry. Fraunhofer and Fresnel diffraction phenomena. Diffraction by circular and rectangular apertures. Babinet's principle, coronas. Resolving powers. Brewster's law, double refraction. Stressed media, optical rotation.

Advanced thermodynamics and radiation.

Thermodynamic functions of state. Joule-Thomson experiment. Application of thermodynamic principles. The phase rule. Stefan-Boltzmann and Wien's laws of radiation. Quantum theory. Introduction to statistical theory.

Introduction to physics of solid state.

Fundamentals of crystallography. Stereographic projection. X-ray diffraction. Determination of structure and texture. Constitution of metals and alloys. Elastic and plastic properties of crystals and aggregates.

1.14 PHYSICS.

Subdivisions marked (E) are electives of which the student will take two only.

Instrumentation and techniques.

Elements of metrology. Strain gauges, photoelastic techniques, elements of stress analysis. Introduction to servo theory. Physico-chemical apparatus. Colorimetry. Radiographic and crystallographic X-ray and gamma-ray techniques. Electron diffraction and microscopy. R.F. heating. Non-destructive testing. Supersonics. Isotope application.

Structure of matter and radiation.

Atomic (electron and nuclear) theory. Spectra, conductivity, super- and semi-conductivity, electron theory of metals. Fission.

Acoustics. (E)

Radiation from point sources, pistons, horns. Theory of transducers. Reciprocity. Measurements in sound field. Reflection and absorption of sound. Acoustics of buildings.

Theory and application of ferromagnetism. (E)

Langevin-Weiss and Heisenberg theories. Gyromagnetic effects, ferromagnetic resonance. Domains. Bloch zones, anisotropy, magnetostriction. Theory of initial permeability, hysteresis and other losses. Ferromagnetics in communication and power engineering. Magnetic measurements.

Rheology.

Classification of visco-elastic materials. Experimental methods, results and analysis thereof. Thixotiopy, dilatancy. Analytical treatment of models of such materials, application to real materials, *e.g.*, concrete, bitumen. Physics of rubber-like and glass-like substances.

Introduction to relativity.

Michelson-Morley experiment. Lorenz transformation and applications. Modified concepts of mass, momentum and energy. Quantum aspects. Applications to optics, astronomy, particle accelerators. Description of general theory of relativity.

Theory and application of dielectrics. (E)

Theories of permittivity and loss. Piezoelectricity, ferroelectrics. Dielectrics in communication and power engineering. Measurements.

The solid state.

Deformation. Slip, fracture, plastic flow. Anelasticity. Dislocation theory. Diffusion.

Physics of h.f. electromagnetic waves. (E)

V.H.F., C.W. and pulse transmission. Pulse shaping, trigger circuits. Magnetron, klystron, transmission lines. Wave guides, receivers. Aerials, aerial arrays. Noise. Ground, tropospheric and ionospheric propagation. Radar, navigation, radio astronomy.

1.21 Physical Techniques I: Laboratory Glass-blowing.

Physical factors involved in glass working, basic operations, types of glass, graded seals, annealing, devitrification, glass-metal seals.

1.22 Physical Techniques II: High Vacuum Technique.

General survey, pumping systems, gauges, use of glass in high vacuum work, degassing and pretreatment, gas absorbents and getters, miscellaneous techniques.

1.23A Physical Techniques III: Electronic Workshop Practice.

Valve characteristics, power supplies, amplifiers, oscillators. Valve voltmeters, mixing circuits, CRO.

1.23B Physical Techniques IV: Optical Design and Workshop Practice.

Paraxial theory of optical instruments. Stops and photometry of optical instruments, aberrations (chromatic, spherical and off-axis) and tests for same. Design of simple optical instruments. Theory and practice of making lenses, flats and prisms. Cementing, blooming, and assembly. Testing of finished optical components.

1.23c Physical Techniques V: Photometry, Photography and Colorimetry.

Light sources, the photographic spectrum, visual, photographic and photoelectric detection of radiation. Photometry, spectrophotometry and colorimetry. Description and theory of photographic processes and materials. Colour photography.

1.23d Physical Techniques VI: Instrument Design.

Difference between instruments and machines. Accuracy, errors, kinematic principles of design. Degrees of freedom and constraint. Semi-kinematical and non-kinematical design. Practical design problems.

1.41 and 1.41d Physics.

Mechanics and properties of matter.

Mass, length, time, derived units. Elementary statics. Elementary dynamics of a particle, circular motion, simple pendulum. Elementary rigid dynamics. Friction. Stress, strain, moduli. Elements of hydrostatics, surface tension, capillarity, viscosity, Bernoulli's theorem. Periodic motion and propagation of waves.

Light.

Elements of geometrical optics, simple optical instruments, the eye. Elements of physical optics, absorption, dispersion, interference, diffraction. Photometry.

Magnetism and electricity.

Elementary magnetism. The earth as a magnet. Electric currents, magnetic, thermal, mechanical and chemical effects of currents. Elementary circuits and measurements. Electromagnetic induction. Introduction to electrostatics: potential, capacity, dielectrics.

Heat.

Temperature, thermometry. Expansion. Gas laws. Calorimetry. Mechanical equivalent of heat. Vapour pressure, humidity, hygrometry. Heat transference. Introductory kinetic theory.

1.42 and 1.42d Physics.

Electricity and magnetism.

Gauss' theorem in electrostatics and applications. Systems of conductors and condensers. Properties of dielectrics. Ferro-magnetism and magnetic hysteresis. The magnetic circuit. Magnetic effect of currents. Galvanometers. Kirchhoff's laws and Thévénin's theorem. Resistivity and temperature coefficient of resistance. Self and mutual induction. Theory of transient currents. Alternating current theory.

Light.

Wave theory and Huyghens' principle. Interference. Elementary interferometry. Diffraction by slit. Diffraction grating. Polarised light. Circular and elliptical polarisation. Strain birefringence. Rotation of the plane of polarisation.

Heat.

Elementary kinetic theory. First law of thermodynamics. Specific heats of gases. Second law: efficiency of heat engines, thermodynamic scale of temperature, entropy. Radiant heat and radiation pyrometry.

1.91 PHYSICS.

Mechanics and properties of matter.

States of matter. Elementary principles of statics and dynamics. Elasticity, simple moduli, bending moments. Periodic motion. Principles of hydrostatics, surface tension.

Heat.

Temperature, thermal expansion of matter. Change of state. Calorimetry. Evaporation and condensation, hygrometry. Transference of heat, convection, conduction, radiation. Mechanical equivalent of heat.

Wave motion.

Progressive, longitudinal and transverse waves. Reflection, refraction and interference of waves.

Sound.

Velocity, pitch, intensity, and quality. Resonance. Measurement of sound intensity. Reflection and absorption. Limits of audibility.

Light.

Nature and sources of light. Effect of radiant energy on the eye. Colour. Photometry. Reflection, refraction and absorption. Application of laws of reflection and refraction in simple optical devices.

Electricity and magnetism.

Qualitative treatment of the following:—

Elements of static electricity. Conductors and insulators. Potential. Discharge from points. Electric shielding, lightning arrestors. Elementary magnetism. Electric currents. Magnetic heating and chemical effects of electric currents. Ohm's law.

1.92 PHYSICS.

Light.

Wave theory and Huyghens' principle. Interference. Elementary interferometry. Diffraction by slit. Diffraction grating. Polarised light. Circular and elliptical polarisation. Strain birefringence. Rotation of the plane of polarisation.

Heat.

Elementary kinetic theory. First law of thermodynamics. Specific heats of gases. Second law; efficiency of heat engines thermodynamic scale of temperature, entropy. Radiant heat and radiation pyrometry.

Electricity and magnetism.

(a) Magnetic effects of currents; self and mutual induction, the transformer, units of inductance; capacitance, units of capacitance; measurement of capacitance and inductance (briefly).

(b) Alternating current; vector representation of A.C.; current and voltage relations in simple L, C, R circuits; power in A.C. circuits.

(c) Galvanometers; characteristics of moving coil types only.

(d) Thermoelectricity; Seebeck effect; thermocouples and their application to temperature measurement; changes in resistance with temperatures; the platinum resistance thermometer.

Introduction to Atomic Physics.

Elementary particles, charge and mass of electron. Ions. Isotopes, mass spectra. Quanta. Thermionic emission and photo-emission of electrons. Rutherford-Bohr atom and radiation. X-rays. Radioactivity.

Electronics.

(a) Characteristics of the diode valve. Rectification. Characteristics of the triode valve. Amplification. Vacuum tube voltmeters (D.C. only). Electrometer tubes, *p*H meters. Multielectrode tubes (briefly).

(b) Photo cells (photoemissive and photovoltaic).

PHYSICS I (GENERAL SCIENCE).

As for 1.11 Physics.

Part I.

As for 1.11D Physics Part I.

Part II.

As for 1.11D Physics Part II.

PHYSICS II (GENERAL SCIENCE).

As for 1.12 Physics, together with the following:

Advanced thermodynamics.

Thermodynamic functions of state. Joule-Thomson experiment. Application of thermodynamic principles. The phase rule. Black-body radiation laws.

Physics of the solid state.

Fundamentals of crystallography. Stereographic projection. X-ray diffraction. Determinations of structure and texture. Metals, insulators and semiconductors; semiconductor-metal contacts. Optical properties of solids. Fluorescence and phosphorescence. Elementary physics of metals. Lattice defects; dislocations, plastic flow, and crystal growth.

Part I.

The following sections from 1.12 Physics: *Light, Heat;* together with *Physics of the solid state* (as shown above).

Part II.

The following sections from 1.12 Physics: *Introduction to atomic physics, Electricity and magnetism;* together with *Advanced thermodynamics* (as shown above).

PHYSICS III (GENERAL SCIENCE).

The following sections from 1.13 Physics: *Electric circuit theory and electrical measurements, Electronics and electron optics, Advanced wave motion and radiation, Light.* And the following sections from 1.14 Physics: *Structure of matter and radiation, Introduction to relativity, Physics of h.f. electromagnetic waves, Theory and application of ferromagnetism.*

Part I.

The following sections from 1.13 Physics: *Electric circuit theory and electrical measurements, Electronics and electron optics;* and the following from 1.14 Physics: *Introduction to relativity, Physics of the h.f. electromagnetic waves.*

Part II.

The following sections from 1.13 Physics: *Advanced wave motion radiation, Light;* and the following sections from 1.14 Physics: *Structure of matter and radiation, Theory and application of ferromagnetism.*

Optometrical Science Conversion Course Subjects.

Advanced Visual Physiology and Physiological Optics.

This course will be divided into two sections, each comprising 2½ hours of lectures and demonstrations per week for one year. The two sections may be taken concurrently in one year or in any sequence in different years.

Section I.

A. *Visual Physiology.*

A study of the advanced literature on—The anatomy and physiology on the retina and visual pathways. The retinal image and visual acuity. The dioptric constants of the eye and the aetiology of refractive errors. The perception of light and brightness. The electrophysiology of vision. Dark- and light-adaptation, night vision. Accommodation. Mechanisms of the pupil. The ocular circulation and intra-ocular pressure. The applications of visual physiology to visual problems in industry, aviation, etc.

B. *Photometry and Colorimetry.*

(For this section, given during Second Term, students will join the class in Laboratory Arts IV conducted by the School of Applied Physics.)

Photometric concepts. Visual photometric measurements. Photoelectric photometry. Spectrophotometry. Principles of colour measurements. C.I.E. colour system, colour atlases.

C. *Colour and Colour Vision.*

A study of the advanced literature on—Physics and chemistry of colour. Physiology of colour vision. Psychology of colour vision. Colour vision theories. Defective colour vision. Colour vision tests.

Section II.

Ocular Motility and Binocular Vision.

A study of the advanced literature on—The physiology and control of ocular movements. Retinal correspondence, Horopter studies, Binocular coordination. Fusion. Stereopsis. Ocular dominance. Aniseikonia. The analysis and perception of three-dimensional visual space. Theories of space perception. Heterophoria and squint. Orthoptic diagnosis and treatment. Visual training.

Advanced Clinical Optometry.

Advanced clinical work in—Industrial Optometry. Contact lens fitting. Remedial reading training. Orthoptics and visual training. Aniseikonia.

Students taking this course will partake in research projects and the preparation of research reports.

MATHEMATICS AND STATISTICS.

Elementary analytical geometry. Elementary differentiation and integration. The elements of statistical theory, including significance tests and an introduction to the analysis of variants.

Throughout this course, examples of the application of these topics to optometric and allied problems will be given wherever possible.

Chemistry.

Subjects 2.01 to 2.97.

2.111 CHEMISTRY, GENERAL.

Inorganic Chemistry.—A review of fundamentals, the elements and their classification, preparation and reactions. Atoms, molecules, formulae, valency and variable valency. Oxides, acids, bases and salts, their classification, methods of preparations and general properties. Hydracids and oxyacids, action of acids on metals. Stability of oxides, bases, and salts. Gas laws and calculations. Oxidation and reduction.

Atomic structure, number, weight, and mass number. Isotopes. Periodic classification. Electronic theory of bonds, valency. Electrovalent, covalent, and co-ordinate bonds in simple compounds. Correlation with physical chemical evidence.

States of aggregation with special emphasis to metallic state. Properties of metal. Review of metals and physical properties in relation to structure and periodic table.

Brief discussion of groups O, IA, IVB, VIIB and transition elements in periodic system.

Physical Chemistry.—A review of the kinetic theory of gases, reference to liquids and solids, diffusion, etc. Solutions, colloidal solutions, osmotic pressure and other properties, vapour pressure.

Electrolytes and non-electrolytes. Ionic and covalent compounds. Strength of acids and bases. Electrolysis of acids, bases and salts.

Law of mass action. Equilibrium and dissociation constants. Indicators and *p*H. Hydrolysis. Buffer solutions. Le Chatelier's principle. Catalysis. Common ion effect. Solubility product. Applications.

Thermodynamics.—First law of thermodynamics, Hess's law of heat summation.

Organic Chemistry.—Characteristics of the carbon atom and general introduction to organic chemistry, qualitative and quantitative analysis of organic compounds. Molecular and graphic formulae.

Paraffin, olefine and acetylene hydrocarbons, alcohols, ethers, aldehydes, betones, acids, amines, esters, halogen derivatives.

Oils, fats, carbohydrates. Polymerisation. Coal tar derivatives. Aromatic hydrocarbons.

2.122 and 2.122d Engineering Chemistry.

For Engineering students who have completed first year chemistry. A general description of the applications of chemistry to engineering.

Corrosion, electrochemical theory, stray current corrosion and its prevention. Hydrogen evolution and oxygen absorption types. Heated metal surfaces and metals in neutral solutions. Differential aeration effect, pitting, pickling of steel, rust protection, paint, lacquer, corrosion resisting surfaces, etc. Corrosion resisting alloys, stainless steels, monel metal, etc.

Refractory materials, properties, acids, neutral and basic types. Insulating bricks.

Paints and varnishes, components. Paints for special purposes, acid proof, heat resisting, rubber-base paints, cement and concrete paint, marine paint.

Fuels, ignition temperatures, flash point, spontaneous combustion. Calorific value and its measurement. Types, solid, liquid, gaseous. Charcoal, coal, coke, powdered coal. Petroleum, and its products. Shale oil and tar products. Alcohol. Natural gas, coal and coke oven gas, water and carburetted water gas, producer gas and blast furnace gas. Gas works and coke oven practice. Method of controlling quality.

Lubricating oils, laws of solid, fluid and boundary friction, wedge theory of oil film. Mineral, vegetable and animal oils. Semi-fluid lubricants, greases. Solid lubricants, graphite, talc, white lead. Properties of lubricants, specific gravity, flash and fire points, viscosity. Spheres of application.

Building and insulating materials. Limes, cements, ceramics, rubber, compressed fibres, plastics, bitumen, oils for insulation.

2.131 Chemistry for Architects.

Elements, compounds and mixtures. Chemical changes and their laws. Symbols, direction of chemical change, valency, formulae and equations. Properties of metals and non-metals.

Basic chemical compounds, acids, bases and salts. Occurrence preparation and properties.

States of matter, solubility, solvent action. Evaporation. Crystallisation. Deliquescence and efflorescence.

Oxidation and reduction.

Hydrolysis, ionisation, electrolysis.

Properties of gases from the chemical point of view. Atomic theory.

Combustion and respiration.

General treatment of acids, bases and salts with particular reference to properties as such and as oxidising and reducing agents.

Special applications of chemistry to architecture. The properties of various metals, ferrous and non-ferrous. Alloys, brasses and bronzes, solders. Properties of oxides and salts, carbonates, sulphates and chlorides.

The chemical constitution and properties of the important building materials. Lime, hard and soft waters, cement, plasters, clays and bricks, pigments, etc.

2.184 Botany.

A study of the major groups of the plants, with special emphasis on—

(*a*) Outline classification.

(*b*) Morphology.

(*c*) Anatomy.

(*d*) Life-history.

All studies to be comparative and illustrated by Australian examples wherever possible.

A more advanced study of genetics and ecology based upon that taken in 2.912 Biology.

2.194 Zoology.

An outline classification of the major groups of animals, illustrated by Australian examples wherever possible. Comparative morphology and anatomy.

The embryology of characteristic invertebrates and vertebrates.

2.21 Chemical Techniques.

The course is intended to prepare all students entering the Chemistry Department for the work that lies ahead. Safety and laboratory rules, the handling of reagent bottles and the technique common to most branches of chemistry will be introduced and demonstrated. The student will carry out a series of experiments in order to obtain practice in the techniques illustrated.

2.32 and 2.32A Physical Chemistry.

An introduction to the interpretation of the physico-chemical properties of systems in terms of intra- and inter-molecular forces, molecular architecture and energy distribution.

Kinetic Theory of Gases.—Real gases, elementary quantum theory, thermal properties of gases.

The Solid State.—Ionic solids, covalent solids, metals, van der Waals solids, heat capacity of solids.

The Liquid State.—Structure of liquids, vapour pressure, surface tension, viscosity.

Chemical Thermodynamics.—The first, second and third laws and their application to physical and chemical equilibria.

2.32D Physical Chemistry.

This course is based on 2.32 Physical Chemistry, with variations in emphasis and content matter to render it more appropriate for students specialising in biological sciences.

2.33 Physical Chemistry.

The application of kinetic and thermodynamic methods wherever possible to the following:—

(i) The phase rule—system of one, two and three components.

(ii) Solution—electrolytes and non-electrolytes.

(iii) Electrode processes.

(iv) Surface chemistry and colloids.

(v) Chemical kinetics.

2.34 and 2.34D Physical Chemistry.

A more detailed study of certain subjects, including the following:—

(i) Surface chemistry and colloidal systems.

(ii) Thermodynamics, with reference to systems which depart from ideal behaviour.

(iii) Chemical spectroscopy; a review of atomic and molecular spectra.

(iv) Chemical kinetics and other rate processes.

Seminars are conducted in the latter part of the year on physico-chemical topics.

2.41, 2.41A AND 2.41B GENERAL CHEMISTRY.

This course of 102 lecture hours is given in first year to full-time students as an integrated whole. For part-time degree courses the subject is divided into Part I (68 lectures in first year) and Part II (34 lectures in second year). The aim of the course is to give the student an appreciation of chemistry as a whole before it is treated in its usual sections. For that reason an introductory rather than a detailed treatment of the theoretical topics is required.

Part I.

States of matter. Classification of substances. General methods, preparation and properties of metals and non-metals. Classification, general methods of preparation and properties of oxides, acids, bases and salts. Formulae, valency, simple calculations of formulae and composition. Equivalent weights, normal solutions, gas laws.

Atomic and molecular structure. Evidence for protons, neutrons and electrons. Nuclear charge and size. Atomic number. Moseley's law and periodic classification. Mass number, isotopes, mass spectrograph. Atomic structure. Energy levels and four quantum numbers. Electrovalent, covalent, and co-ordinate bonds. Fajan's rules, ionisation potentials, ionic radii, covalent radii, electron affinities.

Kinetic theory of matter. Derivation of $PV = \frac{1}{3}$ nmu^2. Experimental gas laws. Properties of ideal gases. Vapour-liquid equibilibrium. Molecular and ionic crystalline solids.

Solutions, equilibria and chemical reactions. Expression of concentration of solutions. Raoult's law. Colligative properties. Molecular weight. Ionisation. Strong and weak electrolytes, electrolysis and hydrolysis. Le Chatelier's principle. Effect of temperature and pressure on equilibrium. Equilibrium constants. Dissociation of constants and solubility products, *p*H and indicators. Buffer solutions.

Periodic table. General introduction—atomic volumes, covalent radii, ionic radii, ionisation potentials, general trends in periodic table, general idea of transition series, rare earth series, etc. Detailed treatment of elements of Periodic Groups IA, IIA, VA, VIA, VIIA.

Organic Chemistry. Alkanes and alkenes, synthesis and physical and chemical properties. Alkynes briefly. Alkanols, ethers, alykl halides and esters. Aldehydes and ketones. Alkanoic acids. Benzene. Addition and substitution reactions of aromatic compounds. Nitro compounds. Amines, tests for distinguishing. Aniline.

Part II.

Qualitative Analysis; dry tests. Group separation tables. Discussion of individual group separations. Identification of anions.

Valency and molecular structure. Shape of atomic orbitals. Elementary ideas of overlap and the covalent bond. Variable valency. Direction of covalent bonds. Mention of resonance and hydrogen bond. Polarisability and polarising power.

Periodic table. Group III, B and Al; Group Ib, Cu, Ag and Au; Group VIII, Fe, Co and Ni.

Complex salts. Co-ordination number. Evidence for complex formation. Isomerism in complex ions and the role of water in complex salts. Co-ordination numbers 2, 3, 4, 5 and 6. Shape of complex ions.

2.42 Inorganic Chemistry.

Molecular structure. Qualitative idea of way in which physical methods are used to determine structure of molecules. Structure of ionic lattices. Simple examples like Cs, Cl, NaCl, CaF_2. Shape of covalent molecules. A knowledge of various shapes and examples. In simple cases, relationship of shape to atomic orbitals involved.

Periodic table. Group II (Zn, Cd and Hg); Group III (Ga, In and Tl); Group IV (Si, Ge Sn and Pb; Ti, Zr, Hf and Th); Group V: Further treatment of nitrogen, compounds like HN_3, N_2H_4, NH_2OH, nitrogen halides and sulphides. V, Cb and Ta. Group VI: Further treatment of sulphur; sulphur halides, oxyhalides. Se and Te. Cr, Mo and W. Group VII: Interhalogen compounds, oxyacids and peracids. Mn, Tc and Re. Group VIII: General properties and discussion of heavier Group VIII elements.

Rare earth and actinides. Stable valencies and general relationships. Carbonyls, carbonyl hydrides, halides and nitrosyls. Relatively brief discussion of preparation and properties.

2.44 and 2.44d Inorganic Chemistry.

Modern valency theory. Elementary wave mechanics. Hydrogen molecule. Covalent bond, valence bond and molecular orbital approach. Hybridisation, multiple and fractional bond orders. Factors affecting bond strength. Overlap integral, electro negativity resonance, etc. Nature of the metal-ligand bond in complex compounds. Physical methods and the structure of complex compounds. A survey of modern methods and of experimental results. Nuclear chemistry: a survey of fundamentals and recent developments. Special topics such as electron deficient compounds, reaction mechanisms in inorganic chemistry, recent chemistry of the hybrides, organo-metal chemistry will be treated as time permits. An essay on some topic in advanced inorganic chemistry will be required.

2.52 AND 2.52A QUANTITATIVE ANALYSIS.

Laboratory rules. Instruction in the use and maintenance of apparatus. The balance, its care and use. Calibration of weights. Record of results. Notes on sampling and its technique. Solution of sample. The technique of gravimetric analysis. Theoretical considerations in quantitative analysis, the concept of solubility product, mechanism of precipitate formation with discussion of supersaturation, coprecipitation, post-precipitation and adsorption. Washing of precipitate and peptisation. Volumetric analysis. Calibration of apparatus; method of use. Reference to Australian Standards publications. Acidimetry and alkalinity. Hydrogen ion activity and its measurement. Dissociation constants of weak acids and bases and simple calculations of *p*H value in such solutions. Use and range of indicators for various types of acid-base titrations. Titration curves and buffer action. Oxidation and reduction from electronic aspect; simple treatment of oxidation-reduction potentials. Importance of *p*H on these potentials. Redox indicators. Precipitation reactions in quantitative analysis; absorption indicators and their limitations. Specific topics such as water analysis, fuel and gas analysis as time permits.

The theoretical treatment will be accompanied by a course of practical exercises to illustrate the important techniques in quantitative analysis and the use of the reagents discussed.

2.53 QUANTITATIVE ANALYSIS.

Amplification of topics such as buffer action, ionic equilibria, redox potentials, electrode potentials, with some mathematical illustrations.

Study of methods of separation used in analytical work including use of organic reagents.

Systematic study of analytical chemistry of a selected number of elements.

The practical work will illustrate these principles

2.54 AND 2.54D QUANTITATIVE ANALYSIS.

A more advanced treatment of topics selected from the following:— Modern theories of acids; bases and indicators; chromatography and ion exchange; separation of elements by solvent extraction; modern developments in electrolysis, polarography and coulometry; spectrometry.

2.62 ORGANIC CHEMISTRY.

The systematic chemistry of the chief classes of organic compounds, with emphasis on the aliphatic types and a brief discussion of the corresponding aromatic compounds. Alkanes, alkenes,

alkynes, aromatic hydro-carbons, cyclo-alkanes, alcohols, alkyl halides, ethers, carbonyl compounds, acids, esters, amides, amines and nitro compounds. An introduction to stereochemistry, carbohydrates, proteins, fats and oils.

2.63 AND 2.63A ORGANIC CHEMISTRY.

A more detailed study following on 2.62 Organic Chemistry, with emphasis on aromatic chemistry. The aromatic hydrocarbons, aromatic substitution; halogenation, nitration, sulphonation. The anyl halides, nitro compounds and sulphonic acids and derivatives. Phenols, aromatic alcohols, amines and other reduction products of aromatic nitro compounds. Diazo reaction and coupling. Aromatic carbonyl compounds, including quinones. Dyestuffs, colour and dyeing. The aromatic acids and derivatives. An introduction to heterocyclic compounds, polymerisation and high polymers (including natural polymers).

In 2.63A special emphasis is placed on carbohydrates, fats and other materials of biological interest.

2.64, 2.64A AND 2.64D ORGANIC CHEMISTRY.

An advanced treatment of specialised topics in organic chemistry. Reaction mechanisms, stereochemistry, structural carbohydrate chemistry and selected topics from carbocyclic chemistry and the oxygen and nitrogen heterocyclic fields (including natural products).

2.65 (2.65A and 2.65B) APPLIED ORGANIC CHEMISTRY.

This subject covers the application of chemical reactions and physical techniques to structural and analytical determinations in organic chemistry.

Emphasis is placed on the correlation of reactivity with structure. Subject matter is selected from *either*—

2.65A The behaviour of fixed oils, essential oils, alkaloids, fine chemicals, vitamins, carbohydrates, natural and synthetic high polymers, etc.

or

2.65B The chemistry of food constituents with particular reference to changes during processing and storage.

2.72 MATHEMATICAL CHEMISTRY.

This course and 2.73 are intended to follow the normal mathematics course given to students in first year, and aim to apply the work done in that year to problems which arise in Applied Chemistry, and, in addition, to introduce some specialised techniques such as

dimensional analysis and statistical methods. . Consideration is given to the proper presentation, critical examination, and assessment of experimental data, and to the design of experiments.

General Chemical Calculations.—Elementary problems in chemical equilibria, mixtures, etc. The solution of typical transcendental and higher degree algebraic equations encountered in Chemistry.

The Handling of Experimental Data.—Non-statistical methods of arranging and handling experimental data.

Dimensional Analysis.—General dimensional methods and their applications.

Differential Equations.—Meaning, significance, use and application in chemical phenomena.

2.73 Mathematical Chemistry.

Partial Differential Quantities.—Typical partial differential functions encountered in statistics and chemical thermodynamics.

Statistical Methods.—Kinds and sources of data. Estimation of parameters, tests of significance and interpretation of data. Correlation and regression, quality control, sampling. Analysis of variance. Design of experiments.

2.91 Biochemistry.

An introduction to the biochemistry of carbohydrates, lipids, amino-acids, proteins and other compounds of biological importance.

2.92 Biochemistry.

An introduction to the following topics:—

A brief treatment of physico-chemical phenomena of biological importance, including the properties of the colloidal state.

The nature of enzymes and their mode of action, the classification of enzymes and the more important enzymic systems.

An introduction to the metabolism of carbohydrates, lipids and proteins.

2.911 Biology.

An introduction to basic biological principles. Introductory biology, e.g., living and non-living, vital activities, plants and animals, protoplasm, the cell, etc. Outline of classifications: Animal and plant kingdoms. Diversity of living organisms. Evolution and genetics. Heterotrophic nutrition. Ecology.

2.912 Biology.

A continuation of 2.911 Biology in the more specialised fields of mammalian anatomy, vertebrate histology, angiosperms, ecology, systematics (taxonomy).

2.913 Physiology.

An introductory consideration of the following features of the physiology of both plants and animals will be presented. As far as possible experiments to illustrate these will be carried out in the practical work.

Physico-chemical structure of living matter.

Physiological significance of physico-chemical phenomena.

Permeability of plant and animal cells.

Synthetic processes in plants and animals with special reference to photo-synthesis and related processes.

Movement of nutrients and water in plants and animals.

Digestive processes in animals and plants.

Respiration and physiological oxidations in plants and animals.

Animal heat regulation.

Intermediary metabolism of carbohydrates, fats, proteins, etc.

Secretory and accumulatory processes in plants and animals.

Excretory processes and hormones and vitamins in the physiology of plants and animals.

Physiology of growth and reproduction.

Excitation and inhibition of nerve, muscle and other animal and plant tissues.

Function of the nervous system in animals. Reflexes. Receptors, including special senses.

Tropisms in plants and animals.

Physiology of movement.

2.914 Physiology.

A more detailed and advanced consideration of the same topics as listed for 2.913 Physiology with accompanying suitably advanced experiments.

2.924 Microbiology.

Brief historical outline. Distribution of micro-organisms. Morphology and cytology of bacteria. Staining properties of bacteria.

Yeasts and fungi and their importance in certain industrial processes. Pure culture techniques. Classification of bacteria. The effect of physical and chemical agents on bacteria. Physiology of

micro-organisms. Nutrition of bacteria. Micro-organisms and their relation to food preservation; disease; resistance of the body to disease.

2.925 MICROBIOLOGY.

Biochemical activities of bacteria.

Growth and multiplication of bacteria. The bacterial growth cycle.

Bacteriophage. Mode of action of the virus and its importance in the cheese industry.

Antigen-antibody reactions. Fundamental principles of serology.

Microbial variation. Mutation and adaption.

Principles of heat processing.

Mode of action of anti-microbial agents, for example, acridine dyes and their relation to *p*H and pK_a.

Standardisation of disinfectants and criticism of popular methods, for example, phenol coefficient, etc.

The microbiology of food. Food spoilage and "food poisoning".

The use of micro-organisms in industrial processes.

2.926 MICROBIOLOGY.

Introduction.—General biology of fungi. Economic importance.

Classification.—General principles involved in classification. The major groups including the Fungi Imperfecti. Identification and the use of keys.

Techniques.—Handling. Media. Preparation of media. Sterilisation. Isolation. Maintenance of stock cultures. Sub-culturing. Inoculation. Methods of culturing. Special precautions. Behaviour on different media. Use of indicators.

Morphology and Life-histories.—A study of selected examples from the major groups, including the Fungi Imperfecti. Species of economic importance to be chosen as examples wherever possible.

Spoilage.—General considerations. Mould counts.

Genetics.—An outline of fungal genetics.

2.94D BIOCHEMISTRY.

An introduction to the following topics:—

Catalysis in biological systems; the properties of enzymes; types of enzyme-catalysed systems.

The energetics of biological systems.

Physico-chemical phenomena in cells and tissues.

2.95 Biochemistry.

An introduction to the following topics: —

Amino acids, peptides, proteins. Their chemical and physical properties, structure, classification and biological significance. Special attention is paid to the colloidal properties of proteins.

The general properties of enzymes and the nature of the catalytic process. Specificity, activators, inhibitors, coenzymes, prosthetic groups.

Hydrolases, phosphorylases, oxidases, dehydrogenases, adding, transferring and isomerising enzymes.

Alcoholic fermentation and the glycolytic sequence. The tricarboxylic axid cycle.

2.96 Biochemistry.

A more detailed study of the following topics:—

Preparation and purification of enzymes.

Influence of various factors on the course of enzymic reactions.

Enzyme-substrate complexes.

The mathematical theory of enzymatic reactions.

The chromoproteins, with special reference to those possessing catalytic activity.

Biological oxidation processes.

The utilisation of energy in biological systems.

2.97 Biochemistry.

A further study of compounds and materials of biological importance, their chemical and physical properties, and their synthesis and degradation in nature, including the following: the compound lipids, proteolipids, polypeptides, simple and conjugated proteins, nucleic acids and related compounds, nitrogen bases, certain carbohydrates and derivatives, vitamins and hormones.

The nature and properties of viruses.

The biochemical bases of the hereditary mechanisms.

The biochemistry of immunological phenomena.

The intracellular location of enzymic systems.

Chemical Instrumentation.

An introduction to certain aspects of applied physics which will acquaint students with the instruments in common use in chemical

laboratories. The subject matter is illustrated by reference to the optical instruments and electrical and electronic devices which a chemist will meet in industrial practice.

Microscopy is dealt with as a separate section within the course.

Materials for Leather Manufacture.

A study of tanning materials, heavy chemicals, dye stuffs, oils and finishing materials used in the manufacture of leather. Sources, use and economic importance.

Principles of Light Leather Manufacture.

The processing of shoe upper leathers, finishing leathers, luggage, upholstery leathers, etc.

Principles of Heavy Leather Manufacture.

The tannage and finishing of sole, felt and harness leathers.

Science of Leather Manufacture.

The chemistry and proteins with particular reference to collagene and keratin. The physical chemistry of proteins with particular reference to hydration and swelling phenomena. The reaction of proteins with alkalines. The classification and chemistry of enzymes with particular reference to proteases. Theories of bating. The chemistry of vegetable tanning. The chemistry of chromium salts. Theories of vegetable and chrome tannage. The mechanism of miscellaneous tannages. Surface active phenomena in relation to leather processing. The chemistry of synthetic tannings.

Analytical Chemistry of Leather Manufacture.

Simple routine procedures are not included in this course. Lectures are devoted to research techniques and physical testing of leather.

Bacteriology and Mycology of Leather Manufacture.

The bacteriology of super faction. The behaviour of bacteria towards sole. Bacterial growth in tannery leather. Growth of moulds and yeasts of leather and in liquors. The use of antiseptics and fungicides.

Leather Laboratory.

Students undertake a research project under direction.

CHEMISTRY I (GENERAL SCIENCE).

As for 2.41 Chemistry.

CHEMISTRY II (GENERAL SCIENCE).

A course of lectures incorporating the subject matter of 2.32 Physical Chemistry, 2.42 Inorganic Chemistry, 2.52 Analytical Chemistry and 2.62 Organic Chemistry.

CHEMISTRY IIA (GENERAL SCIENCE).

A course in Chemistry for students majoring in Biological Sciences. The subject matter includes 2.32 Physical Chemistry, 2.62 Organic Chemistry and approximately thirty lectures on introductory biochemistry and enzymology.

In the part-time course the subject is divided into:—

Part I.

2.62 Organic Chemistry and the biochemistry and enzymology of Chemistry IIA.

Part II.

As for 2.32 Physical Chemistry.

CHEMISTRY III (GENERAL SCIENCE).

A course of four lectures per week based on the subject matter of 2.33 Physical Chemistry, 2.44 Inorganic Chemistry, 2.53 Analytical Chemistry and 2.63 Organic Chemistry.

BIOCHEMISTRY I (GENERAL SCIENCE).

This course covers the following topics:—

Part I (2 hours lecture and 4 hours practical).

A study of Physical and chemical properties of the compounds of biological importance. A detailed study of the principles of enzymology.

Part II (1 hour lecture and 2 hours practical).

A study of advanced enzymology and the principal metabolic systems.

In addition, practical work to illustrate the lecture course is given.

BIOCHEMISTRY II (GENERAL SCIENCE).

The following topics are dealt with:—

Part I (2 hours lecture and 4 hours practical).

Physico-chemical studies on proteins, carbohydrates and lipids. Further studies in enzymology with particular reference to metabolic processes.

Part II (1 hour lecture and 2 hours practical).

A treatment of physical and chemical evidence for biological concepts including the evolutionary theory.

Practical work to illustrate the lecture course is also given.

General Biology (General Science).

This course deals with the following topics:

Part I (1 hour lecture and 2 hours practical).

An introduction to basic biological subjects, dealing with the characteristics of living matter, cytology, reproductive processes, outline of classification, ecology, and the first part of the study of the major groups of plants and animals.

Part II (2 hours lecture and 2 hours practical).

Continuation of the study of the major groups of plants and animals. Heterotropic nutrition. Animal associations (e.g. commensalism, symbiosis, parasitism), evolution, heredity, the systematics of the angiosperms and a further study of ecology.

Practical work to illustrate the lecture course with obligatory excursions is also carried out.

Botany I (General Science).

In this course the following topics are dealt with:

Part I.

A more detailed study of the plant kingdom dealing with the major groups; evolutionary trends; plant anatomy.

A treatment of plant systematics.

Part II.

Elementary plant ecology (e.g. weed ecology); plant geography, an introduction to plant biochemistry; physiology and cytology.

Practical work to illustrate the lecture course with obligatory excursions and the preparation of a herbarium is also conducted.

Botany II (General Science).

The following topics are covered:

Part I (1 hour lecture and 5 hours practical).

An extension of the study of plant biochemistry, plant physiology and plant cytology.

Part II (2 hours lecture and 5 hours practical).

An advanced treatment of plant biochemistry, physiology and cytology.

In addition, practical work to illustrate the lecture course with obligatory excursions and the preparation of a herbarium is given.

Zoology I (General Science).

The following topics are dealt with in this course.

Part I (2 hours lecture and 2 hours practical).

A comparative study of invertebrate anatomy and morphology demonstrating the main evolutionary trends and the bases of systematics.

Part II (2 hours lecture and 4 hours practical).

An introduction to animal physiology, cytology and genetics.

Practical work to illustrate the lecture course with obligatory field work and preparations of a collection is also given.

Zoology II (General Science).

This course will cover the following topics:

Part I (1 hour lecture and 5 hours practical).

A comparative study of vertebrate anatomy and morphology; a description of evolutionary mechanism.

Part II (2 hours lecture and 5 hours practical).

A study of vertebrate histology and embryology. General treatment of physiology and ecology.

Practical work to illustrate the lecture course with obligatory field work with particular emphasis on ecology is conducted.

Chemical Engineering.

Subjects 3.01 to 3.75.

3.14 AND 3.14A INDUSTRIAL CHEMISTRY.

This course aims at giving the student in Applied Chemistry, Chemical Engineering and Industrial Chemistry a broad introduction to the chemical industry.

The course will deal in general terms with the relationship of chemical industries one to the other, the development of the chemical industry in Australia, services used in industry such as water, steam, power, gas, refrigeration and electricity, fuels used in industry and the principal raw materials upon which the chemical industry in Australia is based.

The following industries will be treated in specific detail: sulphuric acid; lime, cement and plaster; salt and potassium salts; sulphide processes; lime caustic, electrolytic caustic and the mercury cell; ammonia; nitric acid; industrial gases; electric furnace products; phosphates, super-phosphates; aluminium and glass; coal carbonisation; coal tar refining; petroleum refining; petroleum cracking processes; fermentation industries—ethanol, absolute alcohol, acetone and butanol; natural oils, fats and waxes; soaps and detergents; cellulose, wood pulp and paper; acetylene production and chemicals therefrom; chemicals from ethylene and propylene; synthetic methanol and formaldehyde; the Fischer Tropsch process; production of sugar, utilisation of Bagasse.

Laboratory experiments will be carried out illustrating the principles covered in the discussion of the industries in lectures.

A short series of lectures on the principles of the writing of technical reports will be given early in first term and will be followed by a series of factory visits throughout the year. The visits will be made to industries closely connected in some way with the material of the lecture course.

3.15 INDUSTRIAL CHEMISTRY.

This series of lectures over three terms will treat some of the more advanced topics of inorganic and organic process industry and in addition certain special topics will be covered on a seminar basis in the third term. Topics for formal lectures will include: survey of thermodynamics; survey of kinetics; silicone chemistry; ceramics; refractories and cermets; high pressure processes—thermodynamics, chemical equilibrium, compression, preparation of synthesis gas, ammonia synthesis in detail, types of reaction vessels, glands, closures, valves and materials; high vacuum processes; industrial chemistry of uranium and thorium; radioactive chemistry; hydrogen peroxide, per- acids and salts; sodium, calcium and magnesium; titanium, zirconium and tantalum.

Rayon; aromatic intermediates; dyestuffs; synthetic resins; insecticides; biochemical engineering.

Specialised lectures and seminars will be given on various topics such as general principles and economic factors in the chemical industry; factory location; regional development; waste disposal; internal transport, storage and packing; factory layout; the industrial structure—the stock exchange, industrial organisation, functions of various departments and the functions of management.

A number of practical assignments will be given in work in the laboratory, these illustrating as far as possible the principles of the work covered in lectures.

Advanced Industrial Chemistry.

This course, which is for honours students only, carries to a further stage the work undertaken in 3.15 Industrial Chemistry and includes work on problems of management and safety in the chemical industry, problems on plant operation including costing and the general economics of the manufacture of chemical products in various places, together with some studies of advanced process chemistry. The course includes an analysis of the structure of large chemical manufacturing concerns, and a consideration of the importance of the various sections such as research, development, production, engineering, sales and commercial service in the industry.

Industrial Chemistry Project.

This project involves the study of a selected chemical process requiring investigations both in the laboratory and in the literature, and in the production of a thesis on the selected topic.

3.24 and 3.24d Chemical Engineering Unit Operations.

The first term is devoted to a study of the basic concepts of fluid flow and heat transfer. In the second term a fundamental study of the following unit operations is made: solid-liquid extraction, liquid-liquid extraction, gas absorption, distillation and adsorption. Lectures in the third term cover the unit operations of psychrometry, drying, evaporation, flow through porous media and filtration. In the laboratory, students will carry out experiments illustrating the principles of the work covered in lectures.

3.25 Chemical Engineering Unit Operations.

In the first term a detailed treatment of the following unit operations is given; gas absorption, rectification vacuum distillation, steam distillation, molecular distillation, multi-component, azeotropic and extractive rectification, batch rectification, liquid-liquid extraction, adsorption, sublimation and dialysis.

In the second term a detailed treatment of the following unit operations is given: solids handling, flow of solids through liquids, sedimentation, flotation, fluidisation, flow through porous media, crystallisation, centrifugation and cooling towers.

In the third term a series of advanced lectures is given on fluid flow and heat transfer.

Throughout the year students will carry out experiments designed to illustrate selected principles of the work covered in lectures.

3.34 AND 3.34D CHEMICAL ENGINEERING DESIGN.

The course covers the essentially mechanical section of chemical engineering design in the first part of the year and the second part is devoted to elementary design of unit operation equipment. The topics will include:

Stress analysis of simple steel structures, elementary reinforced concrete construction, mechanical equipment (shafting, bearings, drives, agitator mechanisms, etc.), pressure vessels for low and medium pressures, code requirements, reticulation of steam, vacuum, brine and fluid services generally. Safety practices.

Elementary, instrumentation, heat exchangers, solid-liquid extraction apparatus, gas absorption and liquid-liquid extraction equipment, fractionating columns, dust and mist collection equipment, evaporators, rotary driers and humidification equipment.

3.35 ADVANCED CHEMICAL ENGINEERING DESIGN.

Advanced lectures will be given on the topics covered in 3.34 Chemical Engineering Design and other selected topics of particular current interest. This programme will be completed early in the year and students will then work on a Major Design Project which will be integrated closely with 3.75 Chemical Engineering Project.

3.44 CHEMICAL ENGINEERING CALCULATIONS.

This course consists of one two-hour lecture per week for one year and embraces the following topics:

Units and dimensional analysis; graphical methods and nomography; empirical formulae and non-periodic curves; some application of differential equations; behaviour of gases and vapour-liquid relationships; conventions, definitions and use of thermodynamic data; materials balances including fuel calculations; energy balances; combined materials and energy balances for a process or chemical works, including the possible use of diagrams made from such data.

3.54 Chemical Engineering Materials.

This course consists of two one-hour lectures per week for one year.

The properties mainly needed in materials for chemical engineering plant construction are strength, and resistance to creep, wear, fatigue, corrosion, and chemical resistance.

These properties and their industrial applications will be considered for the following materials:

A. *Metals.*

Iron and iron alloys, steel and steel alloys, non-ferrous metals and alloys.

Methods and production and heat-treatment effects will be outlined briefly.

Protective coatings, powder metallurgy and an introduction to corrosion are included.

B. *Non-metals.*

Refractories: Types and properties, chemical resistance, furnaces.

Abrasives: Theory of abrasion process, applications.

Glass: Chemical glassware, heat-resistant types, glass-lined vessels.

Insulating Materials: Industrial types.

Organic Plastics: Industrial types and properties, chemical equipment, bondings, coatings.

Rubber: Crude, hard, synthetic, fabrication methods, adhesives, bearings, mountings, chemical conveyors, hose, coatings.

Concrete: Mixes, handling and placing, acid-proof, chemical-tank construction.

3.55 Chemical Engineering Materials.

This course consist of one hour lecture per week and extends the topics of 3.54 Chemical Engineering Materials in a more detailed fashion. In addition, lectures are given on corrosion testing.

3.65 Chemical Engineering Thermodynamics and Kinetics.

Applied Thermodynamics.

Manipulation and use of thermodynamic functions.

Thermodynamics of fluids. Calculation of thermodynamic functions from experimental data and construction of thermodynamic charts and tables. Application of results to chemical reaction equilibria, power cycles and compressible flow.

Heterogeneous equilibria. Relation between free energy, enthalpy and entropy of mixing of liquids and properties of mixtures. Liquid-vapour and liquid-solid equilibria.

Calculation of thermodynamic functions from structure of molecules.

Applied Kinetics.

Homogeneous reactions. Reactions in solution. Stirred reactors. Heterogeneous reactions. Fixed bed catalytic reactors. Mass and heat transfer in catalyst beds. Fluidised bed reactors.

3.75 AND 3.75D CHEMICAL ENGINEERING PROJECT.

The student will be given an individual project involving literature and experimental investigation, and the final preparation of a flow-sheet and design report on a selected chemical process. This project is a final test of all the earlier work the student has done, and brings together in one exercise the knowledge and experience he has gained.

INDUSTRIAL SAFETY.

Organisation for industrial safety; human factors in accident prevention; physical factors in accident prevention; the contribution of medicine to industry; the functions and applications of the Factories and Shops Act, Workers' Compensation Legislation.

FOOD TECHNOLOGY I.

Tinplate and Glass Containers—

Methods of manufacture, factors determining the suitability of tin plate, corrosion problems, lacquers, examination of cans, glass containers.

The Technology of Fruit and Vegetable Products—

Raw material quality—horticultural factors, maturation of plant foods, objective methods of determination of maturity and quality control.

Harvesting and handling for processing. Cold storage systems, gas storage. Freezing of fruits and vegetables, juices and purees. Storage and transportation of frozen foods. Microbiology, packaging and quality control of frozen plant foods.

Dehydration and sun-drying of fruits and vegetables, techniques and equipment. Storage and changes occurring during storage. General principles of canning technology, determination of safe processes, procedures and equipment for the heat processing of canned foods, asceptic canning. The canning of fruit and vegetables, production of jams, jellies and juices. Quality control techniques.

FOOD TECHNOLOGY II.

Edible Fats and Oils—

Classification, extraction, refining and hardening of fats and oils. Their physical properties as related to their end use, plastic fats, flavour stability and rancidity. Superglycerinated fats. The role of fats in composite foods.

Dairy Products—

Milk, composition and properties, production, transportation and storage; microbiology and pasteurisation. Condensed and dried milk; cream, butter, cheese and ice cream.

Cereals and Starches—

The principal cereals, relations between properties and use. Harvesting, storage; milling technology; laboratory control. Uses of wheat flour and by-products for bread, cake, biscuits, adhesives, fermentation, stockfeed, starch, gluten, amino acid production. Starch industries. Enzyme systems of cereals, nutritional aspects.

Meat, Fish and Eggs—

Principles of the technology of protein foods. Production, storage, handling, transportation. Canning, freezing, chilling, dehydration. Quality control.

Normal Microbial Content of Foods—

Normal microbial content of foods from public health point of view and potential spoilage. Factors affecting microbial load, in processed and unprocessed foods. Principles of diagnosis of food spoilage.

Principles of Plant Sanitation—

Sanitary practices in the food industry. Principles of good industrial house-keeping.

Packages—

Water relations of foods, humidity isotherms, control of equilibrium humidity. Water vapour permeability of packages, mechanism of water transfer; methods of measurement. Calculation and testing of packages. Porosity of containers.

Water Supply and Effluents—

Water sources and significant qualities. Water treatments and purification. Sewerage of food processing plants.

Sugars and Confectionery—

Sucrose and glucose for food industries. Non-crystalline sugar products. Confections, raw materials, chocolate.

Metallurgy.

Subjects 4.01 to 4.912.

4.12 General Metallurgy.

A series of lectures occupying one hour per week for one year. This course gives a general survey of the whole field of metallurgy and is intended to emphasise the relationship existing between the various branches of the subject and the subsidiary subjects studied in other schools.

4.22 Metallurgical Engineering.

Principles underlying the unit processes by which metals are extracted from ores and other raw materials. Emphasis on those principles common to all metallurgical processes involving chemical reactions or changes in state. Metallurgical stoichiometry, thermochemistry and thermophysics, heat balances, fuels and combustion, fluid flow, heat transfer, refractories, physical and chemical attributes of the solid and liquid phases in metallurgical systems, mass action, reaction rates. Quantitative application to metallurgical engineering problems.

Laboratory work designed to illustrate the above principles will be performed.

4.23 Metallurgical Engineering.

The unit processes used in extracting metals from ores and other raw materials. Gas solid processes (roasting, calcining and drying), sintering, reduction of metal oxides, smelting, converting, distillation and refining processes studied from the standpoint of the principles introduced in 4.22 Metallurgical Engineering. Apparatus, design and operation variables and engineering calculations for the important unit processes. Hydrometallurgical and electrometallurgical processes. Laboratory experiments designed to measure important variables in typical metallurgical processes and to illustrate the principles of process equipment on a small scale will be performed.

4.24 Metallurgical Engineering.

Integrated metallurgical engineering processes. Synthesis of the principles, unit operations and unit processes studied in preceding courses, with emphasis on the development of complete flowsheets for

producing metals from ores. Economic and other considerations involved in choice of process. Production metallurgy of iron and steel and of the important non-ferrous metals.

4.32 Physical Metallurgy.

The nature of alloys; phase equilibria in alloy systems and its relation to the temperature and composition dependence of the free energies of alloy phases. The physical factors determining the phases and phase boundaries in alloy systems. Elementary treatment of the mechanism of phase transformations. Departures from equilibrium, metastable transition phases, principles of heat treatment. Generation of microstructures, influence of surface tension. Relations between structure and properties. Application and further development of these principles by means of a detailed study of the plain carbon steels, cast irons and the light alloys of aluminium magnesium and titanium.

The mechanical behaviour of metals. Criteria governing flow and fracture of polycrystalline metals. The effects of microstructure, temperature rate of straining and complexity of stress state on the resistance to deformation and fracture. Recovery recrystallisation and grain growth. Creep, fatigue, internal stresses. Forming of metals by mechanical deformation.

Laboratory work includes preparation of alloys, mechanical testing of cold worked and heat treated specimens, pyrometry, dilatometry, thermal analysis, macro examination of cast and wrought products, and a study of microstructures of brasses, aluminium bronzes and plain carbon steels in the "as cast" and heat treated conditions.

4.33 Physical Metallurgy.

A study of the principal alloy steels, cast irons and miscellaneous ferrous alloys, in continuation of the work commenced in 4.32 Physical Metallurgy; the alloys of aluminium and magnesium; miscellaneous alloys of importance for magnetic, high temperature, etc., properties.

A closer study of the effects of stress and deformation in producing controlled properties, preferred orientation, etc., and in alleviating unwanted effects produced by the limitations of the casting process. (Suitable industrial operations will be chosen for study and lectures, laboratory work and visits to a local industry will be co-ordinated for this purpose). A brief survey of modern theories on the physics of metals and alloys and of advanced methods of investigation.

Laboratory work will include microscopical and physical investigations of more complex alloy systems and projects based upon the metallurgical aspects of the industrial operations studied.

4.34 Physical Metallurgy.

Modern theories of the metallic state studied in more detail than in 4.33 Physical Metallurgy, but with constant attention to illustrations drawn from contemporary industrial metallurgical practice. Advanced study of ternary and complex equilibria in metals, slags, refractories, etc., and the effects of out-of-equilibrium conditions upon such systems.

Crystallography and crystal analysis; stereographic projection, pole figures, etc., and their use in investigations.

Laboratory work will include use of advanced methods of physical investigation.

4.44 and 4.44a Industrial Metallurgy.

A choice of several topics from the following (not necessarily complete) list will be available to enable students to gain a more intimate knowledge of particular industrial specialities in the various centres. Where possible, lectures will be given by industrial experts in the various fields—

1. Industrial Relations.
2. Industrial Organisation.
3. Metalliferous Mining.
4. Preparation of Minerals.
5. Iron and Steel Making.
6. Non-ferrous Metal Extraction.
7. Founding.
8. Metal Forming.
9. Welding and Joining.
10. Electroplating.
11. Powder Metallurgy.
12. Advanced Physical Testing.
13. Advanced Metallurgical Analysis.
14. X-Ray Diffraction.
15. Quality Control.

4.54 Metallurgy Seminar.

A series of lectures on all aspects of the presentation of verbal reports and papers will be given. Then each student will deliver a paper on a technical subject chosen by himself. This will be followed by discussion of the paper and its method of presentation.

4.64 Metallurgical Thermodynamics.

Thermodynamics emphasising topics useful in metallurgical operation. Free energies of substances at elevated temperatures and activities of metals in solid and liquid alloys, used in interpreting metallurgical phenomena and in determining the feasibility and limitations of metallurgical processes.

4.912 and 4.912D Engineering Metallurgy.

For engineering students who do not expect to practise metallurgy as a profession.

Comparison of atomic structures, ionic, covalent and metal structures. General structural properties of metals, grain size and control. Plastic deformation, slip planes, cold work and work hardening, hot work, internal stresses and their removal. Physical metallurgy, types of equilibrium diagrams for the main types of binary alloys. Non-ferrous metals, copper and its alloys. Tin, lead, antimony and white metals; zinc, nickel, chromium, manganese, tungsten, cobalt, vanadium, molybdenum. The manufacture of ferrous metals, iron ores, products of the steel and iron industry. The blast furnace, pig iron, foundry cupolas. Steel by open hearth, Bessemer and electric furnace methods. Wrought iron and tool steel.

The physical metallurgy of iron and steel. The iron-carbon equilibrium diagram. Structure and physical properties of carbon steel. Heat treatment of iron and steel, quenching, tempering, annealing, normalising, case hardening and other methods of hardening. Cast iron.

Alloy steels, chief alloying elements, manganese steels, chromium, nickel and chrome, vanadium or chrome molybdenum types. High speed tool steels, silicon steels, stainless steels.

Metallographic preparation of specimens, etching reagents, use of microscope.

Mechanical Engineering.

Subjects 5.01 to 5.94.

5.101 Engineering Drawing and Materials.

This course will consist of lectures on the elements of drawing office practice, and engineering materials and practice.

Drawing.—Use of instruments. Lettering and printing. Standard sheets scales. Projections of simple solids. Freehand and sectional sketching.

Plane Geometry.—Parabola; ellipse; hyperbola; involute; evolute; cycloidal and trochoidal curves.

Descriptive Geometry.—Projections; sections; oblique views; development of surfaces.

5.11 and 5.11d Engineering Drawing.

Instruction in the correct use of drawing instruments and the application of drawing standards. Measurements and dimensioning. Orthographic, isometric and dimetric projections. Lectures on engineering materials and practice, properties and uses of the common engineering materials. In the drawing office the student will be required to do a reproduction on white paper to a scale of full size and to a reduced scale in orthographic projection of a machine part or simple assembly given to the student in isometric projection, and to do a tracing of this in ink on tracing paper. He will also be required to make dimensional freehand drawings of five of the machine parts enumerated below and to make accurate detail drawings and/or assembly drawings from the freehand sketches as a basis.

Machine parts and elements—

Valves (stop, check, safety, gate).

Cocks (water, gauge, glass assembly, etc.).

Bearings (plummer block, oil ring, ball bearing, etc.).

Couplings (rigid, flexible, Oldham, Universal Joint).

Clutches (cone, disc, dog).

Pumps (gear type, semi-rotary, small piston pump).

Pistons (I.C. piston and piston rod assembly).

5.12 and 5.12d Mechanical Engineering Design.

Design procedures, loadings and factors of safety standards. Stresses in bolts. Design examples involving simple stresses. Design of shafts and bearings, belt drives and pulleys (leather, V pivot drives), friction clutch, springs and screws (for power applications).

Design work associated with the above will be carried out in the drawing office.

5.13 and 5.13d Mechanical Engineering Design.

Design of gears (spur, worm), friction brakes (band, shoe), and load lifting appliances.

Design in the drawing office of a complete crane trolley.

5.14 and 5.14d Mechanical Engineering Design.

Design of machine elements with due consideration to acceleration effects. Design of reciprocating mechanisms.

Students will work in groups of two or three in the drawing office on one of the following assignments:—

Air Compressor.

Internal Combustion Engine.

Steam Engine.

5.21 AND 5.21D MECHANICAL TECHNOLOGY.

Properties of Materials and their Principal Uses.

Classification, definitions of properties.

Ferrous metals and alloys, heat treatment, non-ferrous metals and alloys, plastics, thermo-setting, thermo-plastics.

Tolerances and allowances, gauges, inspection, quality control, factory layout.

Machine Elements.

Screw threads and screw fastenings, riveted joints, welded joints, keys and cotters, couplings, bearings, belt drives, chain drives, terminology in gear drives.

5.211 AND 5.211A WORKSHOP PROCESSES AND PRACTICE.

An introduction to some of the basic processes and practices of engineering workshops, to prepare students for the industrial training they must undergo as part of their courses. Students will attend lectures and demonstrations in some of the following fields, according to the courses in which they are enrolled. Instruction is given by the trade sections of the Department of Technical Education.

Fitting and machining, blacksmithing, heat treatment, founding and patternmaking, welding (oxy and electric), boilermaking, automotive mechanics.

5.22 AND 5.22D MECHANICAL TECHNOLOGY.

Material Forming, Hot and Cold.

Cold forming in presses: The structure of metals, punching and shearing, bending, bulging, necking, curling, deep drawing, extrusion, wire drawing.

Spinning, thread-rolling, cold heading and upsetting, wire-forming, die casting.

Hot rolling, forging, welding and flame cutting, technology of plastics, sand castings.

Single and multi-point tool theory, introduction to 5.23 Mechanical Technology.

5.23 AND 5.23D MECHANICAL TECHNOLOGY.

Machine Tools.

Lathes, centre-lathes, turret-lathes, singles and multi-spindle, copying lathes.

Drilling machines, single and multi-spindle, tapping machines, boring mills, jig borers.

Planer, shaper, slotter.

Milling.

Broaching.

Sawing and filing.

Hobbing.

Gear generating.

Grinding, boxing and lapping.

5.32 AND 5.32D ENGINEERING MECHANICS.

A. *Kinematics of the plane motion of a particle.*

1. Rectilinear motion.
2. Curvilinear motion.
3. Graphic methods of solution.
4. Moment of velocity and acceleration.
5. Central motion.

B. *Kinematics of the plane motion of a rigid body.*

1. Translation.
2. Rotation.
3. Instantaneous centres—centrodes.
4. Superposition of motions.
5. Velocity and acceleration in the plane motion.

C. *Dynamics of the plane motion of a particle.*

1. Newton's laws.
2. Energy law.
3. Kelper's laws.
4. Inertia forces—D'Alembert's principle.

D. *Kinematics and dynamics of the relative motion.*

1. Relative motion of points.
2. Motion of points relative to a body.

E. *Dynamics of the plane motion of a system of particles.*

1. Fundamental laws.
2. Corollaries.

F. *Dynamics of the plane motion of a rigid body.*

1. Fundamental laws.
2. Energy law.
3. Conservation of momentum.
4. The central impact of bodies.
5. The eccentric impact.
6. Replacement of bodies by equivalent two or three point masses.
7. Inertia forces—D'Alembert's principle.

G. *The gyroscope.*

H. *Kinematics of mechanisms.*

1. Instantaneous centres.
2. Velocities by means of instantaneous centres.
3. Vector velocity and/or orthogonal velocity diagrams.
4. Vector acceleration diagrams.
5. Coriolis component.
6. Floating link mechanisms.

5.33 AND 5.33D THEORY OF MACHINES.

A. *Velocity and Acceleration.*

Diagrams in mechanisms with triple-paired links.

B. *Cams.*

1. Determination of cam profiles to satisfy given conditions.
2. Analysis of given profiles.

C. *Flywheels for reciprocating machines.*

D. *Engine governors.*

E. *Balancing.*

1. Rotating masses.
2. Reciprocating masses.

F. *Toothed gearing.*

1. Conditions for constant velocity ratio.
2. Involute gearing—standard and corrected gears.

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G. *Gear trains.*

Simple, compound, epicyclic.

5.34 and 5.34D Theory of Machines.

A. *Inertia effects in mechanisms.*

Bending of members' pressures in joints.

B. *Mechanical vibrations.*

1. One degree of freedom, vibration measuring instruments, vibration isolation.
2. Two degrees of freedom, undamped vibration absorbers.
3. Critical speeds of shafts.
4. Torsional vibration of shafts.

5.41 and 5.41D Descriptive Geometry.

Plane geometry; ellipse, parabola, hyperbola, involute, cycloid and other curves.

Fundamental concepts of descriptive geometry, including reference systems, representation of point, line and plane; fundamental problems of position, of perpendicularity and of measurement. Construction of curves from plane geometry. Various surfaces and solids, their sections, developments and intersections in solid geometry. Application of descriptive geometry to certain problems arising in engineering practice. Special emphasis on ability to visualise problems and processes involved in their solution.

5.52 Fluid Mechanics.

Historical development and present day scope of subject. Physical properties of fluids.

Fluid statics. Pressure-density-height relations. Manometry. Forces on plane and curved surfaces. Statics of moving systems. Equilibrium of bodies wholly or partly submerged in a fluid.

Flow of an ideal incompressible fluid. Pathlines and streamlines. Steady flow. Equation of continuity; one dimensional. Equation of motion along a streamline.

Flow of a real fluid. Viscosity. Friction force and energy loss. Velocity distribution and its significance. Laminar and turbulent flow. Reynolds number. Laminar flow through circular tubes and between parallel plates. Stoke's law. Lubrication mechanics.

Fluid measuring instruments. Measurement of fluid properties, static and stagnation pressures. Rate meters. Venturi meters. Orifices. Nozzles. Flow bends. Rotameter. Anemometers and current meters. Pitot-tube. Weirs. Dilution methods. Float measurements.

Momentum equation. Forces on bends, fixed and moving vanes. Impulse turbine. Moment of momentum equation and its application of reaction turbines, centrifugal pumps and fans.

Steady flow in closed conduits. Pipe-flow relationships. Friction-factor charts. Minor losses. Hydraulic and energy lines. Syphons. Non-circular sections. Branching pipes.

Elementary problems of unsteady flow. Orifice discharging under falling head. Discharge of reservoir through pipeline.

Flow of liquids in open channels. Classification of flow. Steady uniform flow. Hydraulic jump. Specific energy, critical depth.

5.53 AND 5.53D FLUID MECHANICS.

Dynamics of ideal fluid. Acceleration—local, convective. General case of equation of continuity. Euler's equations of motion in three dimensions. Curved streamlines. Variation of Bernoulli constant across streamlines. Irrotational motion. Potential vortex. Vorticity. Rotational motion.

Dimensional analysis and similitude. The general form of physical equations. Raleigh method. Buckingham's theorem. Formulation of one set of π's. Formulation of other sets of π's. Geometric, kinematic, dynamic similarity. Theory of models and prediction equations. Types of models. Scale effects. Froude, Reynolds modelling.

Drag. Pressure drag and friction drag. Drag at small and large Reynolds numbers and in a non-separating flow. Boundary-layer mechanics. Separation. Skin friction drag of a thin plate (*a*) laminar, (*b*) turbulent, (*c*) transition from laminar to turbulent boundary layers. Resistance of, and pressure variation around bodies of revolution. Influence of a free surface.

Elementary dynamics of compressible fluids. Velocity of pressure propagation. Energy equation for compressible flow. Pressure and temperature at a stagnation point. Critical flow nozzle. Compressible flow through a Venturi tube. The expansion factor. Isentropic channel flow equations.

Radial-flow and axial-flow machinery. Types of centrifugal pumps and fans. Velocity triangles. Theoretical relationships. Theoretical characteristic curves. Efficiencies. Actual characteristic curves. Flow through impeller. Similarity relations. Specific speed and its relation to design of rotodynamic runners. Scale effect and model laws. Design constants. Cavitation. Design procedure for a radial-flow pump or fan according to the one dimensional theory. Aerofoil theory applied to axial flow machinery. Characteristics of

axial flow machinery. Design procedure for an axial flow impeller. Some particular problems of installation and operation of rotodynamic machines.

5.54 and 5.54D Fluid Mechanics.

Further study of incompressible flow in closed conduits. Turbulence. Apparent shearing stress. Zones of flow in a pipe. Wall-velocity law. Velocity defect law. Resistance laws for smooth and rough pipes. Turbulent velocity distribution. Mechanism of turbulence in pipes.

Hydraulic turbines. Classification. Elements of the hydraulic design of inward radial-flow, axial flow and radial-flow turbines. Similarity relations Cavitation. Draft tubes. Characteristic proportions. Selection of type and speed of turbine for a new plant.

Surges and water hammer. Fundamental equations. Graphical solution.

Gas dynamics. Energy equation of steady flow, fundamental properties of flow through ducts. One dimensional flow, isentropic flow through nozzles, flow through ducts. The Fanno and Raleigh equations. Theory of shock waves.

Propellers and jets. Momentum theory of propeller. Jet propulsion. Ideal efficiency of a jet. Engine-propeller system turbojets, ram jets. Rocket mechanics.

Centrifugal compressors. Energy considerations. The impeller. Slip factor. Effect of prewhirl. The diffuser system. Characteristics of a centrifugal compressor. Surging.

Axial-flow compressors. Energy considerations. Aerofoil theory. Degree of reaction. Cascades of blades. Performance of cascades. Blade form. Free vortex blading. Constant reaction blading. Effect of high velocity. Axial compressor characteristics.

Lubrication. Properties of lubricants. Perfect lubrication. Reynold's pressure distribution. Frictional force. Journal bearings. Petroff equation. Michell thrust bearing. Slipper bearings.

5.64 Production Engineering Design.

Interchangeability requirements. Use of standards. Hole basis or shaft basis. Limits and fits. Unilateral and bilateral tolerances. Functioning, manufacturing, and inspection data. Effect of gauge tolerances and gauge wear. Magnitude of tolerances. Tolerancing of cylinders, gaps and widths, lengths, angles and tapers, squares, hexagons and roundness, etc., profiles, radii and screw threads. General analysis of designs for production. Advantages and disadvantages of pursuing interchangeable principle. Designing for

interchangeability or unit assembly. Design, dimensioning and tolerancing of particular types of work, and associated jigs, fixtures, tools and gauges. Economics of tooling-up. Development and use of standards in design of work, jigs, tools, etc.

5.72 AND 5.72D THERMODYNAMICS.

Thermal Properties of Perfect Gases.

First law of thermodynamics; principle of the heat engine; state of a substance; measurement and units of P, V and T.

Gas Laws.

Boyle's, Charles' and combined gas laws; characteristic equation; the lb-mole; $R = \frac{CJ}{M}$; specific heats.

Energy, Work and Power.

Units of energy, work, and power. · Measurement of work and power—the indicator, the simple rope brake.

Conservation of energy. Forms of energy. General energy equation. Simple energy equation for non-flow processes. Joule's Law of Internal Energy. Enthalpy (total heat).

Entropy.

Definition; the T-φ diagram; change in φ for C.P. C.V. and C.T. operations. General expression for change in entropy in terms of P, V, and T.

Thermodynamic Processes.

Determination of dQ, dW and dE for constant pressure, constant volume, constant temperature operations. Isentropic and polytropic operations. Representation of change of state on P-V and T-φ diagrams. Relationship between R, Cp and Cv. Relationship between dQ, dW, dE. Value of "n" for a given process. Relationship between P, V and T for a change in state.

Heat Engine Cycles.

The working cycle; the Carnot cycle; reversibility.

Air Compressors.

Types and applications; work done in single stage and multi-stage reciprocating compressors; intercooling. Effect of clearance; conditions for maximum efficiency; regulation of output; compressor efficiencies.

Heat Transfer.

Transmission by conduction—solids in series; thin- and thick-walled tubes; equivalent mean radius. Transmission by convection—film coefficients; transmission from fluid to fluid through metal plates; overall heat transfer coefficients. Transmission by radiation—Stefan's law; radiation from solids and gases; cases involving three forms of heat transfer.

Properties of Steam.

Formation of steam at constant pressure; properties of wet, dry and S/H steam. Determination of steam quality; Entropy of water-steam (briefly); use of steam tables.

Steam Boilers.

Purpose; classification; examples of water-tube and fire-tube types; essential fittings. Boiler auxiliaries (briefly); boiler performance (briefly).

Steam Engines.

The Rankine Cycle. Description and principle of operation of the simple steam engine. The indicator diagram—events in the actual cycle.

Internal Combustion Engines.

Classification; air standard cycles and efficiencies (in terms of temperature). Operation and construction of three types; two-stroke and four-stroke cycles; comparison of Diesel and petrol engines. Testing and performance of engines (I.H.P., B.H.P., Fuel H.P. various efficiencies and curves).

5.73 AND 5.73D THERMODYNAMICS.

I.C. Engines—General.

Review of air standard cycles and efficiencies. Effect of compression ratio and maximum permissible pressure on A.S.E. Effects of dissociation and variable specific heat. Calculation of cycle temperatures and efficiencies; use of Hottel charts.

I.C. Engines.

Gas and petrol engines—two and four stroke cycles; ignition; governing; process of combustion; detonation. Petrol engine—effects of ignition timing; valve timing; mixture strength (fuel consumption loops). Supercharging; high compression ratio; carburettors. Oil engine—hot bulb type; semi-Diesel; two and four stroke Diesels; air blast and solid injection; governing; process of combustion; effect of mixture strength and compression ratio. Testing

—usual tests; indicators; dynamometers; fuel and air measuring instruments; exhaust gas analysis. Various efficiencies; performance curves; heat accounts.

Heat Transfer.

Mean temperature difference for counter-flow and parallel-flow heat exchangers. Mean temperature difference for evaporators; condensers; thermal resistance and overall coefficient of heat transfer.

Boiler Auxiliaries.

Economizers; superheaters, air preheaters; combustion equipment.

Boiler Performance.

Heat losses; heat accounts; equivalent evaporation; thermal efficiency.

Steam.

Entropy of water = steam; T-φ and P-V diagrams for water steam; adiabatic equation. Expansions of a vapour; Mollier diagram for water-steam.

Steam Cycles.

Carnot cycle; Clapagron's equation; Rankine cycle of operations. Rankine efficiency for wet, dry and S/H steam; feed pump term. Ideal regenerative cycle; use of regenerative methods with compound reciprocators and steam turbines.

Steam Nozzles.

Purpose; types; steam flow through nozzles; critical pressure; determination of steam velocity and weight of discharge. Determination of nozzle dimensions; effects of friction and super-saturation.

Steam Turbines.

Principles of operation; reduction of steam velocity; types of turbine. Velocity compounding; pressure compounding; pressure-velocity compounding; reaction turbines; combination turbines. Velocity diagrams for single stage only; calculation of tangential force, work and horsepower; stage efficiency.

5.74 AND 5.74D THERMODYNAMICS.

Steam Turbines.

Blade friction, reheat, internal efficiency. Velocity diagrams for impulse and reaction turbines. Drum and blading dimensions, methods of improving efficiency, applications of turbines.

Gas Turbines.

Development; constant volume and constant pressure cycles. Ideal thermal efficiency; adiabatic and polytropic efficiency; methods of improving efficiency; actual cycles. Description of components (compressor, turbine, burner and heat exchanger). Application and performance characteristics.

Steam Engines.

Steam chest and cylinder; steam valves and valve gear; reversing gear. Indicator diagrams; behaviour of steam in cylinder; indicated steam consumption; missing quantity.

Calculation of cylinder sizes for simple and compound engines. Testing of steam plant; heat accounts; performance curves. Methods of improving efficiency; application of steam engines.

Steam Condensers.

Surface and jet condensers; cooling water calculations; vacuum efficiency; calculation of air present; air removal; air pumps and ejectors; modern developments.

Binary-fluid-cycles.

Methods of extending temperature range using two fluids; mercury-steam, internal combustion-steam, diphenyl-steam plants; practical applications; efficiencies attained; future possibilities.

Refrigeration.

General principles; terms used; reversed Carnot cycle; cold air machines (Bell-Coleman cycle). Vapour compression types; effects of superheating and under-cooling; conditions for maximum COP; nature and use of I-φ and P-I diagrams. Absorption refrigeration; commercial and domestic. Choice of refrigerants; refrigerator calculations; testing of refrigerators; heat accounts.

Special Boilers.

Progress in design of steam generators for high pressures and for quick starting; Clayton, Velox, La Mont Loeffler, Benson, etc., boilers.

5.94 Mechanical Engineering.

This course covers the fundamental mechanical engineering principles of heat engines and simple theory of machines. It will include the subject-matter of 5.72 Thermodynamics, together with selected topics from 5.32 Engineering Mechanics and 5.33 Theory of Machines.

Electrical Engineering.

Subjects 6.01 to 6.95.

6.12 and 6.12D Electric Circuit Theory.

Introduction: Circuit and field problems, basic circuit parameters, units, electric conduction. Ohm's law, resistance, effect of temperature, non-linear resistances.

Electromotive force: Sources of e.m.f. Generation of alternating and direct voltages.

D.C. networks: Series and parallel resistances. Delta-star conversions, node and mesh equations, circuit theorems.

Magnetic circuits: Analogy between magnetic and electric circuits. Computations, magnetic force, magnetic hysteresis, permanent magnets.

Circuit parameters in circuits: Inductance, mutual inductance, capacitance and resistance in d.c. and a.c. circuits. Transient and steady state solutions.

A.C. concepts: Sine wave theory, vector representation, complex algebra.

R.L.C. circuits in the steady state: Circuit theorems, resonance, coupled circuits, air core transformers, equivalent circuits.

Harmonics: Production of harmonics. Solution of circuits for non-sinusoidal voltages and currents.

6.13 (6.13A and 6.13B) Electric Circuit Theory.

Harmonics and harmonic analysis.

Polyphase circuits, balanced and unbalanced, symmetrical component treatment.

Passive networks, network analysis, two and four terminal networks, electric wave filters.

Networks with active elements, analysis of circuits with vacuum tubes.

Transients in electric circuits and networks, Laplace transform method.

Non-electric and mixed networks, electromechanically coupled systems.

Feedback in amplifiers, automatic control and servomechanisms.

Quasi-stationary field problems, potential problems, field plotting relaxation methods, computation of circuit parameters, skin effect, proximity effects, heat dissipation.

Materials used in electrical engineering, conductors, semiconductors, dielectrics and insulating materials.

Non-linear circuit elements, vacuum tubes, rectifiers, thermistors.

Electric transmission lines treated from both the power and the communication aspect. Overhead and underground lines. Reflection, loading, artificial lines, concentric lines, transients.

Maxwell's equations, propagation of waves along transmission lines, wave guides and in vacuo.

Magnetic circuits and forces between currents and magnetic fields.

6.214 Electric Power Engineering A.

Transformers. Leakage reactance. Current surges. Phase conversion. Special types. Harmonics in single and 3-phase transformer. Design, 3-winding transformers. Thermal rating. Instrument transformers.

Power transmission by underground cables and overhead lines. Line constants. Rigorous solution for steady state conditions. Reactive power. Power circle diagrams. Voltage surges. Terminal effects.

Symmetrical components. Application to unbalanced faults.

Protection. Operation of basic devices and application to equipment and system protection.

System voltage regulation. Power limits and stability.

Traction. Speed time curves.

Illumination. Requirements and design.

6.224 Electric Power Engineering B.

Principles of e.m.f. generation. Armature windings for direct and alternating current machines. Leakage reactance, armature reaction, rotating fields.

Synchronous generator; operation on load; synchronous reactance; estimation of regulation; parallel operation on large and small systems; transient conditions; automatic voltage regulators.

Synchronous motors; circle diagrams; vee curves; synchronous condensers.

Induction motors; operating characteristics; speed control by pole changing, cascading and control of secondary e.m.f. Induction generator. Synchronous induction motor.

Commutator motors. Phase advancers. A.C. and D.C. control systems for starting, speed control, braking, and load balancing. Electric and regenerative braking; plugging.

Metadynes, selsyns.

6.23 (6.23A AND 6.23B) ELECTRIC POWER ENGINEERING.

Magnetization of iron, magnetic circuits in transformers and machines. Transformers, construction, operation, theory, design, polyphase, instrument transformers. D.C. and A.C. machine construction. Machine windings. Generated e.m.f., rotating m.m.fs. in polyphase machines. Synchronous generators and motors. Induction motors, single phase motors. D.C. generators and motors, operation, applications, starting and control. Rotary converters. Transmission, overhead and underground, voltage regulation, power limits, stability, protection. Distribution, wiring rules, power factor correction. Circuit breaking devices, arc extinction. Basic devices and relay applications in protection. Meters, indicating, recording and integrating. Illumination, light sources, visibility, requirements for effective illumination.

6.303 (6.303A AND 6.303B) ELECTRONICS.

(A) Electron ballistics: charged particles and their motion in electrostatic and magnetic fields.

Electron emission from metals: thermionic emission, photoelectric emission, secondary emission.

Electrical conduction through vacuum, gases and vapours; space charge limitations, occurrence of gas in electronic devices, gaseous discharge, Townsend discharge, breakdown, glow discharge, arc discharge.

High vacuum electron tubes: characteristics, rating and control in high vacuum diodes and triodes, tetrodes, pentodes, beam power tubes and other multi-electrode tubes.

Gas tubes: effect of gas in thermionic diodes, mercury arc rectifiers, ignitrons; effect of gas in thermionic triodes, thyratrons.

(B) Single phase rectifier circuits: recitfier theory, smoothing and filter circuits.

Vacuum tubes as Class A amplifiers: considerations of voltage gain, input admittance, waveform distortion, power output and efficiency; coupled amplifiers with various types of coupling.

Amplifiers of the Class AB, Class B and Class C type: design and operation.

Vacuum tube oscillators: types of oscillators and conditions for oscillation.

Modulation and detection: the modulation process and types of modulation, radio communication.

6.304 (6.304A AND 6.304B) INDUSTRIAL ELECTRONICS AND CONTROL.

A course designed to link electronic and electric power engineering and various other branches of engineering and science in the minds

of students, and to give advanced students composite projects involving many aspects of what they have learnt together with economic and practical aspects.

Section A.—Regulators and servomechanisms, dynamics of closed systems, industrial control problems.

Section B.—Induction heating, dielectric heating.

Section C.—Selection of topics such as—

Polyphase rectifiers;

Electronic control of motors and generators;

Basic timing circuits;

Ignitrons and thyratrons as line switches;

Resistance-welder controls;

Industrial X-rays;

Photoelectric devices, electronic lamps;

Electrostatic precipitation;

Power line carrier.

6.314 High Frequency Engineering A.

Propagation of radio waves: A general treatment of propagation by means of ground, sky and space waves. Reflection and refraction in conducting media.

Properties of the ionosphere. Practical problems of propagation at different frequencies.

Radiation: Fundamental considerations deriving from Maxwell's laws. Use of Poynting's vector. Calculation of field pattern from linear antenna in free space. Effect of ground reflections, and properties of spaced antennas. Pattern and gain obtainable from directional arrays. Wave guides, aperture radiators and reflectors. Receiving aerials.

Vacuum tube circuits: Behaviour of basic oscillator and amplifier circuits at low and high frequencies. Inverse and positive feedback. Conditions for oscillatory or non-oscillatory response. Sinusoidal and relaxation oscillations. Trigger circuits. Input admittance, output impedance, gain and phase shift of untuned amplifiers. Tuned amplifiers, response and operation, class A and class C. Harmonic generators, linear amplifiers and special amplifiers.

Modulation and modulators—amplitude, frequency and phase. Response of circuits to modulated waves. Frequency multiplication of modulated waves. Demodulation and demodulators. Frequency conversion and mixers.

Elements of radio communication and navigation systems. Elements of television systems. Brief treatment of electro-acoustic transducers, elements of acoustics.

6.324 High Frequency Engineering B.

Principles and methods of design procedure are exemplified in the design of equipment of the following types—

Low frequency and high frequency measuring and testing devices, audio frequency systems, special-purpose amplifiers, cathode-ray oscillographs, communication transmitters and receivers.

6 334 Line Communication Engineering.

More advanced work on circuit theory following 6.13, specially applied to line communication work. Telegraph systems, manual operation, machine operation, elements of equipment and characteristics.

Carrier telegraphy, line and equipment operation. Picture transmission. Long lines and cables.

Telephone systems, general principles and electrical design of common components, circuit design, switching systems and exchanges, carrier systems. Distortion, interference, cross talk, power line interference, protection, amplifiers and repeaters.

6.83 and 6.83d Electrical Engineering.

Special course for engineers not intending to follow electrical engineering as a profession. Presentation of the fundamental principles of electric and magnetic circuits and the application of these principles to the theory and performance of direct and alternating current machines.

Lighting systems and illumination, wiring code, safety precautions.

6.84 and 6.84d Electrical Engineering.

More advanced work following 6.83 on the operating characteristics of motors. Controller design and application, including types, methods of acceleration and retardation, protective devices. Essentials of connecting motor to load. Principles of moving fluids and solids. The application of motors, electron tubes and photo-electric cells.

6.94 Electrical Engineering.

This course consists of one hour lecture and two hours laboratory per week for an entire year. Half of the course is devoted to detailed mathematical and descriptive study of electric and magnetic circuits. The other half of the course will provide an introductory course on transformers, motors, generators and electronics.

6.95 Electric Engineering.

This course consists of two one-hour lectures and three hours laboratory per week for an entire year. Half of the course is devoted to detailed mathematical and descriptive study of transformers, motors, generators, wiring practice and electrical measurement. The other half of the course is devoted to electronics and special applications of electrical engineering to chemical plant. This section of the course will be given by various specialists. The following subjects are examples of its coverage:—

Thermionic tubes; conduction of electricity through gases; rectifiers; rheostats; magnets; electric furnaces and electroplating; power generation and distribution.

Mining Engineering and Applied Geology.

Subjects 7.001 to 7.583.

7.001 Mining Processes and Practice.

This course is an introductory series of lectures in mining dealing with the following:—

History of the mining industry, development of methods of working, ventilation of mines, mine lighting, transport and mining machinery, mine organisation and mine management, health and safety in mines, mine gases and explosions. Elements of geology.

7.002 Mining.

Mine Atmospheres. Mining Hygiene. Dust Control. Mine Lighting. Gas Testing. Deep Boring and Shaft Sinking.

Mine Atmospheres.

Atmospheric conditions in mines. Sources of pollution of mine air; mine gases; properties and physiological effect of various gases; sampling of mine air; air analysis; detection of gases, gas detectors.

Temperature and humidity; their causes; geothermic gradient; physiological effect of temperature and humidity; kata thermometer; effective temperature; conditioning of mine air; hot and deep mines. Environmental surveys.

Mining Hygiene and Dust Control.

Miners' diseases; silicosis; pneumoconiosis; nystagmus; sporotrichosis; ankylostomiasis; dermatitis. Compensation and treatment.

Dust formation. Dust prevention:—Boring; cutting; loading; travelling roads; ore bins and chutes; screens. Air cleaning. Dust extraction. Dust measurement, sampling and analysis.

Mine Lighting and Gas Testing.

Brief historical development of safety lamp; principle and construction of wire gauze. Conditions to be fulfilled in efficient safety lamp; types of flame safety lamps; electric hand lamps and cap lamps; M.L. lamps; mains lighting; discharge lighting; aids to illumination.

Lamp fuels; tests on lamp fuels; illuminating power; design and equipment of lamp rooms; safety lamp tests.

Gas detection. Flame safety lamps; special methane detectors.

Deep Boring and Shaft Sinking.

Percussive, rotary; non-coring, coring; equipment, accessories; lining and surveying of boreholes.

Shaft sinking. Preliminary considerations; selection of site; determination of number and size of shafts; ordinary methods of sinking and lining shafts; appliances and accessories required.

Ventilation and lighting of shafts; dealing with water from shafts.

Shaft sinking in difficult conditions; special methods of sinking; enlarging, repairing and deepening shafts. Large diameter boreholes.

7.003 Mining.

Explosives and Blasting. Mine Ventilation. Methods of Working Coal.

Explosives and Blasting.

Action of explosives; types of explosives; composition and classification of explosives. Permitted explosives; tests of explosives; choice of explosives; sheathed explosives; storage of explosives.

Detonators; charging and firing shots; gases due to shotfiring; multiple shotfiring. Exploders. Arrangements of shotholes in coal and stone. Substitutes for explosives. Tunnelling; shothole drilling practice and methods of blasting.

Mine Ventilation.

Quantity of air required for ventilation; measurement of quantity and pressure of air; resistance to flow of air.

Ventilation laws; their evolution and application; equivalent orifice; motive column; evasée chimney; air distribution in mines; splitting air currents; regulators. Methods of producing ventilation; brief historical review; natural ventilation; description and characteristics of centrifugal and axial flow fans. Main and auxiliary ventilation; ventilation surveys.

Methods of Working Coal.

Open-cut methods; proving the deposit; general outline of development; equipment used. Shaft mountings and insets; location; factors affecting location; structure. Pit bottom; excavation; support; layout. Development of coal seams; order of extraction; methods employed; horizon mining. Bord and pillar workings; suitable conditions; size of pillars; typical layouts and machines used; pillar extraction. Longwall working; suitable conditions; layouts and machines used. Methods of working in special cases; steep seams; thick seams; seams in close proximity; seams subject to spontaneous combustion. Roof supports; at the face and on roadways. Hand, hydaulic, pneumatic and mechanical stowage. Caving. Withdrawal of supports. Preservation of timber supports.

Laboratory.

Fan testing. Ventilation plans. Dust measurement. Mine air analysis. Gas detectors.

7.004 MINING.

Winding, Transport and Drainage. Power Supply and Transmission. Mine Organisation, Management and Mining Law.

Winding.

Guides—rigid and flexible. Cages, cage-chains, detaching hooks, capels. Headframes, keps. Decking arrangements. Winding engines, drums, brakes, reversing gear, overwind and slow banking gear. Koepe and other winding systems. Characteristic winding curves. Balanced winding. Skip winding. Signalling systems. Ropes.

Transport.

Rails; tracks; skips. Manual haulage. Horse haulage. Rope haulage. Locomotive haulage. Safety devices; signalling systems; haulage calculations.

Drainage.

Adit levels. Siphons. Ram pumps. Piston pumps. Multi-throw pumps. Differential pumps. Duplex pumps. Centrifugal and multi-stage centrifugal pumps. Mono pumps. Megator pumps. Sumps and standages. Drainage of flooded workings.

Power Supply and Transmission.

Fundamental principles of electric and magnetic circuits and the application of these principles to the theory and performance of direct and alternating current machines.

Compressed Air. Air compression; types of compressors; receivers; transmission lines; pressure drop in lines; air meters; application and air consumption of various type of air motors.

Electricity—Outline of Colliery Electrical Organisation and Equipment.

Surface Installation at Mines. Distribution of power; sub-stations; electric winding engines—straight a.c. system, converter equalizer system, Ward Leonard system, Ilgner system, C.M.B. system, Cascade motor system; ventilation fan motors; other surface plant; bare overhead transmission lines; rectifiers; surface lighting. Lamp room equipment.

Underground Plant. Underground distribution; typical examples. Shaft cables. Pit bottom sub-stations. Roadway cables. Transformers. Calculations of size of cables. Joint boxes. Underground equipment. Motors; control, switchgear and protective devices. Flame-proof equipment. Trailing cables; connection for trailing cables; care, treatment and repair of trailing cables. Haulage locomotives.

Switchgear and accessories for coal face equipment. Earth continuity protection. Remote control devices. Intrinsically safe equipment. Signalling.

Mine Organisation, Management and Company Law.

Surface organisation and equipment and colliery costs. General surface arrangements; location of plant; workshops and surface buildings. Colliery organisation and management; control of labour; duties and functions of officials; reports; returns and notices; labour and output; materials and stores; systems of payment. Time keeping; measurement of work; analysis of costs; estimates; overheads.

Company organisation and company law; economics of New South Wales coalfields. Trades unions and associations.

Laboratory.

Electricity in mines; mining machinery.

7.013 Metalliferous Mining.

Working of unstratified deposits.

Definition of mining terms. Types of mineral deposits. Prospecting. Exploration.

Surface mining methods. (*a*) Alluvial mining; panning; long tom sluicing; hydraulicking; dredging; drift mining. (*b*) Quarrying; layouts; glory-holing; methods of loading and transporting products.

Underground mining methods. Factors influencing selection of methods. Development. Open stope supported naturally. Open stoping; sub-level stoping. Open stope supported artificially. Horizontal cut and fill; inclined cut and fill; stulled and square set stoping. Shrinkage stoping. Caved stopes. Block caving; sub-level caving; top slicing. Combination of various methods.

*7.014 Coal Mining.

Subsidence and Strata Control. Spontaneous Combustion, Fires and Inundations. Explosions, Rescue and Recovery Work.

Subsidence and Strata Control.

Subsidence; early theories, angles of draw, surface movements, influence of thickness of seam, depth, inclination of strata, nature of strata, methods of working, etc. Shaft pillars and pillars for other surface supports.

Properties of coal measure rocks.

State of stress at mining depths; the stress conditions in the vicinity of single and multiple roadways and their effects.

Stress conditions along pillar extraction lines in bord and pillar mining.

Principal stress conditions in longwall mining and their effects; means of modifying excessive stress conditions.

Rock bursts in mines; theories; classification; conditions conducive to bursts; examples of rock bursts; preventative measures.

Spontaneous Combustion, Fires and Inundations.

Oxidation of coal; historical review of theories of cause of spontaneous combustion; factors influencing self-heating; observation and organisation in seams liable to spontaneous combustion; detection of incipient heatings.

Methods of dealing with heatings and gob fires; removal of fires; construction of seals.

Layout of workings in seams liable to spontaneous combustion. Re-opening of sealed-off areas.

Other causes of underground fires; precautions and methods of dealing with fires.

Sources of water under pressure; precautionary measures when working under or approaching water; water blast; dams.

Explosions, Rescue and Recovery Work.

Ignition of gas and coal dust; explosive properties of coal dust; factors affecting explosibilty; nature and characteristics of gas and coal dust explosions; causes, effects and precautionary measures; research work on gas and coal dust explosions.

Rescue work; respiration; self contained breathing apparatus; smoke helmets and respirators; organisation and operation of rescue work; rescue stations and brigades; mine accidents; ambulance stations and organisation.

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*Optional for students in the Mining Engineering Course who wish to specialise in Coal Mining.

Laboratory.

Analysis of dusts. Explosion tests of coal dust and methane. Rescue apparatus.

*7.024 Metalliferous Mining.

Mining.

Mine development and methods of mining. Ventilation of Mines.

Rock drills; drill steel and steel sharpening; drill bits; churn, calyx and diamond drilling.

Blasting in stopes and shafts; long hole blasting.

Transfer of broken ore from stopes to chutes and cars.

Underground haulage.

Mine fires; fire fighting; fire protection in stopes and shafts and electrical installations.

Subsidence and Strata Control.

Subsidence, theories; surface movements; pillars. Rock bursts in mines; classifications; conditions conducive to bursts; examples of rock bursts; preventive measures.

Sampling.

Underground sampling. Procedure. Stope and development sampling; reduction of samples; computations for tonnage and assay values; books and assay plans.

Borehole sampling. Procedure; spacing of boreholes; computation for tonnage; average value.

Alluvial sampling. Borehole samples; power and hand drill drive; pipe panning; computation of bore value; computation for yardage and value.

Pit sampling. Dump-sampling; reliability.

Mining Law and Valuation.

New South Wales Mining Act.

Ore reserves—proved, probable and prospective; mineral beneficiation and marketing of ores.

Mineral properties. Taxation; life; annual value; present value. Mine Accounts. Day labour, contract and bonus work.

Organisation of mine management; mine reports.

Mine stores and storekeeping.

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*Optional for students in the Mining Engineering Course who wish to specialise in Metalliferous Mining.

Laboratory.

Principally additional work on—

(*a*) Metalliferous mine ventilation plans.

(*b*) Preparation of minerals and assaying.

(*c*) Laboratory work and tests for preparation of theses.

7.034 Preparation of Minerals.

Object, scope and economics of coal preparation and mineral dressing.

Size Reduction: jaw, gyratory, cone and roll crushers, Bradford breakers, hammer mills, stamps. Grinding, ball mills, rod mills, tube mills.

Liberation: theory and effect on concentration procedures.

Sizing: laboratory sizing and industrial screens.

Theory of Classification: classifiers; coal washing machines which operate on classification principles.

Coal Preparation: distribution of ash in coal; float and sink tests; washability curves; jig and trough washers; float and sink separators; cyclone separators; spiral concentrators; froth flotation; pneumatic separators.

Mineral Dressing: sink and float; jigging; flowing film concentration; flotation and agglomeration; spiral concentrators; magnetic separators; electrostatic separators; amalgamation; cyanidation; recovery of metal from ores.

Storage: conveyors, weighing; sampling; feeding; thickening; drying; filtering; pumping; tailings disposal; centrifuges; dust collection.

Marketing: sale of products; smelter schedules.

Flowsheets: mill design; pilot plants.

Laboratory: Principally work on—

(*a*) Sampling.

(*b*) Size reduction, crushing, grinding and screening.

(*c*) Separation.

(i) Coal preparation.

(ii) Mineral concentration.

7.052 Mining Engineering Practice.

Introduction. A general review of mining practices and methods. Mining viewed as a link between geology and different industries.

Proving the mineral by boring from the surface. Methods of deep boring. Tunnelling. Organisation and equipment. Drilling and loading. Explosives and blasting. General considerations of breaking ground with explosives. Some details of principal methods of shaft sinking and lining. Underground methods of working metalliferous deposits. Underground methods of working coal deposits. Strata control. Subsidence. Methods of supporting roadways and workings —general principles and description. Special methods of support—stowing. Underground transport. Shaft winding. Some details of winding. Power. Steam. Compressed air. Electricity. Drainage—general considerations. Some details of principal types of pumps. Mine lighting. Mine ventilating. General principles concerning the production and distribution of the air current. Mine atmospheres. Heat and humidity. Gases—properties and physiological effects. Gas testing. Dusts and their control. Health and hygiene. Safety—general considerations. Fires and fire-fighting. Mine explosions. Rescue and recovery work. Underground organisation. Surface organisation. Surface installations. Overall control and management. Surface methods of working metalliferous and coal deposits. Mining —its problems and future.

7.502 Geology.

Introduction, the scope and applications of geology; cosmology and structure of the earth; agents of denudation, weathering, river action, glaciology, wind action, the sea and its action, lakes; underground water, diastrophism, vulcanism and earthquakes; igneous sedimentary and metamorphic rocks, coal and petroleum, introductory stratigraphy and historical geology, the relationship of geology to mining and civil engineering problems.

Laboratory.

Examination and identification of common minerals and rocks in hand specimen; interpretation and preparation of geological maps and sections.

Field Work.

Six excursions to be held on Saturdays during the year.

7.502A Geology.

A course for students in Architecture.

Scope of the science of Geology, the various sub-divisions of the science, the geological periods; cosmology and structure of the earth's crust, agents of denudation, weathering, river action, glaciology, wind action, the sea and its action, lakes, underground water; diastrophism, vulcanism, earthquakes, primary and secondary geological structures; principles of physiography; igneous, sedimentary

and metamorphic rocks. Introductory study of important ore-forming minerals; economic deposits of non-metallic materials such as clay, gypsum, ochre, limestone, shale, etc.

Inter-relation of geology and soil mechanics—types of unconsolidated materials and their behaviour under stress. Geological aspects of foundation sites—ground conditions, groundwater considerations, preliminary and exploratory geological work, influence of geological features on foundation design.

7.503 (7.503A AND 7.503B) PETROLOGY.

Petrology.

Detailed treatment of the mode of occurrence of igneous rock bodies; the composition and constitution of magmas, the physico-chemical aspects of crystallization of magmas, temperature composition diagrams for binary and ternary magmas; magma differentiation; sedimentary rocks—detailed treatment of the origin, types and classification of sedimentary rocks.

Chemical analysis of rocks and their mineralogical interpretation, calculation of norm, variation diagram, trilinear diagram, methods of classifying igneous rocks; the reaction principle in the petrogenesis, differentiation, hybridism, assimilation, deuteric activity; origin of igneous rocks; the alkaline rocks and their origin; petrographic provinces.

Principles of sedimentary petrology, the environmental factor in sedimentation, classification of environments, rhythms in denudation and sedimentation, classification of sediments by sedimentary petrological methods, methods of rational analysis of the constituents of sedimentary beds, heavy mineral residues, provenance.

Metamorphism.

Agents of metamorphism, depth, zones and metamorphic facies, metamorphic minerals and structures; cataclastic, thermal, dynamothermal, plutonic and metasomatic metamorphism; classification of metamorphic rock-types, use of equilibrium diagrams in studying metamorphism, lit par lit injection, granitization and anatexis.

Advanced Lithology.

More detailed study of various rocks, including the less common types.

Micro-petrology.

Microscopical examination of minerals and rocks.

Petrographic Methods.

Graphical representation of chemical analyses of rocks; the integrating stage; the Delesse-Rosival method of rock analysis; computation or norms, variation and trilinear diagrams and their use; A.C.F. diagrams, computation of formula of complex minerals from chemical composition.

Petrographic Micro-technique.

Preparation of microslides of rocks and fossils.

7.504 Advanced Mineralogy and Petrology.

Descriptive mineralogy of selected less common but important mineral groups.

Instruction in the use of the universal stage; introduction to the study of petrofabrics.

Industrial Mineralogy.

Application of petrological methods to the study of industrial raw materials; mineralogy of artificial minerals, cements, slags, ceramics and refractories; optical determination of artificial minerals.

Laboratory.

Practice in the use of the universal stage, petrofabric investigations; thin section examination of artificial minerals found in ceramics refractories, slags and cements; differential thermal analysis and its applications.

7.513 Mineralogy and Crystallography.

Fundamental laws of crystallography; symmetry elements and symmetry operations; crystal systems and classes; Miller indices and other systems of notation; crystal goniometry, stereographic and gnomonic projection of crystals. Examples of the more common crystal classes. Regular and irregular attachment of crystals, twinning, etc.; crystal growth and its anomalies.

Fundamentals of the atomic structure of crystals: the Bravais lattices, point groups and space groups. Introduction to X-ray analysis of crystals, by Laue diffraction, powder method and its modifications.

Examples of atomic structures of common minerals; elements of chemical crystallography: relation between chemical constitution and crystal structure. Isomorphism, polymorphism, pseudomorphism; etching figures and corrosion forms of crystals. Spectrographic analysis of minerals. Physical properties of crystals as related to crystal structure: mechanical properties of crystals, cleavage, gliding, secondary twinning. Hardness and specific gravity of crystals

and the methods for their accurate determination. Fundamentals of crystal optics in polarised light. The Fresnel and index ellipsoids. Division of crystals on the basis of their optical properties. Colours of crystals; electrical and magnetic properties of crystals.

Descriptive mineralogy of common minerals on the basis of the categorical synopsis of mineral properties including some less common groups of minerals.

Laboratory.

Crystallography.

Examination of crystals and crystal models for symmetry; perspective drawing of crystal models. Measurement of crystal angles by the one-circle and two-circle goniometer; stereographic and gnomonic projection of crystals; crystal drawing from projections.

Examples of crystal structure analysis by X-ray methods.

Optical Mineralogy.

Determination of the optical parameters of crystals by means of the polarising microscope in plane polarised light; determination of the refractive indices of crystal fragments by means of the immersion method; examination of crystals in convergent polarised light, measurement of the optic axial angle. Accurate determination of the specific gravity of crystals and minerals by various methods.

Descriptive and Determinative Mineralogy.

Macroscopic examination of common mineral groups, including simple physical, optical, chemical and blowpipe methods; study of the paragenesis and mode of occurrence of common mineral groups.

7.513A MINERALOGY AND CRYSTALLOGRAPHY.

A course for Metallurgy students, similar in content to 7.513 above.

7.514 MINING GEOLOGY, MINERAL ECONOMICS, MINE VALUATION.

Textures of the ore minerals and their significance. Detailed study of a number of Australian and overseas mineral deposits, including origin, structure, paragenesis, mineral content and distribution, etc. Metallogenetic epochs. Australian and overseas resources of industrial and rare metals. The search for minerals.

Underground survey procedures, preparation of mine plans, sampling, minable ore limits, ore reserves, sample assay analyses, and ore reserve calculations.

Detailed treatment of drilling methods.

Marketing of minerals, buyers, prices, Australian consumption, overseas trade, graphs of Australian and world production figures;

assessment of mineral resources; strategic, critical and essential minerals; mining enterprise and its relation to the social and economic pattern, commercial controls and national policies.

New South Wales Mining Act.

Mine Valuation.—Appraisal of ore reserves; extraction costs, beneficiation and smelting costs, capital value of machinery, production costs v. market values, taxation, life, annual and present value, etc.

Laboratory.—Mapping exercises, including the application of stereographic projection to the solution of mining geology problems; computation of ore tonnages in mining leases, logging of bore cores, preparation of reports, examination of mine plans.

Mineragraphy.—Principles of the mineragraphic determination of opaque minerals, examination of a wide range of minerals, interpretation of ore textures, applications to ore dressing.

7.523 Stratigraphy and Palaeontology.

Stratigraphy.—Stratigraphic principles and nomenclature. Detailed study of the geology of the Commonwealth of Australia. Overseas students will have the opportunity of studying the geology of their own country.

Palaeontology.—Systematic classification of the various phyla and detailed study of the important sub-divisions of the phyla. Outline of historical geology. Regional palaeontology; stratigraphic significance of fossil assemblages. Micropalaeontology.

Laboratory.—Examination and description of representative fossils from the various phyla; study of fossil assemblages from important localities. Study of microslides. Study of rock suites from various localities; study of geological maps of selected areas.

7.524 Photogrammetry, Photogeology and Military Geology.

Photogrammetry.—As for the Civil Engineering IV degree course elective.

Photogeology.—Interpretation of terrain from aerial photographs; determination of geological structure and rock type; vegetal determination of lithology; applications in military geology.

Military Geology.—Physical character of bedrock in relation to trenching, mining, etc.; groundwater studies and sub-surface drainage conditions; appraisal of the strength of ground as a foundation for fortifications and heavy guns.

Location of sand, gravel and other materials for construction works; prediction as to the stability of different types of ground under different weather conditions; photogeological interpretation of wave, current and tide action and other strandline phenomena (coral reefs, shoals, etc.); studies of the penetration and damage effected in various types of rocks due to bombing and shelling.

Laboratory.—Photogeological interpretation of physiography, structure, lithology, etc.; applications of photogeological methods in engineering practice and in military operations; compilation of geological maps from aerial photographs, use of the Multiplex projector in regional geological studies.

7.533 (7.533A AND 7.533B) ECONOMIC GEOLOGY.

Origin of primary ores—magmatic, neomagmatic and geosynclinal origin. Ore deposits related to the cooling history of an orthomagma. Regional and local structural controls. Wall rock alteration. Magmatic segregations and disseminations, pegmatites, hydrothermal veins and lodes, pyrometasomatic deposits. Post-mineralization changes within an ore-body.

Gemstones—nature and occurrence.

Clays and refractories—brief treatment of mineralogical and physical constitution, industrial uses and mode of occurrence.

Laboratory.—Macroscopic and microscopic examination of the various ore minerals. Blowpipe analysis.

7.534 ADVANCED ENGINEERING GEOLOGY.

Geological exploratory work in engineering projects; inter-relation of soil mechanics and geology; testing of the physical properties of rocks.

Geological aspects of quarrying and tunnelling, geology of dam sites and reservoirs, bridge and building foundations; rock creep and landslides; protection of river banks against scour; transportation of sediments, siltation of rivers; soil erosion and its control.

Water table in granular and fractured rocks, artesian water, geological classification of artesian aquifers, review of sub-surface waters in Australia, mathematics of groundwater flow.

Building stones, concrete aggregates, road materials and railway ballast.

Principles of subterranean installations.

Principles of engineering seismology.

Mining tectonics—structures induced by mining, rock bursts, applications of microseismic methods, strata control in mines; subsidence—causes and effects, support of overburden by pillars, protection of surface structures.

Laboratory.—Consolidation characteristics and permeability of sediments; methods of testing rocks in tension, compression and shear, petrological interpretation of the physical behaviour of various rock types under stress. Logging of bore cores.

Examination and testing of building stones, road materials and aggregates; preparation of reports.

Students will be required to peruse geological literature pertaining to engineering works.

7.543 (7.543A AND 7.543B) GEOPHYSICS AND GEOTECTONICS.

The physical properties of rocks, stress-strain concepts, mechanics of deformation and rupture in rocks, behaviour of rock types under various stress conditions.

Modern ideas relating to the internal structure and constitution of the earth, the concept of isostasy, major crustal structures—geosynclines, mountain chains, rift valleys, etc.; continental drift theories, sub-crustal convection currents, radioactive heat and diastrophism, continental growth, polar wanderings, glacial epochs, age of earth.

Description and analysis of folds, joints and faults; secondary foliation and lineation, granite tectonics. Salt domes, slump structures and submarine canyons.

Various methods used in geophysical exploration, instrumental details, limitations of the various methods; miscellaneous geophysical methods, including electrical bore core logging and the study of geothermic gradients and heat flow in mines; field techniques, compilation of field data, preparation of geophysical reports.

Microchemical prospecting.—An introduction to microchemical procedures, crystal reactions and spot tests used in field practice; detection of traces of metallic constituents in plants, soils, rocks, and groundwater.

The applications of geophysics to geology.

Geophysics (laboratory and field).—Introduction to the use of geophysical instruments; compilation, plotting and interpretation of the results of simple geophysical surveys (gravimetric, magnetometric and resistivity).

Laboratory.—Structure contour exercises, interpretation of structure and history from geological maps. Use of stereographic net in solving mapping problems.

Field Work.—Instruction in geological and geophysical survey methods.

7.544 Geology of Fuels.

Coal.—Review of the structural features associated with coal seams, detailed treatment of the physical and chemical properties, microscopic features, metamorphic evolution, utilization and classification; review of Australian occurrences; important overseas coalfields, coal derivatives.

Petroleum.—Detailed treatment of the origin and occurrence, stratigraphic and structural features of oilfields; subsurface laboratory methods—micropalaeontological analysis, detrital mineralogy, X-ray diffraction, differential thermal analysis, water analysis, core analysis; fluor-analysis, etc.; subsurface logging methods—cable-tool samples, electrical, radioactive well logging, temperature logging, drilling-mud and cuttings analysis, drilling-time logging and other specialist techniques. Details of drilling methods.

Secondary recovery of petroleum, subsurface maps and illustrations. Important oilfields of the world.

Laboratory.—Coal. Micro-petrological examination of various types of coal, microspore correlation; determination of moisture, ash fusion point, etc.; proximate analysis and classification.

Petroleum. Correlation by micropalaeontological and sedimentary petrological methods; interpretation of logging data; preparation and interpretation of subsurface maps, isopach and convergence maps.

Field Work.—Visits to mining centres and engineering works.

7.553 Geology.

A course for students in Mining Engineering.

(*a*) *Petrology, Crystallography and Mineralogy.*

Physical, chemical and optical properties of the chief rock-forming mineral groups; elementary crystallography; detailed study of the origin and nature of igneous, sedimentary and metamorphic rock types.

(*b*) *Stratigraphy and Palaeontology.*

Principles of stratigraphy; elementary palaeontology, use and value of fossils; Australian geology (special emphasis on New South Wales geology).

(c) *Principles of Ore Deposition.*

Introduction; formation of minerals, importance of underground waters, openings in rocks, metasomatism, form and structure of mineral deposits; syngenetic and epigenetic deposits; structural control of ore deposition, ore shoots; classification of mineral deposits; alteration of ore deposits near the surface.

Laboratory.—Examination of hand specimens of rocks; elementary crystallography; microscopic examination of the principal igneous, sedimentary and metamorphic rocks; macroscopic study of important ore minerals; interpretation and preparation of geological maps and sections.

Field Work.—A minimum of six days to be spent in the field.

7.554 GEOLOGY.

Geology of non-metallic substances, including structual and building materials, refractories, abrasives, ceramic materials, etc.; groundwater supplies.

Photogeology and its applications; methods of geological and geophysical exploration; geology of foundation sites, cuttings and embankments.

Geology of Coal and Petroleum.—General considerations; details of occurrence, macroscopic and microscopic features, chemical and physical properties, classification, origin and review of Australian coal occurrences; occurrences in other countries in the world.

Metalliferous Geology.—Textures of the ore minerals and their significance.

Detailed study of a number of Australian and overseas mineral deposits, including origin, structure, paragenesis, mineral content and distribution, etc. Metallogenetic epochs.

Australian and overseas resources of industrial and rare materials.

The search for minerals.

Laboratory.—Examination of industrial materials such as refractories, abrasives, road metals, etc.; determination of ores by blowpipe tests; mineragraphy; macroscopic and microscopic examinations of coal. Advanced mapping and its application to economic problems; photogeology.

Field Work—A minimum of six days will be spent in the field during the year. Students will be instructed in the methods of geological and geophysical surveying.

7.583 AND 7.583D ENGINEERING GEOLOGY.

A course of one term in Civil Engineering on the application of geological principles to typical engineering problems, and covering the following topics:

Geological Exploratory Work.—Type of work, relationship between geologist and civil engineer, nature of problems to be faced. Preliminary and detailed investigations, underground investigations, reports.

Geophysical Exploration.—Introductory treatment of scope and methods of applied geophysics—magnetic, electrical, seismic and gravimetric methods—applicability to civil engineering problems.

Structural Features of Rocks.—Bedding, cleavage, schistosity, joints, cracks, folds, faults, etc., their effect on quarrying, tunnelling and construction operations.

Dam Sites and Reservoirs.—Relationship to geological features, both of rock type and structures, foundation testing, spillway problems.

River Engineering.—General problems, protection from flooding, development and control of bars, maintenance of navigable channel, bank erosion and protection.

Geological Aspects of Foundation Engineering.—Testing, stability of slopes, effects of erosion, control measures.

Underground and Artesian Waters.—Porosity, permeability, movement, development, importance in engineering operations.

Geology and Petrology of Materials.—Road aggregates, clays, cements, etc.

Field Work—A total of at least four days to be spent in the field during the year.

GEOLOGY I (GENERAL SCIENCE).

This subject covers the following topics (divided into Part I and Part II for the part-time course):—

Part I.

General Geology.

Introduction, the scope and applications of geology; cosmology and structure of the earth; agents of denudation, weathering, river action, glaciology, wind action, the sea and its action, lakes; underground water, diastrophism, vulcanism and earthquakes; igneous sedimentary and metamorphic rocks, coal and petroleum, introductory stratigraphy and historical geology.

Practical.—Examination and identification of common minerals and rocks in hand specimen; interpretation and preparation of geological maps and sections.

Field Work.—Six excursions to be held on Saturdays during the year.

Part II.

Crystallography and Mineralogy I.

Fundamental laws of crystallography; symmetry elements, and symmetry operations; crystal systems and classes; Miller indices and other systems of notation; crystal goniometry. Stereographic and gnomonic projection of crystals. Examples of the more common crystal classes. Regular and irregular attachment of crystals, twinning, etc., crystal growth and its anomalies.

Fundamentals of the atomic structure of crystals; the Bravais lattices point groups and space groups, introduction to X-ray analysis of crystals. Examples of atomic structures of some common minerals.

Physical properties of crystals: cleavage, gliding, secondary twinning. Hardness, specific gravity of crystals and the methods for their accurate determination. Fundamentals of crystal optics in polarised light. The Fresnel and index ellipsoids. Division of crystals on the basis of their optical properties. Colours of crystals; electrical and magnetic properties of crystals.

Chemical composition and classification of minerals; descriptive mineralogy of common minerals.

Practical.

Crystallography.—Examination of crystals and crystal models for symmetry; perspective drawing of crystal models. Measurement of crystal angles by the contact goniometer, demonstration of the one-circle and two-circle goniometer; stereographic projection of crystals.

Optical Mineralogy.—Examination of crystals and crystal fragments by means of the polarising microscope in plane polarised light. Determination of the extinction angle; determination of the refractive indices of crystals by means of the immersion method. Examination of crystals in convergent polarised light.

Descriptive and Determinative Mineralogy.—Macroscopic examination and determination of common mineral groups including simple physical, optical, chemical and blowpipe methods.

GEOLOGY II (GENERAL SCIENCE).

This course of approximately 136 lectures and associated practical work consists of a treatment of the following subjects:

Petrology, Crystallography and Mineralogy II, Stratigraphy and Palaeontology I, Structural Geology, and two subjects chosen from Submarine Geology, Engineering Geology, and Agricultural Geology.

Part I.

Petrology.

Forms and structures of igneous rocks; physical chemistry of rock forming minerals; consolidation of magmas; variation in igneous rocks; classification of igneous rocks; petrographic methods; alkaline rocks and their origin; petrographic provinces; ultramafic rocks; origin and mode of emplacement of bathyliths.

Thermal, regional and plutonic metamorphism; facies concept in metamorphism; metasomatism.

Composition and classification of sedimentary rocks; sedimentary environments; physical properties of sedimentary rocks; facies concept in sedimentation; tectonism and sedimentation; palaeogeographic mapping.

Laboratory.—Microscopic examination of minerals and rocks. Introduction to petrographic methods.

Crystallography and Mineralogy II.

Synopsis of the thirty-two crystal classes including classes less commonly represented by minerals. Conventional and alternative orientation of crystals. Zones and zone axes, Weiss' zone law. Representation of zones and crystal forms (general and special) by stereographic and gnomonic projections. Principles of crystal drawing from projections. Crystallographic calculations; methods of calculating axis ratios. Crystal twinning as based on atomic structure.

Crystal Structure.—Bravais lattices and unit cells. Point groups and space groups. Methods of X-ray investigation of crystal structures by Laue diffraction, powder method and their main modifications. Selected examples of crystal structures of minerals and artificial compounds.

Physical Properties of Crystals as Related to Atomic Structure.—Cleavage, twinning, gliding. Crystals as conductors of heat, electricity. Piezoelectricity of crystals.

Chemical Crystallography.—Relation between chemical composition and crystal structure. Isomorphism. Dimorphism, polymorphism; pseudomorphism. Parallel growth. Modes of mineral formation; mineral synthesis.

Optical Mineralogy.—Selected examples of advanced crystal optics. Relation between optical and geometrical symmetry of crystals. Structural and compositional colouring of minerals; luminescence, phosphorescence. Introduction to the microscopic investigation of opaque minerals in reflected polarised light (mineragraphy).

Descriptive and Determinative Mineralogy.—Descriptive mineralogy of less common mineral groups, including radioactive minerals, minerals of rare elements, etc. Principles of mineral determination; the determination of less common minerals by a combination of various advanced methods.

Practical.

Crystallography.—Crystallographical calculations; crystal drawing from stereographic and gnomonic projections. Measurement of interfacial angles of crystals by means of the one-circle and two-circle goniometer.

Crystal Structure.—Examples of X-ray analysis of crystals; identification of crystalline substances by means of the powder method; indexing of X-ray powder photographs.

Crystal Optics.—Selected problems of crystal optics: precision measurement of the refractive indices of crystals; measurement of the optic axial angle in convergent polarised light.

Descriptive Mineralogy.—Examination of less common minerals by macroscopic methods as well as optical, chemical and blowpipe methods. Mineragraphic determination of common opaque minerals.

Part II.

Stratigraphy and Palaeontology I.

Stratigraphy.—The geological evolution of the Australian Continent from Pre-Cambrian to Recent time.

Palaeontology I.—Introduction to systematic palaeontology. Study of fossil assemblages from important Australian localities.

Laboratory.—Examination and description of representative fossils from the various phyla; examination of rock suites and fossil assemblages from Australian type localities, study of maps of stratigraphically important areas; advanced stratigraphical mapping.

Structural Geology.

A short course of lectures and lecture demonstrations on special topics such as the mechanics of folding; rock failure by rupture; joints; mechanics of faulting; salt domes; granite tectonics; Alpine structures, the Appalacian mountains, the Scottish Highlands and other regions of classical structure.

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Laboratory.—Advanced structural mapping and the solution of structural problems. Interpretation of terrain by photogrammetric methods.

**Submarine Geology.*

Methods of submarine exploration; topography and sediments of the continental shelves; topography and sediments of the continental slopes; submarine canyons; the floor of the deep oceans; true oceans; submerged continents.

Laboratory.—Study of bathymetric charts. Examination of suboceanic sediments.

**Engineering Geology.*

The relation between geology and engineering practice; geological aspects of quarrying and tunnelling; foundation sites; dam sites; rock creep and landslides; rivers and harbours; building stones, road materials and railway ballast.

Laboratory.—Petrological examination of building stones, road materials, concretes, etc. Study of geological engineering "case histories".

**Agricultural Geology.*

The relation between topography and pastoral and agricultural activities. Rock types and soil types. Determination of trace elements and heavy mineral contents of soils. Mineral manures. Porosity and permeability of soils and rocks. Soil erosion and its control.

Laboratory.—Mechanical analysis of soils; porosity and permeability and porosity tests; base exchange capacity in soils; pH determination, organic matter, available nutrients and moisture determinations.

Geology III (General Science).

The subjects which constitute this course of approximately 170 lectures and associated practical work are as follow:—

Palaeontology II, Advanced Mineralogy and Petrology, Geology of Fuels, Economic and Mining Geology, Geophysics and Geotectonics, and an elective.

Part I.

Palaeontology II.

Systematic classification of the various phyla and detailed study of the various sub-divisions of the phyla. Species and introspecific cate-

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*Two subjects to be chosen from Submarine Geology, Engineering Geology and Agricultural Geology.

gories; phylogeny and ontogeny, evolutionary trends and the theories of evolution. Palaeontological environments and their relations to sedimentology; ecology. Statistical methods in palaeontology.

Laboratory.—Examination and description of a wide range of fossil animals (including vertebrates) and plants. Laboratory techniques in palaeontology. Comparative studies of species and sub-species; study of morphological variations through time.

Advanced Mineralogy and Petrology.

This course will be devoted to a study of current problems in mineralogy and petrology on an advanced level. Outline of the methods of qualitative microchemical analysis of minerals.

Laboratory.—Instruction in the use of the universal stage; advanced petrographic methods; introduction to the study of petrofabrics; differential thermal analysis and its application.

Geology of Fuels.

Coal.—Review of the structural features associated with coal seams; detailed treatment of the physical and chemical properties, microscopic features, metamorphic evolution, utilization and classification; review of Australian occurrences; important overseas coalfields, coal derivatives.

Petroleum.—Detailed treatment of the origin and occurrence, stratigraphic and structural features of oilfields; subsurface laboratory methods, micropalaeontological analysis, detrital mineralogy, X-ray diffraction differential thermal analysis, water analysis, core analysis, fluoranalysis, etc.; subsurface logging methods—cable-tool samples, electrical, radioactive well logging, temperature logging, drilling-mud and cuttings analysis, drilling-time logging and other specialist techniques; details of drilling methods.

Secondary recovery of petroleum, subsurface maps and illustrations. Important oilfields of the world.

Laboratory.—Coal. Micro-petrological examination of various types of coal, microspore correlation; determination of moisture, ash fusion, point, etc.; proximate analysis and classification.

Petroleum. Correlation by micropalaeontological and sedimentary petrological methods; interpretation of logging data; preparation and interpretation of subsurface maps, isopach and convergence maps.

Field Work.—Visits to mining centres and engineering works.

Part II.

Economic and Mining Geology.

Origin of primary ores—magmatic, neomagmatic and geosynclinal origin, ore deposits related to the cooling history of an orthomagma.

Regional and local structural controls. Wall rock alteration. Magmatic segregations and disseminations, pegmatites, hydrothermal veins and lodes, pyrometasomatic deposits. The physical chemistry of ionic migration and its application to ore deposition. Post-mineralization changes within an ore-body.

Gemstones—nature and occurrence.

Clays and refractories—brief treatment of mineralogical and physical constitution; uses and occurrences.

Laboratory.—Macroscopic and microscopic study of various ores. Study of small-scale structures associated with ore bodies. Examination and identification of gems and gemstones.

Geophysics and Geotectonics.

Methods of geophysical prospecting—gravimetric, seismic, magnetic, electrical, radiometric. Modern ideas on the structure and internal constitution of the earth. The earth's thermal history. Theories of diastrophism. Palaeomagnetism. Determination of the age of the earth. The physical properties of rocks.

Laboratory.—Instruction in the use of the various geophysical instruments, plotting and interpretation of geophysical data. Testing the physical properties of rocks.

Civil Engineering.

Subjects 8.01 to 8.94.

8.11 AND 8.11D ENGINEERING MECHANICS.

Graph drawing, graphs of two variables, use of functional graph paper, graphs of three variables. Graphical differentiation and integration. Simple machines, velocity, ratio, mechanical advantage, efficiency, etc. Graphical statics, solution of simple framed structures by graphical and analytical methods. Introduction to the concepts of shear force, bending moment, axial force.

8.112 AND 8.112D THEORY OF STRUCTURES.

Stress, strain, elasticity. Riveted and welded joints, thin shells. Compound stresses. Bending moment and shear force. Theory of bending of beams, bending stresses, shear stresses; deflection of beams. Torsion, springs. Combined bending and twisting, combined bending and direct stress. Strain energy, resilience, impact loads.

8.113 AND 8.113D STRUCTURES.

Influence Lines.—For statically determinate structures including three-hinged arch.

Three-moment Equations.—Applied to beams with non-deflecting supports. Indication of how the equations may be extended to continuous beams on deflecting supports.

Strain Energy.—Strain energy methods used for the solution of one-fold statically indeterminate rigid frame and pin-jointed truss problems. Determination of deflection using unit load method and Castigliano's Theorem. Use of Williot Mohr diagrams for deflections of trusses.

Plate Web Girder Design.—Design of plate web girders and crane runway girders—flanges, web, stiffeners, splices, etc.

Reinforced Concrete.—Simple reinforced beams and slabs Tee-beam design. Doubly reinforced beams. Axially loaded columns. Eccentrically loaded columns. Circular columns. Column roofings.

Drawing Office.—

1. Problems on statically determinate beams, trusses, three-hinged arched frames and three-hinged arch trusses.
2. Problems on three-moment equations.
3. Complete design of a plate web girder, either riveted or welded.
4. Complete design of a reinforced concrete warehouse floor, including slab; two-span continuous beam, an edge tee-beam and axially loaded column.

8.114 Structures.

(*a*) Tension coefficients. Space frames. Relaxation methods and analysis of indeterminate structures. Elementary treatment of arches. Experimental model analysis. Moment distribution methods.

(*b*) Design of retaining walls, weirs, small dams, timber design, strength, joints, beams and joists, columns and struts. Reinforced concrete columns. Plastic theories applied to reinforced concrete. Prestressed concrete design. Limit design of continuous beams.

(*c*) Associated drawing office work..

8.122 Structures.

Riveting design of all types of joints. Welding design of all types of joints. Tension member design—both centrally and eccentrically loaded. Compression member design—both centrally and eccentrically loaded. Beam design—including design of built up standard rolled steel sections. Plate web girder. Roof truss and bent design.

Drawing Office.—

1. Each student designs a complete riveted roof bent.

2. Each student designs a complete welded frame consisting of one battened column.
3. Each student designs a complete welded frame consisting of one latticed column.
4. Each student designs a complete welded frame consisting of one plated R.S.J. beam.
5. Calculation of elements of plate web girder.

8.123 AND 8.123D STRUCTURES (THEORY AND DESIGN).

For students in Mechanical Engineering.

(*a*) Influence lines for statically determinate beams and trusses. Impact maximum moments and shears. Continuous beams. Three-moment theorem and applications.

(*b*) Design of steel structures—columns with bracket loads, plate web girders, mill buildings, steel-frame buildings.

(*c*) Associated drawing office work.

8.124 STRUCTURES.

For students in Architecture.

Revision of fundamental theory, including proofs where these were previously omitted. Bending of beams. Relationship between load intensity, S.F. and B.M. Distribution of bending stresses and shear stresses with proof of formulae. Curves of maximum B.M.

Slope and deflection of beams. Application to fixed-ended beams. Moment-area methods. Myosotis method. Continuous beams. Theorem of three-moments.

Unsymmetrical Bending.—Bending in a plane inclined to the principal axes of the cross-section. Angles used as beams. Conditions of freedom from twist.

Complex Stresses.—Principal stresses. Mohr's stress circle.

Theory of Columns.—Columns with lateral loads in addition to direct thrust.

Strain Energy.—Due to axial force, bending moment, etc. Trussed beams.

Framed Structures.—Analysis of frames with one redundant member. Deflection of trusses. Design of riveted and welded joints; tension joints, beam to column connections, etc. Features and design of plate girders.

Drawing Office Work.—Design of plate girder. Design of column with lateral loading. Design of timber trestle subjected to wind load.

8.125 Structural Design.

For students in Architecture.

Statically indeterminate structures. Analysis by strain energy methods.

Analysis of rigid frames by moment distribution. Further reinforced concrete design; simple beams, double-reinforced beams, T-beams. Continuous slabs. Pigeaud's method. Axially loaded columns and columns with bending and compression. Circular columns. Column footings.

Design of retaining walls.

Drawing Office Work.—Design of a simple reinforced-concrete building frame.

Design of a continuous floor slab with beam system.

Design of cantilever R.C. retaining wall.

Those students who have pursued the study of structural design up to this stage, will be encouraged to carry this study further by taking part of the Civil Engineering degree course.

It is intended that, apart from the lectures in the engineering course, they should provide full calculations and structural details on one or two of the design projects that they are taking as a part of their Architectural course; this work is marked separately from their work on architectural design and construction. Alternatively, in addition to the lectures they may provide a thesis on some matter of structural design in steel or reinforced concrete, or building research.

8.132 Materials and Structures.

For students in Chemical Engineering.

This course runs for two terms at three hours per week, and consists of one term of fundamental work, and one term on materials technology and practice. The early sections of the theoretical work will be treated in detail, but with the more advanced work emphasis will be placed on applications rather than derivations.

Fundamental Work.

Stress-strain theories for thin and thick cylinders, particularly in the creep range for the latter. Dished heads of all types, internal and external pressures. Welded joints.

Bending moment and shear force in cantilevers and beams; eccentric loading; three moment theorem applied to supports.

Torsion of circular and tubular shafts, combined torsion and bending; power transmission (multiplane graphical solution). Stresses and deflections of close-coiled springs. Simple strut theory.

Materials Technology.

Principles of engineering laboratory practice, precision of measurements, error calculations. The testing of materials, use of standard specifications, behaviour of common engineering materials when subjected to tension, compression, shear, torsion, impact, hardness, fatigue, and creep conditions. Non-destructive test techniques and the efficient utilisation of materials is discussed.

Laboratory work includes tension, compression, hardness, and impact test with metals, also experiments on flexure, torsion and creep.

8.22 Materials of Construction.

A materials technology course for students in Architecture.

Section 1. *General Materials Technology.* (48 *hours*).

This section consists of 15 hours of lecture work and 33 hours of laboratory work as follows:—

Principles of engineering laboratory practice, introduction to the precision of measurements and the calculator of errors. The behaviour of constructional materials is considered, with special emphasis on standard tests and material characteristics in tension, compression, shear, impact, hardness, fatigue, and creep. Some non-destructive test methods will be given, with special mention of their application to building practice. Efficient utilisation of materials with reference to durability, appearance and economy.

Laboratory work will consist of tension behaviour of common metals, compression, behaviour of common timbers, shear, impact, and cleavage tests on these timbers, compression and bending tests on clay bricks, tiles, etc., demonstration of other experimental and testing techniques.

Section 2. *Concrete Technology.* (28 *hours.*)

This section consists of 8 hours of lectures and 20 hours of laboratory work serving as an introduction to Concrete Technology, as follows:

Principal types of cements, their properties and simple testing; cement handling and storage. Concrete aggregates, characteristics, grading, and testing. Admixtures. Factors affecting concrete properties. Basic concrete mix requirements and mix design methods. The manufacture of concrete and job control.

Laboratory work includes the testing of cement, aggregate, and concrete, and the examination of concrete mix design techniques, workability, yield, and air entrainment.

8.23 and 8.23d Materials of Construction.

Concrete.—Materials used in modern concretes; manufacture, physical and chemical properties of cements; production, testing, and selection of aggregates; pozzolans; admixtures. Strength, durability, workability, elastic and other properties of concretes. The design and proportioning of mixes. Manufacture and field control, mixing, transporting, placing, curing, formwork, testing. Special types of mortars, concretes, and special techniques.

Timber.—Types, properties and structure of timber. Defects, tests, and selection of structural timber. Attack and preservation. Manufactured units.

Steel.—Brief summary of manufacture, testing, selection, and tolerances of structural grades.

Aluminium.—Brief summary of manufacture, properties and use of structural aluminium and aluminium alloys.

Building Stone and Structural Clay Products.—Production, types, application to engineering construction.

8.33 Engineering Computations.

The emphasis in this course is placed on the actual solution of engineering problems rather than on the mathematical aspects, and the latter is given only in so far as is necessary to the carrying out of the work. The following topics will be treated:

Construction of intercept charts for three or more variables. Construction of nomographic charts by use of determinants. Curve fitting by method of least squares. Solution of algebraic and transcendental equations by simple iteration methods—horizontal iteration, Newton—Raphson method. Brief introduction of Matrices—multiplication, inversion. Solution of linear simultaneous equations—(a) by Cholesky (Crout) method (b) by relaxation. Introduction to finite differences—the difference table, mention of control differences, forward and backward differences, correlation between finite differences and infinitesimal derivatives. The difference equation. Solution of differential equations and partial differential equations. Relaxation methods applied to solution of problems involving differential equations such as Poisson's Equation using the previous work.

Student work is essential, and about half the total course consists of tutorials. The tutorial work includes problems which require electrical desk calculators for their solution.

8.42 Land Surveying.

The principles of the theodolite and dummy-level; use of level in taking longitudinal and cross-sectional profiles and in setting out

works for construction; simple applications of the use of the theodolite in building construction work; simple traverses; setting out; contouring on a grid; simple earth-work problems.

8.43 AND 8.43D SURVEYING.

Chaining; instruments and their use; basic survey methods and principles; tacheometers and tacheometry; procedure for azimuth determination by extra-meridian sun observation; barometric instruments and surveys; barometric survey methods; plane tabling; estimation of errors; areas and volumes; setting out works; legal aspects.

Survey Camp of one week's duration (attendance is compulsory for third year Civil Engineering and Mining Engineering students, second year Applied Geology students). In the case of the fourth year Mechanical Engineering students, attendance at this camp is optional, unless the student desires to gain a credit or distinction pass.

8.44 AND 8.44D SURVEYING.

Instruments—modern developments; theory of errors and adjustments; precise surveys; elements of geodesyl mine surveying; aerial surveying and photogrammetry; elementary field astronomy; computations; elements of map projections; engineering applications of surveying.

Survey Camp of one week's duration (compulsory for fourth year Civil Engineering and Mining Engineering students).

8.53 FLUID MECHANICS.

Properties of fluids. Fluid statics. Ideal fluid flow. Orifices and weirs. Viscous fluid flow. Laminar and turbulent flow. Surface and form resistance. Dimensional analysis. Scale models. Pipes and pipe systems. Uniform flow in open channels. Hydraulic machines.

8.54 APPLIED HYDRAULICS.

Non-uniform flow in open channels, channel transitions, hydraulic jump, waves, surges. Discharge measurements.

Potential flow, application to hydraulic structures. Weirs, spillways, energy dissipation.

Pipe flow, networks; unsteady flow, surge, water hammer. Sedimentation.

8.63 CIVIL ENGINEERING.

(A) *Engineering Construction.*

Construction plant and equipment. Compressed air. Tunnelling. Explosives. Excavations, piling, coffer dams, caissons, dams and weirs, foundation piers and abutments, scaffolding, job programming and economy.

(B) *Hydrology.*

Elements of hydrology. Precipitation. The run-off process. Infiltration. Water losses. Determination of available flow. Flood flows. Movement of surface water.

8.64 CIVIL ENGINEERING.

(C) *Public Health Engineering.*

Elements of biology and bio-chemistry, decomposition. Basic Public Health treatment processes (mechanical, physical, chemical, biological, hydraulic). Sedimentation. Sterilisation, filtration. Measure of pollution.

Practical application of basic processes to design and operation of treatment works. Planning and construction of water supply and sewerage schemes. Refuse disposal and treatment. Swimming pools. Minor Public Health Engineering problems.

(D) *Road Engineering.*

Elements of road design. Factors affecting design. Economics. Drainage. Road pavements, concrete, bituminous and non-bituminous. Road bridges and ferries. Subsidiary works and facilities. Elements of aerodrome design and construction.

(E) *Railway Engineering.*

Main features of railway engineering. Economics and special features of layout. Permanent way, ballasting of track, sleepers, rails, rail fastenings, points and crossings. Signalling. Special structures. Rolling stock.

(F) *Harbours and Rivers Engineering.*

Natural and artificial harbours. Training of river estuaries by groynes, training walls, breakwaters, etc. Effect of tides, wave action. Docks, wharves, slipways. Road and rail access. Construction plant, dredging. Sea-bed exploration. Hydrographic surveying.

(G) *Irrigation Engineering.*

Natural and artificial irrigation. Soil deterioration and prevention. Water requirements. Sources of water. Methods of application to land. Investigation and design of irrigation system.

Special structures and appurtenances. Water metering. Operation and maintenance of system.

(H) *Hydro-electric Engineering.*

Associated works and equipment. Preliminary surveys and investigation. Economic factors. Water available, drought characteristics, storage regulation. Emergency precautions, maintenance.

(I) *Engineering Administration.*

General conditions of contract, principles to be observed in drawing up contract documents including specifications, with practical assignments. Quantity surveying applied to civil engineering works, practical assignments in taking out quantities and preparing estimates. Costing systems, cost statements, economics of projects, sinking funds, capitalised cost, depreciation.

(J) *Engineering Construction.*

Advanced earthworks methods, tunnel mechanisation, major bridge foundations, reinforced concrete and pre-stressed concrete construction, steel fabrication and erection, rival and coastal control works, works organisation, major project planning. Soil exploration, stability problems in soils, soils stabilisation, moisture movement in subgrades.

8.73H Soil Mechanics and Hydrology.

Physical and mechanical properties affecting soil action in engineering problems; coefficient of permeability, capillarity and compressibility and their application in practical problems relative to seepage, uplift, liquefaction and the settlement of buildings located above buried compressible soil strata; shearing strength and bearing capacity and their application to engineering problems.

8.72H Soil Mechanics and Hydrology.

Soil Mechanics.—Physical and mechanical properties affecting soil action in engineering problems; coefficient of permeability, capillarity and compressibility and their application in practical problems relative to seepage, uplift, liquefaction and the settlement of buildings located above buried compressible soil strata.

Hydrology.—Elements of meteorology and climatology, analysis of precipitation for engineering purposes, soil physics, the run-off process, interception, infiltration, evapotranspiration, estimations of future floods, long-term yield of surface streams, application of hydrologic principles to civil engineering projects with special reference to Australian conditions.

8.84 Town and Country Planning.

Principles of regional and town planning. Inter-relationship of various civil engineering and planning problems. Evolution of the modern town and city and relationships of architecture and engineering to problems of development and civic design. Street systems. Transportation. Public buildings and utilities. Parks and playgrounds. Housing. Zoning. Methods of financing city improvements.

8.92 AND 8.92D PROPERTIES OF MATERIALS.

The lecture work deals with the principles of engineering laboratory practice, types of testing machine used, precision of measurement, introduction to the theory of errors, and calculation of maximum errors. The load-deformation behaviour of engineering materials is considered, particularly with regard to the results of tension, compression, shear, impact, hardness, fatigue, and creep tests.

Laboratory work includes tension, compression, hardness, and impact tests with metals, and experiments on flexure and torsion.

8.92B PROPERTIES OF MATERIALS.

A course for students in Electrical Engineering.

The lecture work deals with the calculation of maximum errors, and precision of measurement. The load-deformation behaviour of engineering materials is considered, particularly with regard to results of tension, compression, shear, impact, hardness, fatigue, and creep tests. Mention is made of radiographic, sonic, ultrasonic, magnetic and electrical testing techniques.

Laboratory work includes tension and hardness tests with metals, and experiment of flexure, torsion or overstraining of wires.

8.92C PROPERTIES OF MATERIALS.

A course for students in Metallurgy.

This course has been designed as a complete course in materials technology and the mechanics of materials. The lecture work is as follows:—

(a) Principles of material laboratory practice, types of testing machines used and their characteristics. Precision of measurements, and introduction to the theory of errors, calculation of maximum and standard errors. The stress-strain behaviour of metals and alloys is considered with special reference to the results of standard tests in tension, compression, hardness, micro-hardness, impact, shear, torsion, creep and fatigue. Non-destructive test techniques. Theories of failure, inelasticity, plasticity lost.

(b) Mechanics and Materials. Stress, strain and elasticity. Bending moments, axial and shear forces. Theory of bending of beams, bending and shear stresses. Torsion—combined stresses, complex stress arrangements, principal stresses and strain. Strain energy, resilience, impact loads. Laboratory work includes tension, compression, hardness, impact, torsion and bending tests; also investigations in over-straining and inelastic behaviour, creep and fatigue.

8.94 AND 8.94D PROPERTIES OF MATERIALS.

Detailed treatment of material properties and uses; elastic and inelastic behaviour; methods of failure and various theories related therewith; design factors; non-destructive test procedures; experimental stress-analysis methods.

Laboratory work includes tests on timbers and wires, creep experiments and work with wire resistance strain gauges.

PROFESSIONAL ELECTIVES.

Two elective subjects are to be selected from the chosen "Option".

OPTION 1. CIVIL ENGINEERING DESIGN.

(*a*) *Theory and Design of Structures.*

Study of design aspects of civil engineering by further work on influence lines for statiscally indeterminate structure, relaxation theories and the mathematical theory of elasticity together with topics such as arches, columns, prestressed concrete, column analogy, limit design of steel structures and model analysis.

(*b*) *Soil Mechanics and Foundation Engineering.*

Advanced studies of theoretical and applied sections of soil mechanics, including foundations, mass soil behaviour, tunnels and arching, stability of slopes, earth dams, soil testing and stabilisation work.

(*c*) *Hydrology.*

Further studies of a selection of topics such as catchment characteristics, infiltration, sediment transportation by streams, river flow and flood routing. Flood flow estimation, long term water-supply yield.

(*d*) *Hydraulics.*

Further work in hydrodynamics; the theory and practical applications of hydraulic models; sediment transportation; miscellaneous advanced topics, as time permits.

(*e*) *Advanced Mathematics.*

Students whose interests are along the lines of advanced mathematics may study application of such work to specialised engineering problems.

(*f*) *Modern Foreign Language.*

Students with a leaning towards modern foreign languages may elect to master a language and review recent engineering literature of the country concerned.

OPTION 2. CIVIL ENGINEERING CONSTRUCTION AND ADMINISTRATION.

This option is for the student intending to work mainly upon construction work, local government work, and in similar spheres where general supervision of a field organisation is an important factor. Appropriate subjects are:—

(*a*) *Construction Equipment and Methods.*

Analysis of construction procedure and selection and use of equipment for various tasks. Cost estimating, job planning, production capacity, operating costs for different equipment, scheduling of materials and methods applicable to specific kinds of construction.

(*b*) *Geology.*

Further study of Australian geology and its relation to construction tasks. Structural geology and interpretation of further work in petrology and study of the application of such topics to civil engineering. Geological mapping. Photographic geology, introductory treatment of geophysics. Study of typical geological investigations for dam sites, etc. Preparation of geological reports. Field work in geological surveying and the mapping of a small area.

(*c*) *Management.*

Purposes of management. Leadership. Personnel control. Applications to construction. Management in practice. Financial aspects. Sales engineering.

(*d*) *Road Engineering.*

Fundamental principles of road engineering. Detailed study of design and construction practice for various types of traffic and other conditions. Maintenance techniques.

(*e*) *Public Health Engineering.*

Review of fundamentals of public health engineering—followed by relatively detailed and comprehensive study of the application of such principles to design, construction and operation of water supply and sewerage system, treatment work, etc., with special reference to modern developments. Review of associated work such as refuse disposal, industrial hygiene, etc.

OPTION 3. SURVEYS AND INVESTIGATIONS.

(*a*) *Astronomy and Geodesy.*

Fundamentals of geodesy and astronomy and a study of the application of these sciences to national projects.

(*b*) *Topographical and Aerial Surveying and Photogrammetry.*

A specialised study of all aspects of topographical surveying and its application to major civil engineering projects.

Study of terrestrial and aerial photographic surveying and the theory of photogrammetry. Use and principles of stereoscopic mapping instruments.

Specifications for aerial photography.

Application of aerial photography to civil engineering projects and geology.

(*c*) *Soil Mechanics.*

See section (*b*) of Civil Engineering Design Option.

(*d*) *Hydrology.*

See Section (*c*) of Civil Engineering Design Option.

(*e*) *Hydraulics.*

See Section (*d*) of Civil Engineering Design Option.

(*f*) *Geology.*

See Section (*b*) of Civil Engineering Construction Option.

OPTION 4. MATERIALS.

(*a*) *Soil Mechanics.*

See Section (*b*) of Civil Engineering Design Option.

(*b*) *Concrete Technology.*

Further studies in basis behaviour of concrete materials. Introductory cement chemistry and micromeritics, testing and characteristics of additive and replacement compounds. Aggregate gradings, workability, mix design methods.

The physical behaviour of set concretes, including elastic properties, creep and introductory rheology, durability, permeability, failure theories, etc. Concrete control and special techniques.

(*c*) *Advanced Mechanics of Materials.*

Theories of elasticity and plasticity. Investigation of failure theories. Complex stress failure. The structure of matter as related to stress distribution. Structural theories of deformation. Inelastic behaviour. Selected experimental work in the materials field. Description of strain gauges and significance of test results.

(*d*) *Photoelasticity and Experimental Stress Analysis.**

The theory and practice of two dimensional photoelasticity, including appropriate investigations with simple models. Structural similitude, analogies. The wire resistance strain gauge. Static and dynamic strain gauge circuits. Selected experimental investigations to illustrate the subject matter.

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*This combination constitutes a double elective. Certain lectures in subject (c) are also required.

(*e*) *Advanced Mathematics.*

To be arranged to suit advanced study of materials behaviour.

(*f*) *Modern Foreign Language.*

See Section (*f*) of Civil Engineering Design Option.

Wool Technology.

Subjects 9.01 to 9.94.

9.104 Nutrition.

Composition of the animal body. Composition and classification of foodstuffs and pastures. Digestion, absorption and metabolism of carbohydrates, proteins, fats, minerals and vitamins. Digestibility of foodstuffs. Nutrient and energy balances and requirements of livestock. Feeding standards and the quantitative application of nutritional data with particular reference to Australian conditions. Fodder conservation, pasture improvement (strains and ecotypes, top-dressing, pasture management and rotational grazing). Hay, silage. Supplementary feeding—grain, hay, crops and cropping. Rates of stocking. While particular emphasis will be given to nutritional requirements of sheep, those of other farm livestock will be dealt with in this section.

9.114 Farm Livestock.

A study of the breeding, feeding, management and most common sources of loss in livestock, other than sheep, of importance to the pastoral industry of Australia.

9.12 Sheep Husbandry.

The sheep and its development. Introduction to breeds, classification of breeds. Sheep breeds—descriptions, uses and economic relationships. Sheep judging. Anatomy and physiology of the sheep. Principal sheep areas in the Commonwealth, development of the sheep and wool industry, and its place in the economic life of Australia. Natural conditions governing sheep farming and stratification of the industry. Calendar of operations on a sheep property—classing of ewes and rams; culling; mating; crutching and wigging; lambing; dockings, markings and castration; branding; shearing; weaning; drenching; mulesing, etc.; dipping; shepherding. Purchase and care of rams. Care and management of the breeding ewe. Hogget rearing. Principal sources of loss, and their control.

9.124 Farm Management and Mechanisation.

Business and practice of farming on various types of holding. Conditions governing class of farming in a district. Bookkeeping and valuation. Purchase and running of properties. Budgets. Economics of farm management. Inspection visits and comparative compilation of detailed reports of properties inspected or visited during practical work. Farm buildings, dips and yards. Tractors and modern developments, use and influence in farming organisation implements. Pumps and sprays. Electricity on the farm—motors, lighting plants. Engines and power transmission—care and maintenance. Shearing machinery—installation and servicing. Experting. Elementary plumbing and draining.

9.13 Sheep Husbandry.

(*a*) *Sheep Production.*—Crossbreeding. Fat lamb production. Stud breeding—record keeping. Factors affecting sheep and wool production—pasture improvement, fodder conservation, supplementary and drought feeding. Elementary marketing. Principles of animal production—reproduction and fertility, milk secretion, growth and development, elementary nutrition, elementary breeding. Sheep products—preparation for market and quality concepts (skins, mutton and lamb).

(*b*) *Sheep Health.*—Sheep husbandry in relation to diseases. The Stock Diseases Act. Types of disease, immunity. Bacteriology and pathology: Parasitology—external parasites (lice, mite, foot louse, blowfly—myiasis); internal parasites (worms, fluke and black disease, hydatids). Diseases of the fleece—fleece rot, canary stain, pink rot. Deficiency diseases. Poison plants. Specific diseases—anthrax, balanitis, black leg, cascous lymphadenitis, dystocia, entero-toxaemia, foot rot, foot abscess and scale, mycotic dermatitis, photosensitisation, pregnancy toxaemia and hypo-calcaemia, swelled head, subterranean clover disease, tetanus malignantoedema, toxaemic jaundice, urinary calculi, etc. Veterinary first-aid. Common drugs.

9.134 Accountancy.

Definitions. Principal documents. Theory of double-entry bookkeeping. Classes of accounts. The books of account. Entering and posting. Trial balance. Distinction between capital and revenue. Classes of errors. Bank reconciliation statements. Columnar or tabular recording. Sectional and self-balancing ledgers—control accounts. Petty cash. Bills of exchange and promissory notes. Ascertainment of the cost of goods sold and rate of stock turnover. Trading and profit and loss accounts. Balance day adjustments. Balance-sheet. Grouping of balance-sheet items. Classes of assets and liabilities.

9.144 Commercial Law.

Law of contract. Sale of goods. Principal and agent. Bailments. Common carriers. Bill of Sale. Pawn. Hire purchase agreements. Lien. Mortgages. Guarantees. Ships and shipping and sea carriage of goods. Commercial terms.

9.154 Synthetic Fibres.

Study of the origin, identification and use of synthetic fibres used on wool processing machinery.

9.22 Agronomy.

Economic and environmental factors affecting agricultural development and utilisation of land.

Climate.—Rainfall; moisture relationships. Temperature. Light responses. Classification of climate. Homoclimes. Application of climatological data to land utilisation.

Soil.—Soil formation and soil types. Work of the soil surveyor. Requirements of a fertile soil. Physical properties in relation to crop production and land management. The supply of nutrients to plants; organic matter and the biological condition of soil; the nitrogen economy of soils.

Topography.—Effect on climate, soil, erosion rate and utilisation of machinery.

Classification and naming of plants.

Vegetative cover.—Types. Clearing and developmental costs.

Proximity to markets.—Transport of livestock, wool, wheat and perishable products.

Modification of environment.—Irrigation and drainage; electricity supply. Scientific discoveries and developments.

Soil erosion.—Principles of wind and water erosion. Effect of land utilisation. Prevention and control.

Agro-climatological associations in the chief divisions of New South Wales.

Principles of crop production.—Tillage, rotation of crops, fertilisers and manuring. pH of soil and its modification.

Sheep and irrigation agriculture.—Economic combination; prospects for expansion. The place of sheep in wheat belt.

Trees on the farm.—Suitable types for windbreaks and shade; fodder trees; establishment and after-care; direct practical values and incidental advantages.

9.24 Pastoral Agronomy.

Climatic, vegetal, and topographic characteristics of the major agricultural and pastoral divisions of New South Wales, with special reference to suitability for stock raising and mixed farming.

Principles of agrostology. Pasture plants; gramineous, leguminous and other species. Indigenous and exotic types. Advantages and disadvantages of native pasture for the pastoralist. Pasture establishment and management for different regions of New South Wales. Irrigated pastures.

Weeds in relation to the pastoral industry; harmful effects, factors in the control of weeds, methods of combating weeds, weedicides and hormone-type herbicides. Some useful points of weeds.

Principles of crop rotation. Rotations suitable for tablelands and Western areas. Ley farming.

Detailed treatment of crop plants utilised in sheep raising. Fodder conservation; principles; economics of conservation; cereal and meadow hay, silage, grain.

9.33 Economics.

Nature, scope and methods of economics. Economic laws and terms Economic systems. Price and marketing—controlled marketing. Price control. Supply and demand. International trade and theory of comparative costs; balance of trade; tariffs and trade policies. National income. Foreign payments. The state and national income. Index numbers.

Economics of the wool industry:

(*a*) Production—the key importance of the wool industry in the Australian economy; climatic and other physical controls over the wool industry; trends in breeding—crossbreds and fat lambs; the long-term trend of production; the importance of research; the problem of drought; water and fodder conservation; the nature of costs.

(*b*) Demand—the nature and direction of demand; the dependence of the wool market on external trade—possibilities of developing the domestic market and the export market.

(*c*) Substitutes—the history and present organisation of wool marketing; BAWRA and J.O.; the attitude of the wool industry to stabilisation programmes.

9.34 Banking, Currency and Foreign Exchange.

Financial institutions (money, banking systems, trading banks). Domestic monetary theory and policy—value of money, factors affecting value of money, effects of changes, inflation and deflation, monetary policy and the national income. Exchange rate theory and

policy—exchange rates and methods of quotation, spot and forward rates, gold standard. Exchange control—international currency and reconstruction, International Monetary Fund and exchange adjustments.

9.42 General Textiles (Yarns).

Brief introduction to the history and structure of the textile industries. Yarn count systems. Textile mathematics relating to yarns. Theories of spinning by draft V. twist and roller-drafting methods. The effect of fibre length, fibre diameter and twist on the properties of yarn. The origin, properties, uses and identification of natural and synthetic textile fibres. Remanufactured fibres, their processing and uses. Twisting processes. The preparation of yarn for fabric manufacture. Sizes and sizing. The production of fancy yarns. Recent developments in yarn manufacturing processes.

At the end of this course the student must present a series of plain and fancy yarns which he has prepared to exemplify the subject matter of the lectures.

9.43 General Textiles (Fabrics).

Felts and non-woven fabrics. Woven fabrics and their production. Introduction to textile design as a preparation for more detailed study later. Mathematics of cloth setting. Simple and compound cloth structure. Methods of ornamenting fabrics, by yarn, colour, weave, colour and weave, colour printing, flock printing and cloth finishing. Complex textiles, including gauzes, pile fabrics, and tapestries. Survey of knitted structures and knitting mechanisms. Standard fabrics and their identification. Scaffolding threads and their applications. The appreciation of good design in textiles. New development in textile manufacture. Textile literature and research associations, their interests and utility.

In this course students must produce a range of hand or power woven fabrics, the construction of which should be based upon the principles of fabric structure discussed during the term. It is most important that the textile student should note changes in the dimensions of these fabrics' weaving state to finishing. Data recorded in this way is of inestimable value in later years as there is no way of making precise calculations of grey particulars from the finished fabrics.

9.44 Yarn Manufacture (Wool).

A functional and detailed study of the machinery used to produce worsted and woollen yarns. The various systems of spinning will be described and the latest developments aimed at economies in production. Consideration will also be given to the structures of the wool textile industry, its research activities and problems. Method

of wool cleaning and drying. Worsted—functional aspects of worsted machinery. Details of worsted carding, preparing, combing and drawing on English, French, and Anglo-Continental systems. Spinning by flyer, cap and ring and later developments. Twisting and fancy yarn manufacture. Woollen—raw materials; the functional aspects and mechanisms of carbonising and blending; carding and ring and mule spinning; remanufactured fibres, their types and sources of supply; grinding, carding and spinning yarn calculation; yarn conditioning and testing; warping and winding; a résumé of problems in the processing of rayon on woollen and worsted machinery.

9.52 Wool.

Place of wool in world trade and in the economic life of Australia. Elementary wool science. Wool quality—fleece defects. Principles of wool processing in relation to preparation of the clip. Wool areas of the Commonwealth. Wool terms. Types. Woolclassing—principles and special clips, responsibilities of the classer. Marketing. Costs to grower, selling procedure. Methods of selling. Fellmongering, scouring and carbonising. Wool research. Wool improvement. Wool publicity.

9.53 Wool.

Preparation of wool, from various types of flocks, for marketing. Recognition of wool types and assessment of wool quality number. Wool pressing and branding. Sorting Merino and Crossbred wool to spinning quality and length. Classing various types of clips—large and small Merino, large and small Crossbred, large and small Tablelands Merino clips, Comeback clips. Special treatment of clips from North-west, Central-west, Riverina and Far-west districts. Wool appraisal in terms of type, quality, number and yield. Wool judging.

9.54 Wool (Wool Store Study).

This subject will consist of practical exercises in the estimation of wool types and their values, using existing trade procedure (A.W.R.C. types). Instruction will cover style grades; burr, seed and dust percentages; washing—carbo, and top and noil yields; skin wools, slipes and scoured wools; wastes and shippers' lines; oddments such as overgrown, dead, black, etc.

9.74 Fibre Science.

Biology of fibre growth—histology, fibre arrangement, morphology and fleece genetics. Fibre physics. Microscopic and sub-microscopic structures. Fine structure investigations. Fibre chemistry. Principles of protein chemistry and special reactions of keratin. Moisture relationships. Carbonising. Finishing processes. Chemistry of skin secretions. Wool wax recovery and utilisation. Wool metrology. Conditioning house procedure.

9.94 GENETICS.

Applied genetics in relation to sheep and other farm livestock. Mendelian theory. Chromosomes and the physical basis of heredity. Mechanisms of crossing over. Genetics of sex differentiation. Sex linkage. Multi-factor inheritance. Principles of statistical genetics. Strength of inheritance. Selection—phenotypic, family lines, progeny test. Relation of genetics to sheep improvement. In-breeding and line breeding.

Mathematics.

Subjects 10.01 to 10.92.

10.11 MATHEMATICS.

Review and extension of matriculation algebra and trigonometry. Determinants, partial fractions, limits, convergence of infinite series, approximations.

The circular, exponential and hyperbolic functions and their inverses. Equations and limits involving these functions.

Derivatives and their applications. Indefinite and definite integrals. Approximation to the numerical value of a definite integral by Simpson's rule.

Quadrature, rectification, determination of volumes, means, moments, centroids and quadratic moments.

Partial derivatives, total differential and applications.

Taylor's and Maclaurin's expansions and their uses.

The co-ordinate geometry of the straight line and of such curves as are of technical importance, using Cartesian and polar systems of reference. Determination of linear laws and reduction of other laws to linear form. Use of logarithmic and other forms of graph paper.

First order differential equations of "variables separable" type and of "exact" type. Second order equations of the type $y'' + ay' + by = 0$.

Introduction to complex algebra.

10.11 MATHEMATICS, PART I AND PART II.

In part-time courses offered in the Faculty of Engineering the subject 10.11 Mathematics is presented in two approximately equal courses over two years, the courses being designated 10.11 Mathematics Part I and 10.11 Mathematics Part II.

10.11B Mathematics.

A special course in statics and dynamics integrated with the work in advanced mechanics and properties of matter which is taken in third term of first year Course I (Applied Physics), Course II (Applied Chemistry), Course III (Chemical Engineering) and Course IV (Metallurgy).

10.11-B Mathematics, Part I and Part II.

In part-time courses offered in the Faculty of Science the subjects 10.11 Mathematics and 10.11B Mathematics are combined and presented in two approximately equal courses over two years, the courses being designated 10.11-B Mathematics Part I and 10.11-B Mathematics Part II.

10.12 Mathematics.

A fuller treatment of Mathematics 10.11 with special reference to functions of more than one variable. Multiple integrals.

The Laplace transform and its use in solving linear differential equations. Solution of differential equations in series. Introduction to partial differential equations.

Revision of work on complex numbers covered in 10.11 De Moivre's theorem, nth roots. Complex circular and hyperbolic functions.

Introduction to three-dimensional co-ordinate geometry. Lines, planes and surfaces.

Vector analysis. Differential calculus of vectors. The vector differential operators. Stokes' theorem and the divergence theorem.

Introduction to Fourier series and harmonic analysis.

The general principles of dynamics and their applications.

10.12 Mathematics, Part I and Part II.

In part-time and conversion courses offered in the Faculty of Engineering the subject 10.12 Mathematics is presented in two approximately equal courses over two years, the courses being designated 10.12 Mathematics Part I and 10.12 Mathematics Part II.

10.13 Mathematics.

A course for students in Applied Physics.

Statistical theory and its application to experimentation. Some special functions relevant to mathematical physics. Matrix algebra.

10.14 Mathematics.

Selected topics in mathematical physics including some of the following: tensors, elasticity, boundary value problems, hydrodynamics, calculus of variations, numerical methods.

10.22 MATHEMATICS.

A course for students in Chemical Engineering.

Functions of two or more variables. Partial derivatives. Multiple integrals, centroids, moments of inertia, centre of pressure. Linear differential equations (solved by conventional and Laplace methods). Partial differential equations.

10.23 MATHEMATICS.

A course for students in Chemical Engineering. Application of partial differential equations to problems in Chemical Engineering fluid mechanics. Theory of complex variable.

10.33 MATHEMATICS.

A course of advanced mathematics for students in Electrical Engineering Courses. Complex variable theory and contour integration inversion theorem. Solution of differential equations met in electrical engineering. Potential theory, electromagnetic theory. Laplace and wave equations.

10.43 MATHEMATICS.

A course in mathematical statistics for Civil Engineers.

Beta and gamma functions—the normal distribution function.

Fundamental statistical ideas (randomness, etc.). Probability and elementary theories relating to it.

Variates and distribution functions (binomial, Poisson, normal, t. χ^2 F, etc.) and applications, largely to hydrological questions.

10.51 MATHEMATICS.

A course for students in Architecture.

Revision and elementary mathematics needed in costing. Revision of algebraic processes.

Plane and solid geometry. Conic sections. Trigonometry.

Co-ordinate geometry: location of points by co-ordinate systems, plane and solid; graphs in Cartesian co-ordinates.

Calculus: differentiation, integration.

Centroids and moments of inertia.

10.91 MATHEMATICS.

A course in mathematics preparing students for work in statistics.

Simple probability theory. Determinants; solution of linear equations. Least squares method of fitting linear forms, and extensions.

Rectangular Cartesian and polar co-ordinate systems, with applications.

Elementary differential and integral calculus, up to and including a treatment of circular, exponential and hyperbolic functions and their inverses. Power series. Numerical solution of equations.

Functions of several variables: partial derivatives and multiple integrals.

10.92 MATHEMATICS.

A course in statistics for Wool Technologists.

Fundamental statistical ideas (randomness, sampling, etc.). The standard elementary distributions: Poisson, binomial, and normal. Sampling distributions derived from the normal distribution (χ^2 t-, and F- distributions) and standard tests based on these. Introduction to experimental designs and their analyses.

MATHEMATICS I (GENERAL SCIENCE).

(Four one-hour lectures and two tutorial hours per week for 3 terms.)

Calculus and Elementary Functions—3 lectures per week for 2 terms.

Co-ordinate Geometry—1 lecture per week for 2 terms.

Differential Equations—1 lecture per week for 1 term.

Dynamics—2 lectures per week for 1 term.

Theory of Equations—1 lecture per week for 1 term.

MATHEMATICS II (GENERAL SCIENCE).

(Three one-hour lectures and two tutorial hours per week for 3 terms.)

Calculus—1 lecture per week for 1 term.

Differential Equations (and Elementary Fourier Analysis)—1 lecture per week for $2\frac{1}{2}$ terms.

Co-ordinate Geometry (and beginning of Vector Analysis)—1 lecture per week for $2\frac{1}{2}$ terms.

Dynamics—1 lecture per week for $1\frac{1}{2}$ terms.

Statics—1 lecture per week for $\frac{1}{2}$ term.

Infinite Series—1 lecture per week for $\frac{1}{2}$ term.

Elementary Complex Functions—1 lecture per week for $\frac{1}{2}$ term.

HIGHER MATHEMATICS II (GENERAL SCIENCE).

(Seven one-hour lectures per week for 3 terms.)

Analysis—4 lectures per week in first term, 3 lectures per week in second term, and 2 lectures per week in third term.

Dynamics—1 lecture per week in second term and 2 lectures per week in third term.

Differential Equations—1 lecture per week for 3 terms.

Vectors—1 lecture per week in first term.

Algebra—1 lecture per week for second and third terms.

Geometry—1 lecture per week for 3 terms.

GENERAL MATHEMATICS (GENERAL SCIENCE).

(Four one-hour lectures per week for 2 terms and three one-hour lectures per week in third term.)

Algebra—19 lectures.

Analytical Geometry—15 lectures.

Functions of a Single Variable—84 lectures.

Functions of Several Variables—8 lectures.

Architecture.

Subjects 11.01 to 11.96.

11.101-11.103 THEORY OF STRUCTURES.

The whole range of this subject has been divided into five sections. The first three sections (subjects 11.101, 11.102 and 11.103) are compulsory and taken by all students, whereas the last two sections (subjects 8.124 and 8.125) are taken only by those students who elect to do so. It is presumed that these latter students have aptitudes for the structural design subjects of the course and also that they intend to practise it in some measure in their profession.

From this point of view the first three sections have been designed to cover the major portion of the field of structures as it affects the Architect, but a certain amount of the work is intended to be dealt with descriptively rather than analytically. In the advanced sections it will, therefore, be necessary to revise the early work, supplying the analytical proofs where necessary, and then proceed to the more advanced work in order to complete the field.

Supplementing the theoretical work there will be exercises in structural design and testing work in the Testing Laboratory.

11.101 Theory of Structures I.

The first year series of lectures in Theory of Structures is designed to give a thorough grounding in the principles used in calculations relating to architectural construction and covers the following:—

Statics.—Composition and resolution of co-planar forces; equilibrium of co-planar forces (both concurrent and non-concurrent); moments, couples and equations of equilibrium; force polygons and funicular polygons; forces acting on and determination of stresses in pin-jointed structures by graphical and resolution methods.

Beams.—Moment determination of reactions for simply supported beams (up to and including two supports and two overhanging ends).

Shear in beams, determination of shear and shear force diagrams.

Bending moments in beams, and bending moment diagrams for beams.

Correlation of and relationship between shear and bending moments in beams.

Modulus of elasticity.

Summation of elementary beam theory.

11.102 Theory of Structures II.

Beam Theory.—Bending moments and shear force—Diagrams, analysis and relationship to loading. Explanation and derivation of section modulus, moment of inertia, radius of gyration, moment of resistance, deflection and factor of safety.

Theory of Bending.—Fibre stress, horizontal and vertical shear, proof of formulae, relation between deflection and bending moment.

Column Theory.—Short columns, long columns, slenderness ratio and eccentric loading, combined bending and direct stress.

Structural Timber.—Properties, gradings, permissible stresses, factors of safety.

Design of beams and checking of stresses.

Design of columns and checking of stresses.

Design of floor systems including connections of members.

Design of roof trusses with wind loading, bending and direct stress on upper chord, roof truss connection of members by bolting and ring connectors, roof systems.

Footings.—Considerations and design for strip footings and isolated footings.

Retaining Walls.—Arched, gravity, buttress, counterfort. Overturning, sliding, drainage, foundation pressure for cases when material retained is: water, granular, fragmentary, cohesive-clay.

Angle of repose, internal friction.

Concept of equivalent fluid pressure and surcharge.

11.103 Theory of Structures III.

The study of structures in third year is concentrated on structural steelwork (riveted and welded construction) and reinforced concrete.

The sequence of lectures is arranged to provide the design information required by the student in carrying out problems in the Building Construction Class, and the information given precedes the class work so as to allow the student to determine size of structural element prior to commencing detailed drawing.

The influence on design by the Local Government requirements is discussed and all design is related to such requirements.

Structural Steel (riveted and welded construction.)—

Revision of work on properties of steel, use of rolled steel joists sections, plated sections, use of steel handbooks, properties of sections.

Steel Beam. Design, plated sections, lateral support, web buckling, stiffeners, and bearing. Design of joints, curtailment of plates, beam to beam and beam to column connections.

Steel Columns. Radius of gyration, lateral support, effective length, design of columns with concentric and eccentric loads, design of columnplates, stool connections, cap and base plates, splices.

Steel Roof Trusses. Types of trusses, types of sections, design of members, joints and fixings, truss framing arrangement and bracing.

Reinforced Concrete.—

General theory of design, usual mixes and strengths, types of reinforcement.

Design of columns (concentric loads only). Rectangular and spirally wound, bar lists and reinforcement positioning.

Design of beams. Free ended, fixed ended, continuous (using coefficients), web reinforcement, cantilevers, use of compression reinforcement. Beam theory, formulae, shear and bond stresses.

Design of slabs. One way, two way, continuous, placing of reinforcement, stair construction, retaining walls.

Design of footings. Unreinforced and reinforced types as governed by limiting dimensions, effect of base plate pressure on design.

General. Design effect of varying stresses in concrete by altering mix, increasing depth, varying stress in steel reinforcement.

11.11 Descriptive Geometry.

This subject provides an introduction to general draughtsmanship. The student is taught the correct choice of drawing office materials, use of instruments, the elements of good lettering, geometric drawing, perspective and sheet composition. A good grounding in this work is essential in later years.

There are about thirty-two lecture-demonstrations followed by drawing. Each student is required to complete thirty sheets of drawings dealing with the following: Exercises in line drawing and plane geometry; lettering; orthographic, isometric, oblique, axonometric projection; theory of perspective, exteriors, interiors, inclined planes; shadows cast by geometrical features and simple architectural subjects on vertical and horizontal planes; shadows in perspective; solid geometry; development of intersections and surfaces; roof developments and layout; graphic symbols.

11.114 Architectural Research (alternative to 8.124—Structures).

In this subject the student is required to undertake research work on early Australian architecture, and on some subject of his own choosing.

The historical research takes place during the first term, and the student is required to work as a member of a group. Each group is assigned a particular building of architectural merit and historical significance, and must carry out a complete investigation of the building and furnish a report including photographs, drawings and evidence of thorough research of historical background.

During the second and third terms each student is required to deliver a brief paper upon some aspect of architecture or the allied arts, the selection of matter being left to the student, subject to approval by the lecturer.

11.115 Planning Research (alternative to 8.125—Structural Design).

The student is encouraged to pursue some special department of planning, relative to modern design. Considerable freedom is

allowed, but the student must provide evidence of his own studies and reading. One or two advanced exercises in individual research will be given relative to the projects being undertaken in architectural design and construction. Moreover, in addition to this each student has to prepare a dissertation which he will read before the general body of students, answer questions relative to it from his audience of fellow students and take part in general discussion upon it.

11.125—11.126 Professional Practice.

Contracts; relationship of builder, client and architect; professional ethics as laid down by the Royal Australian Institute of Architects; services and fees; office administration; building law and regulations; aspects and problems of practice; business principles; building finance and supervision; relations with the quantity surveyor, structural engineer and other specialists.

11.135 Specifications.

The definition of a specification; types of specifications and their uses; specifications in parts; setting out front page of a specification; specifications with trades in schedule form; specification for two or more similar buildings, treatment of trades for alterations and additions and use of addendum.

Theory of specification writing; expression in writing; methods of typing dimensions, cross referencing; door schedules and numbering rooms in large buildings; trades covered by regulations; points to observe in visiting site and existing buildings; explanation of differences between a government specification and that of private architect; explanation of P.C. items, provisional and contingency sums and provisional quantities.

Reading and explanation of a standard specification and its uses; practical sketching from specifications and résumé of first two terms.

11.145 Building Research Review.

A series of lectures on the work of organisations in Australia and overseas engaged in research on problems related to building, including materials, structure and functional requirements.

Special attention is given to contemporary problems in building production, new materials and methods, prefabrication, preassembly, standardization, dimensional co-ordination; relation of building regulations with new materials and methods; the use of research information by the practising architect.

11.154 Interior Furnishing and Decoration.

A series of lectures on furniture, cabinetmaking, the aesthetics of interior finishes, furniture, carpets, curtains and furnishings. Colour, materials and techniques in interior decoration.

11.164 Acoustics and Sound Insulation.

Nature of sound, wave length, frequency amplitude. Resonance. Hearing, thresholds of audibility, masking. Reflection, diffraction, absorption, transmission. Units of intensity and loudness. Geometrical acoustics. Acoustic materials. Auditorium design. Noise reduction in buildings. Transmission of air-borne and impact sound through walls, floors, windows and doors. Isolation of noise from machinery.

11.176 Architectural Science and Research Thesis.

During this period, the student is encouraged to study some specialised aspect of architectural planning and research, such as the latest developments in the equipment and engineering services of buildings, and specialised planning and equipment of buildings, such as hospitals, schools, etc. Some of this advanced study will be relative to the design projects being carried out under the heading of architectural design and construction, civic architecture or town planning, or the student may, with the approval of the Professor, pursue some avenue in scholarship, such as the literature of architecture, aesthetics or history; this work will be embodied in a thesis to be submitted by the student; importance is attached to the general presentation of this thesis.

11.186 Civic Architecture.

A limited number of informal lectures is given by the Professor of Town and Country Planning of the University of Sydney covering the principles and problems of Civic Architecture. Research and practical problems are carried out, usually relating to improvement and re-development from a planning and architectural point of view, of parts of existing cities, such as Sydney and Newcastle.

Civic surveys are made of the actual areas and all relative information is obtained by the students in groups, generally with the support of town planning officials in Sydney, Wollongong, Newcastle, etc., who indicate the basic economic, social and industrial conditions within which the student may have to re-plan and re-design the particular street or area.

11.196 Town Planning.

Introductory course of lectures, arranged by the Department of Town and Country Planning, University of Sydney. There is one

term of studio work associated with the lectures. The course of lectures is preparatory to the post-graduate diploma course in Town Planning, conducted jointly by the University of Sydney and the New South Wales University of Technology. This introductory course of lectures provides a brief outline of what is comprised within town and country planning, and touches on the history of town planning, the theory and practice of town planning, and draws attention to the social, economic, geographic and architectural factors involved.

11.203 Building Services and Equipment A.

Drainage, sullage disposal, septic tanks, sub-soil drainage, house drainage, by-laws, etc.; laying, joining and testing drains; ventilation of same; water supply, fittings and materials, water storage tanks, pumps, etc.; meters; fire services; sanitary plumbing; types of soil and waste fittings; design and installation of sanitary fittings, soil stacks, waste stacks, flushing systems, hospital and laboratory fittings and appliances; domestic layout including storage tanks, etc.

Gas service and domestic gas service and installation, appliances, flues, etc., heaters, stoves, fires, etc., refrigerators.

Hot water services of various kinds, solid fuel, gas, electric, separate and individual types, various appliances, hot water boilers and heating units; relative costs for different types of building.

11.204 Building Services and Equipment B.

Generation and use of steam; sources of heat, combustion, selection of boilers; flues, stacks; layout of boiler rooms.

Hot water supply; types of calorifiers; hot water storage tanks, layout of plant; hot water boilers.

Heating of buildings; heat transmission through walls and floors, etc.; types of radiators, accessories, pipe systems; equipment and fittings.

Pumps; application to specific jobs.

Ventilation; natural and mechanical; air change, fans, ducts, registers; requirements of local authorities.

Refrigeration; refrigeration cycle; machines and accessories; location of plant; cool rooms, construction and insulation.

Air conditioning; description of sensible heat: latent heat, dew point, humidity, heat content of air; relation of aspect to head load, human occupancy, etc.

Fire protection; sprinkler systems; requirements of controlling authorities; fire extinguishers.

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Lifts; application of lifts to buildings; types of lifts; requirements of controlling authorities; size of lift cars; size of walls; motor rooms; enclosures.

Lighting; natural and artificial; light intensity; requirements for lighting; types of lamps and fittings; calculation of lighting requirements; methods of installation; switch rooms, etc.

Call systems; application of call systems in hospitals, hotels, business premises, factories, etc.; telephones for intercommunication.

Kitchen equipment; items for kitchen equipment, their application and use; methods of operation, gas, electricity, steam, fuel oil, coal, coke. Servery equipment and accessories.

11.21 Freehand Drawing and Presentation I.

Introduction by means of studio and out-door drawing to architectural presentation and as an aid to design process. Practical survey—by way of simple tasks of drawing materials, media and elementary techniques. Study of the sources and effects of light, with particular regard to their influence on form definition in delineation. Freehand lettering and the progressive study of simple geometrical, irregular planar and complex casts. Independent work in sketch-book form, with appropriate instructions and a limited number of stated assignments, designed to develop powers of observation and memory and to provide scope for practical expression of intiative and imagination.

11.215 Estimating.

Introduction; methods employed for estimating; standard mode of measurement; profit, establishment and other changes; plant—purchase and hiring costs; awards, insurances, taxes, etc.; local and other authorities—scale of fees and charges; provisional and prime cost items.

Trades and Operations. Examples of "building up" the elements of unit cost rates in respect to: excavation, drainage, concrete, formwork, reinforcement, brickwork, masonry, structural steel and ironwork, carpentry and joinery, plumbing, floor and wall tiling, paving, plastering, painting and decorating, glazing.

The subject-matter for each trade or operation will include:—

(*a*) Current material prices.

(*b*) Schedule of unit labour costs.

(*c*) Memoranda in respect to:—weights, mixing proportions and yield of materials; waste allowance: working costs and depreciation of plant: scaffolding, etc.

(*d*) Problems for students to work out, using class examples for reference.

Variations.

(*a*) Measuring and valuing.

(*b*) Methods of adjusting.

Schedules.

(*a*) Grouping of unit items to obtain a bulked cost rate for different structural parts of buildings.

(*b*) Comparison of costs for alternative methods of construction related to structural parts of a building.

11.22 Freehand Drawing and Presentation II.

Continuation of Part I at a higher level with emphasis on out-door work: instruction in free out-door sketching and sketch notation in conjunction with study in various media or more complex range of natural and artificial forms. Elementary measuring and plotting in association with sketching of simple buildings. Practical analysis of techniques of more advanced character. Importance of good composition stressed in all work. Private sketch-books as a medium for independent experiment and practice as for Part I. Students' sketch-books will be marked separately and those failing to reach a reasonable standard will continue sketch-book work in Third Year.

11.31-11.32 Architectural Studies and Design.

A course in general design, taken over Years I and II, leading to Architectural Design and Construction. The objectives of this study are a development of aesthetic perception in the student and an awareness of his relation to his environment. By process of inquiry and critical analysis each student is encouraged to make individual assessment of design fundamentals. Participation in forum activity is encouraged in the way of prepared talks, debates and group discussions.

11.31 Architectural Studies and Design I.

This subject embraces architectural drawing, rendering, perspective and introduction to design.

During first and third terms the student works in the studio under the guidance of an instructor. Short lectures are given in conjunction with the studio work. Exercises are carried out dealing with the following:

Architectural Drawing—Selection of materials; linear patterns; lettering; sketch plan presentation.

Rendering—Wash exercises in monochrome and colour; value, hue and intensity; rendered elevations and perspectives.

Perspective (in conjunction with Descriptive Geometry sheets) —Exteriors, interiors and shadows in perspective.

Design—Elements of design—line, shape, form, texture and colour; study of objects of everyday use; analysis of an architectural feature.

Drawing the second term problems in elementary design are set to be carried out by the student at home.

11.32 Architectural Studies and Design II.

Design Fundamentals.

Design Concept—Elements of design and principles of composition introducing three dimensional design exercises; models; analytical study of value in colour.

Colour—Historical survey and theories of colour mixing; the Otswold and Munsell Systems of colour notation; the psychology of colour and its relation to purpose.

Texture—The senses involved and study of characteristics of surfaces; relation to purpose; texture "collages".

Space Concept—Study of space articulation; the model; analytical purpose problems and integration of previous studies.

11.41-11.43 History of Architecture.

This is one of the basic subjects leading to Architectural Design, not because of possible present-day use of any plan or feature from the works of past masters, but for the reason that some knowledge of past systems of building, use of materials, principles of design, use of geometry and choice of form for purpose and beauty rightly should be understood. The place of architecture and living environment in the social structure of peoples and their effect on the course of civilisation provide a useful and substantial part of the knowledge required by designing architects of this age.

The subject is treated in a wide manner, appropriate reference being made to significant events and conditions; the mass movement of peoples and the effect of military invasions; land and sea trading routes, lines of communication and the spreading of ideas; political, religious, social and economic influences; the work of the guilds and craftsmen.

The allied arts and minor crafts are considered as well as the masterpieces of architecture. Most examples are examined analytically in plan, external form, section and structure. The approach

is critical rather than archaeological, the past affording examples of how recurrent architectural problems have been solved structurally and aesthetically. Some consideration is also given to urban planning, streets, grouping, gardens, etc.

The subject is divided into three stages. Each stage consists of about thirty-three one-hour lectures. A final examination is set at the close of each stage.

11.41 History of Architecture I.

Primitive construction: the correlation of hands and mind and the beginnings of architecture.

Ancient (*1st Term*). Works of the Egyptians, Chaldaeans, Assyrians, Babylonians, Persians, Pelasgians and Etruscans.

Classic (*2nd Term*). Works of the Greeks and Grecian Empire.

Classic (*3rd Term*). Works of the Romans and Roman Empire.

11.42 History of Architecture II.

Study of the evolution of church architecture of the Eastern and Western types and the rise and perfection of Gothic architecture.

Early Christian. Later Roman works and the emergence of the basilican type of church building. Variations from the Roman type.

Byzantine. Works of the Byzantine Greeks and development of Eastern types of domed churches. Carcase and "finish" method of construction.

Romanesque. The development of Western Christian architecture. Experiments in form and construction towards ideal of a complete architecture in stone, including vaulted ceilings.

Gothic. The pointed style. Zenith of medieval architecture. Engineering in stone. The "unit-bay" system of construction. The correlation of balanced forces to produce stability in buildings of great height. Cathedrals, abbeys, churches, monasteries, castles, municipal buildings, guild-halls, etc. Gothic vaulting, church fitments and decoration.

11.43 History of Architecture III.

Architecture of the Renaissance in Europe.

Italy. Florence and the Early Renaissance: the architecture of Venice; the Mature Renaissance and Rome: Palladianism and the Baroque: Planning and garden design.

France. Early influence of Italy; the architecture of the Loire; the evolution of the French chateau and landscaping; the unification of the arts under Louis XIV; French civic design.

England. Influences of the early continental craftsmen; Jacobean architecture; Inigo Jones and the unification of foreign elements; Wren and his school; Palladian influence and the Baroque; the development of the English house during the Renaissance; English contribution to planning.

History of architecture in the 19th and 20th Centuries. The Industrial Revolution and the Romantic Movement. The Age of Revivals; Archaeology and the Medievalism; the Eclectics. The emergence of the engineer and the growth of specialisation; Art Nouveau and the Deutche Werkbund; the development of the Garden City. Social changes and the development of Building Acts. New materials and new techniques. The evolution of the steel framed building, reinforced concrete; its influence on the development of free planning. Louis Sullivan and Frank Lloyd Wright; Le Corbusier and Cubism, the Villa and the Zeilenbau. The development of the house. The growth of the modern city.

11.51 Building Science I.

Porosity, absorption and permeability of materials and the relationship of these properties to methods of formation, density, capillary attraction, weathering, heat and sound insulation, condensation and strength.

Analysis of the constituents of rainwater and their effect on the weathering of building materials.

A study of the manufacture of bricks and the decay of brickwork due to the action of water.

Types of stone and their formation, their properties and reaction to frost and florescence.

Chemical and physical analysis of the constituents of concrete and the necessary qualities required. Advantages of grading of aggregate. Water content and bulking of sand. Florescence and moisture movement. Methods of waterproofing.

Plastics, types and manufacturing processes.

Chemical and physical analysis of softwoods and the relationship between structure and strength. Moisture content and movement and its relationship to atmospheric humidity. Casehardening theory. Decay, fungi and insect attack.

Chemical and physical analysis of commercial metals, their properties and uses.

11.52 Building Science II.

Heat as a form of energy, its molecular movement and measurement. Ways in which heat affects homogeneous and heterogeneous solids and their relationship to thermal movement and stresses.

Factors affecting transmission of heat; conduction, convection and radiation. Low and high frequency radiations and their relationship to diathermanous materials.

Calculation of thermal expansion and its resultant stresses. Differential movement in buildings and problems of restraint. Prevention of thermal movement by various methods.

Climate and its influence on design and construction. Australian climatic zones. Ways in which heat gains ingress to buildings and preventive measures. Thermal insulation, its advantages and disadvantages. Thermal capacity and the ways in which it may be used to advantage.

Theory of insulation and the relationship between molecular structure and conduction. Air as an insulator.

Overall thermal transmission coefficient and the relationship of its composite factors. Calculations of thermal conduction of walls. Ventilation of cavities. Transmission through ceilings and roofs and typical calculations.

Sunlit surfaces and rise in temperature and variation due to colour and texture, with calculations.

Reflective insulation and its effect upon radiant heat.

Effects of moisture on thermal conductivity.

11.61 Building Trades and Crafts.

Short lectures given by different specialists on the staff, both from the point of view of the employer (the master builder) and the specialist craftsman. The specialist trade instructors in the department provide demonstrations in the techniques of bricklaying, carpentry, joinery, plastering, painting and decorating. Each student is required to do a small amount of practical work, such as mixing mortar, carrying and laying of bricks, elementary practical work in carpentry and joinery, plastering and painting. Model making, in connection with the architectural studies.

The general intention of this period is to familiarise the student with the tools and terms used by the building craftsman, and to give him an understanding of the craftsman's skill.

11.71 Building Construction I.

Lectures.

Brief instruction on draughting techniques, projections and lettering.

Brick manufacture, types and qualities; bonding. Types and composition of mortars and their uses.

Cement manufacture, types and uses. Concrete and its constituents. Bulking of sand and determination of correct water content by slump test. Vibrated and lightweight concretes.

Footings and foundations and requirements of Local Councils and Ordinance 71. Trenches and timbering.

Cavity wall construction and treatment of openings.

Hardwoods and softwoods, conversion and seasoning; moisture content and shrinkage. Decay and defects.

Ground floor construction, timber and concrete and types of finishes. First floor timber construction.

Fireplaces and flues and design requirements.

Flat roof construction with consideration of waterproofing and insulation. Types of roof coverings. Skillion and pitched roofs, sizes of members according to Ordinance 71. Suitable roof coverings and their methods of fixing. Chimney stacks and flashings to pitched and flat roof surfaces. Roof plumbing and materials used.

Timber framed house construction, floors, walls, gable end details.

Weatherboarding and asbestos cement external covering.

Brick veneer construction. Joinery joints and applications. Types of doors and frames.

Functions and types of windows.

Stone, its selection and uses in building. Types of walling. Cast stone, terrazzo and terracotta.

Water collection and distribution.

Domestic plumbing and drainage according to Ordinance.

Plastering, types of bases and precautions to be taken. Fibrous plaster manufacture. Acoustic tiles.

Paints and their components.

Glass manufacture. Types of glass and their uses.

Practical.

Studio work comprises a number of half imperial detail sheets done during first and second terms. These are designed to give the student practice at setting up a sheet and improving his draughting.

During third term the students have an Integration problem which correlates elementary design theories* with constructional detailing in the form of working drawings of a simple building.

*See 11.31, Architectural Studies and Design I, at page 291.

11.72 Building Construction II.

Lectures.

The course comprises thirty-four one-hour lectures covering the following points of construction:—

Timber stairs; cupboards and storage walls; large glass areas; building site assessment and preparations; footings; piling and rafts; demolitions; excavations; shoring; underpinning; basement construction; water, moisture and damp-proof walls; theory, preparation and handling of concrete; pouring of concrete, formwork; theory of reinforcing of concrete, brickwork and masonry, placing of reinforcement; roofing of large areas; heavy timber construction; load bearing brick walls; warehouse construction; fire resisting construction; curtain walls; wall facings and finishes (internal and external); floor surfacings.

As it is impossible to cover all points in connection with any topic under discussion in the time available, each lecture is supplemented with a detailed list of references.

Practical.

The work for the year consists of five sheets of detailed drawings and five sheets of working drawings, of imperial size, exemplifying the subject matter of Building Construction Theory II. The actual problems set cover mainly:—Joinery, advanced domestic construction, heavy timber construction, heavy footings, load bearing brick walls and the roofing of large areas. Particular attention is paid to the correct method of executing working drawings and all work is to comply with relevant by-laws and regulations.

11.73 Building Construction III.

Lectures and practical periods for the study of advanced constructional work beyond that of years I and II.

Advanced building detailing, building layout as affected by Local Government regulations, Sydney Corporation Act By-laws 51 to 58 inclusive.

Ordinary and fireproof construction, curtain walls, stairways, lifts, light wells. Consideration and detailing of problems met in framed construction, both steel and reinforced concrete.

Economical frame layouts and relationship to architectural plans and design. Detail drawings of wall sections, special facings, flashings, flat roofs, drainage, parapets, fireproofing, internal finishes, etc., and working drawings of multi-storey frame buildings, design and detailing of structural elements in steel (riveted and welded work) and reinforced concrete following the lectures in the Theory of Structures subject 11.103.

The working drawings and details of a multi-storey frame building are required to be done for an Integration problem which is treated in the Design class for some of the architectural design aspects.

11.81 Introduction to Architecture and Building.

(*a*) The functions of the architect in society; the functions of related specialists, builders, structural engineers, quantity surveyors, town planners, specialists in services and equipment, the general foreman, craftsman and labourer.

(*b*) The structure of the building industry, how the architect fits into it; professional and trade organisations in the industry; the manufacture and distribution of building materials.

(*c*) Brief description of the main subject matter which the student will have to undertake throughout the whole course; how one subject is complementary to another and the practical implications of all the subjects.

(*d*) Basic principles in architecture and building; the fundamentals in the course of study which the student must watch for; architecture is fine building; it consists of three things, efficient planning, scientific structure, and beautiful appearance; outline of main points under these three heads in anticipation of the lectures on the theory of architecture and building science, to follow in succeeding years.

11.82 Theory of Architecture A.

Basic functions of buildings; clients' needs and programme of requirements; functional planning, scientific structure, beautiful appearance; introduction to planning; scientific study of requirements; processes in determination of plan; circulation; process diagrams in planning; site and surroundings; study of various sites and how they affect the building; prospect, aspect, orientation; drawing up a programme of requirements; requirements and human need; locality, structure economy, historical and contemporary structure; classical and contemporary plan composition; symmetry and asymmetry; decisive plan forms; proportioning of plan units; principles of architectural composition; aesthetic theories; modes of thought; buildings as organisms; visual art, unity, duality, contrast, rhythm, proportion, scale, character; verticality, horizontality; the dominant, major and minor features; major and minor focal points; composition of masses; space enclosure in three dimensions; the element of decision; accentuation.

11.82A Theory of Architecture.

A course for students in Civil Engineering emphasising the engineering approach to Architecture, and consisting of selected material from 11.82 Theory of Architecture A.

11.83 Theory of Architecture B.

Factors influencing architectural design: people, climate, topography, materials, economics, social system, etc.; influence of the weather and the "elements", i.e., sun, light, air, wind, rain, etc.; orientation.

Elements of contemporary architecture; floors, walls, roofs, windows, doors, etc.; expression of function, materials and construction; style; character and atmosphere; colour and texture in buildings.

Choice of materials; engineering services and equipment in buildings.

Logical approach to an architectural problem; procedure of planning and design from the broad aspects to the detailed.

Influence of adjacent buildings on design; elementary notes on urban architecture; scale and other principles of design in simple contemporary work; detailing; the surroundings of buildings. Contemporary philosophies.

11.93-11.96 Architectural Design and Construction.

This range of subjects embodies and applies all the subject matter of the other lectures and studies in the Architecture Course. Architectural Design includes planning, construction, specialised building techniques, engineering services and equipment, specification, estimating and building job supervision and control.

The whole course consists of a series of practical problems in design, generally accenting fundamental aesthetic and technical points but with problems interspersed expressly to stimulate imaginative thinking.

In all problems construction is considered an essential part of design. In many cases special or unusual points in design are required to be substantiated by sketch details of construction. At least once in the latter end of the course structural calculations and details of construction are produced for a large building.

An increasing proportion of the work as the course proceeds is done under the "group" system.

All work is marked by a jury, with class criticism and discussion.

11.93 Architectural Design and Construction A.

Studio assignments on the analysis of building elements for structure and function, historical survey and consideration of contemporary application in various structural systems, followed by integration development in simple structure. Analysis of module

planning, solid and void, plan composition and massing, siting and sun penetration. Requirements in living, eating and sleeping, followed by inclusive consideration in domestic design (multi-cell type), co-ordinating all structural and functional analysis, furniture and interior design and landscaping, in sketch esquisse, working drawing, specification and rendered presentation.

11.94 ARCHITECTURAL DESIGN AND CONSTRUCTION B.

Problems more intricate in planning and technical aspects; exercises designed to determine the influence on design of climate and the elements; construction and materials; the logical use of glass; natural lighting and aspect; the aesthetic exploitation of such practical needs in modern building; expression of character in building.

11.95 ARCHITECTURAL DESIGN AND CONSTRUCTION C.

Lighting, both natural and artificial; design of commercial buildings and the examination of associated economic factors; industrial planning, expression of function in large architectural projects; influence of adjacent buildings or sites on design; housing; group building; simple problems in urban architecture involving the concept of town planning. Where possible problems are set for actual sites.

11.96 ARCHITECTURAL DESIGN AND CONSTRUCTION D.

Large architectural projects, usually done in small groups, relative to actual sites and involving considerable research into human and community requirements and the problems of structure and mechanical and other equipment associated with large buildings; problems in specialised buildings to fit the present and future needs of the developing community.

Applied Psychology.

Subjects 12.01 to 12.70.

12.01 PSYCHOLOGY I.

Three hours per week of lectures and practical work.

This course may be the only contact many students have with psychology. It is therefore planned to be appropriate to the largest number of students as well as a suitable introduction to more advanced work. The topics to be studied are the subject matter and methods of psychology, the biological and social determinants of behaviour, the basic processes of development of personality, motivation, perception, thinking, learning, individual differences, ability,

the organisation of behaviour in the adult, adjustive behaviour, an analysis of selected life situations—marital adjustment, vocational adjustment, adjustment to age. Throughout the course attention will be given to the nature and kind of methods used in psychology, observation, experiment, measurement, the function of hypotheses, verification of hypotheses and causation.

12.02 Psychology II.

Two lectures and two periods of practical work per week.

The course consists of:

(*a*) Personality dynamics and development with particular reference to perception, motivation, ability, thinking and language.

(*b*) The nature and assessment of individual differences in ability and personality.

12.03 Psychology III.

Three lectures and one hour of practical work per week.

This course aims to consider theories of personality and the criteria for the evaluation of personality theory. It should assist the student to develop a theory of personality which he can apply to his work. It considers the empirical aspects of personality as related to theories. Such topics as types of personality, cultural background of personality, factor analysis and personality, patterns of personality development and personality and adjustment problems are included. Practical work will include reworking experimental data basic to some of the theories.

12.10 Psychological Assessment I.

One lecture and two hours practical work per week.

The course consists of:

The logical aspects of measurement: the role of measurement in modern science, uses of mental measurement. The nature of fundamental units, derived units. Kinds of criteria for measuring the validity of various kinds of tests, objective and subjective criteria used to measure tests of achievement, general aptitude, special aptitude, interests, attitudes and personality. The construction of quality scales and their use as validity criteria; the composite criterion.

Types of job analysis and their use as criteria. Factors affecting the use of criterion measures.

Reliability—analysis of variance. Understanding of true score, errors of measurement, index of reliability, influence of range of

talent on coefficient of correlation. The concept of optimum administration time as related to validity and reliability. The relation of the distribution of item difficulty and item discrimination to validity and reliability.

Item construction: problems of sampling; a consideration of the mental processes involved in answering various types of items. Scoring devices: formulae for correction of chance success; weighting test scores according to dispersion, reliabilities and validities. Rating scale methods: optimum number of scale units; types of scales for various purposes; errors in rating. Interpretation of test scores and ability patterns.

12.11 Psychological Assessment II—Industry.

One lecture and two hours practical work per week.

Measurement of individual differences. Test theory; intelligence tests—uses and limitations. Primary mental abilities. The growth and decline of intelligence. Achievement, aptitude, interest, personality and trade tests used in selection and assessment. The use of questionnaires, rating scales, inventories, cumulative records in the measurement of work effort, responsibility, productivity and motivation. Group methods of selection and management. Interviewing; different types of interview. Interpretation of results, case analysis, differential occupational ability patterns. The employee selection ratio and critical scores.

12.11a Psychological Assessment IIa—Counselling.

One lecture and two hours practical work per week.

Measurement of individual differences. Test theory. Intelligence tests—uses and limitations. Primary mental abilities. The growth and decline of intelligence. Achievement, aptitude, interest, personality and special tests used in counselling. Group and individual tests. Diagnosis questionnaires. The use of records, references and authoritative opinion. Directive and non-directive interviewing. The evaluation of assessment data. Case analysis, differential occupational ability patterns, differential educational achievement patterns, differential avocational interest patterns. Interpretation of growth and development profiles. Problems of selection. Critical ratio.

12.20 Psychology IV—Social.

Three hours lectures per week.

This course will take up the general problems of social behaviour and the relationship of social psychology to psychology on the one hand, and to the various social sciences on the other. It will discuss

the theory of institutions, groups, and social movements, social controls, group pressures and standards, conformity and social norms. The importance of status, role, behaviour, communication, rumour, attitude formation and the various mechanisms of social expression will be investigated. The relationship between character, society and culture, studies in the authoritarian personality, ethnocentricism, prejudice and theories of leadership are topics included in the courses.

12.21 Psychology V—Applied Social.

Two hours lectures, two hours practical work per week.

The course will include the following topics:

Theory.—Supervision: leadership and power relation in industry; industrial motivation; morale dimensions; dynamics of social change and industrial behaviour; the field of human relations. Psychological features of human relations. Mechanism in social interaction exemplified in various consultative situations. An examination of British and American studies in group dynamics and human relations programmes.

Practical.—Systematic observation of spontaneous social occurrences. Systematic observation of group phenomena. Experimental studies on group influence on skills and the communication of attitudes.

Ethics.—The distinction between a code of behaviour and an ethic. Psychology and ethics. Theory and practice. Social responsibility. A positive ethic.

12.30 Industrial Psychology.

Two hours lectures per week.

This course deals with the adjustment of the individual to the work situation.

A. *Work as Part of a Pattern.*—Acceptance of work. General treatment of problems of incentives and absenteeism, personal and group efficiency.

B. *Environmental Conditions Affecting Work Behaviour.*—Lighting, ventilation, colour, temperature, etc.

C. *Physiological Conditions Affecting Work Behaviour,*—Physique, posture, movement, motor co-ordination, speed, span of perception, fatigue.

D. *Social Conditions Affecting Work Behaviour.*—Social structure and organisation. Explanations of group behaviour. Industrial groups. Social integration. Social factors and perception. Attitudes, beliefs, ideals, loyalties. Social controls.

INDUSTRIAL AND LABOUR RELATIONS.

Three hours lectures per week.

I. *Industry as a complex social organisation.*

The development of modern industry.—The factory system and its forerunners. Factory production. Capitalism, science, and technology; individualism and the division of labour. The growth of professional management. The development of Australian industry.

The industrial community: Interdependence of industry and community. Types of industrial communities. Effects of community values on personality development, *e.g.*, mining.

Social classes and industry: The nature of social classes. Occupational distribution. Occupational mobility.

Social controls of industry.

II. *Problems of planning.*

The development of personnel management. Relation of personnel administration to social and economic objectives; influence of early social legislation, scientific management. Contributions from sociology, psychology and political science; rise of trade unionism and labour legislation. Organisation of personnel administration. Human relationships and technical efficiency. Efficiency and effectiveness. The significance of personnel selection and placement, job analysis and classification, time study and rate setting, job evaluation and classification, training and promotion, employee services, employee adjustments, personnel records and controls. Evaluation of personnel administration. Cost of personnel administration. Measurement of cost, savings, pattern and future for personnel research.

III. *Labour relations.*

The nature of labour relations: Industrial and population distribution, social and economic objectives, types of labour problems—social, political, psychological and economic. Historical background.

The organisation of labour: Line and staff organisation. Committee organisation. Union and management organisation. Joint consultation.

Labour legislation: Labour standards, wage and hour regulations, arbitration, workers' compensation.

12.40 PERSONNEL TECHNIQUES.

One lecture and three hours practical work per week.

In this course, students learn through practice many of the techniques described in other courses—the development of a personnel programme, job analysis, job description. Demands of occupations on the individual. Unit of work, selection, training and promotion.

12.40A PSYCHOLOGY Vb—COUNSELLING TECHNIQUES.

Two lectures and four periods of practical work per week.

The purpose of this course is to give first-hand acquaintance with the techniques of counselling and to develop the skill to use them with individuals in need of counselling.

Types of counselling problems. The case history of the individual. Tests, academic records, vocational history, family background. Relating the characteristics of the individual to possible work adjustment. Interviewing—basic concepts of interviewing—types of interview. Provision for practice in conducting interviews. Application of measurement techniques. Individual and group tests. Different types of tests. Making case studies. Recording of data, report writing and supervised experience in industry, technical colleges, Government and social service agencies.

12.44 OCCUPATIONAL INFORMATION.

One lecture per week.

This course aims to give a realistic background of information concerning occupations and industries. In the first section a study is made of the literature and in the second section the student develops occupational and industrial information by observation in the field.

Topics will include jobs and industries classification, and obtaining facts by job analysis. The necessity of obtaining facts first-hand by observation. Preparation of job information for counselling—job descriptions, job families, occupational trends. Patterns of jobs in individual establishments, flow of work, promotional sequences, relationship of jobs to the functions of the firm.

12.70 PSYCHOLOGY IVb—PRINCIPLES OF COUNSELLING.

Two hours lectures and two hours practical work per week.

The scope of counselling work in industry, education and the public service. The counselling function in a modern community. The assumptions and philosophy of counselling. Theories of counselling and psycho-therapy. Counselling services. The analysis of counselling records. Counselling as a learning process. The purpose and use of different techniques. Directive and non-directive counselling. Theory of group counselling and group therapy. The place of mental health programmes in modern institutions.

Humanities and Social Sciences.

The courses for 1955 will be as follow:—

G1 Logic (Compulsory).

Science is sometimes described as organised or connected or systematised knowledge; logic may be roughly described as an enquiry into the kinds of organisation, connection and system found in extended bodies of knowledge. For instance, if you open at random a textbook on a scientific subject, you are quite likely to come upon such a statement as this:

> "It can be shown by the methods of thermodynamics that Raoult's law and the osmotic pressure equation are related; the validity of one requires the validity of the other." (Linus Pauling—*General Chemistry*, p. 293).

Mostly, when we read a statement like that, we look closely at such terms as "thermodynamics", "Raoult's law" and "osmotic pressure"; we take for granted that we clearly understand the terms "shown", "methods", "law", "equation", "related", "validity", "requires". Now what we thus ordinarily take for granted is what logic invites us to question and examine—logic is a study in which we ask, for instance, just what we do when we "show" something; in which we ask whether there are distinguishable "methods" for "showing" things; ask whether an "equation" can or cannot be a "law"; ask how statements and terms can be "related"; ask whether "validity" is to be distinguished from "truth", and ask how it comes that the "validity" of something can "require" the "validity" of something else.

In general, all serious discussion, in any field of knowledge, makes constant use of such terms as "suppose", "because", "if . . . . then", "implies", and so on; every page of scientific writing mentions "facts", "hypotheses", "theories" and "explanations". It will be our business in this course to examine those features of coherent knowledge which are indicated by these and similar terms. It is hoped that students will find this examination interesting in its own right; and hoped also that it will assist them to make critical appraisals of arguments in other fields of study.

Recommended Books—

No books are prescribed for the course, but students would find it much to their advantage to possess, or have access to, one or several of the following:—

Cohen, M. R. and Nagel, .—*An Introduction to Logic and Scientific Method.* Routledge and Kegan Paul—(Complete Edition, 1949).

Eaton, R. M.—*General Logic.* Scribner, 1931.

Black, M.--*Critical Thinking.* Prentice-Hall, 1950.
Larrabee, H. A.—*Reliable Knowledge.* Houghton Mifflin, 1945.
Stebbing, L. S.—*A Modern Introduction to Logic.* Methuen, 1945.

G2 INTRODUCTION TO MODERN PHILOSOPHY (COMPULSORY).

The editors of *The Concise Oxford Dictionary* hold that philosophy is especially concerned with ultimate reality, and with the most general causes and principles of things; and many philosophers would agree with them. For this course, however, we have in mind a rather more modest conception of philosophy. We shall take it that modern philosophy has, to a large extent, been concerned with an examination of the ways in which we may arrive at reliable generalised knowledge; and that, among the many questions to which philosophers have given attention, a central place is occupied by some questions which concern the nature of systematic enquiry—these are the questions we shall chiefly consider.

We shall therefore be most concerned with those parts of philosophy which lie nearest to logic; but in this course (in contrast to G1 logic) we shall have in mind the historical fact that the period in which Bacon, Descartes, Locke, Berkeley and Hume were shaping some important parts of the modern philosophic tradition was also the period in which such men as Kepler, Galileo, Gilbert, Harvey and Newton were laying the foundations of modern science. One of the books we shall study is Descartes' *Discourse on the Method of Rightly Conducting the Reason and Seeking Truth in the Sciences.* The title itself points to the close connections, at this time, between philosophy and science. These connections we shall look at in some detail; in looking at them we shall be taking up, for example, questions about the nature of explanation, the establishing of general truths, the distinction between reason and experience, the nature of perception, the notion of matter or substance, the distinction between primary and secondary qualities, and the notion of causation.

The course will not pretend to be a comprehensive introduction to modern philosophy; it will rather be concerned with those parts of philosophy which, in the work of the seventeenth century writers, are linked to the development of what has come to be called the scientific method of enquiry. It will aim, incidentally, to show whether there is indeed one or several methods of enquiry which are peculiar to the sciences. The exposition will be partly historical, but the chief emphasis throughout will be placed on the questions raised and the answers which may be given to them, rather than on the mere historical succession of theories. It is hoped that students will thus come to see some of the important philosophic pre-suppositions which underlie much of modern science.

Recommended Books—

Students will be expected to read some of the works of Bacon, Descartes, Locke, Berkeley and Hume. There are editions of some of the writings of Descartes, Berkeley and Hume in the Everyman Library (Dent); for Bacon and Locke students may consult:

Burtt, E. A.—*The English Philosophers from Bacon to Mill.* The Modern Library, 1939.

Some useful discussions of the work of these philosophers, and its relations with contemporary science, will be found in—

Wolf, A.—*A History of Science, Technology and Philosophy in the 16th and 17th Centuries.* Allen and Unwin (2nd Edition, 1950).

Russell, B.—*History of Western Philosophy.* Allen & Unwin, 1948.

Butterfield, H.—*The Origins of Modern Science.* Bell, 1949.

Burtt, E. A.—*The Metaphysical Foundations of Modern Physical Science.* Routledge and Kegan Paul—(Revised Edition, 1949).

G3 Philosophy of Science (Minor Elective).

A Minor Elective for full-time students in their third year. An account will be given of the growth of some major scientific theories—for instance, those associated with Copernicus, Newton, Stahl (phlogiston), Black (caloric), Dalton, Young and Fresnel (the luminiferous ether) and Darwin. Members of the class will be expected to undertake, independently, an examination of some substantial scientific theory.

Recommended Books—

Detailed references will be given in class, but the following books will be generally useful:—

Wightman, W. P. D.—*The Growth of Scientific Ideas.* Oliver and Boyd, 1950.

Einstein, A., and Infeld, L.—*The Evolution of Physics.* Cambridge, 1938.

G6 Philosophy (Major Elective).

Full-time students in their final year may take philosophy as a Major Elective. The course will aim to give an introduction to present-day thought in some major branches of philosophy. It will include 24 lectures on ethics or moral philosophy, 24 lectures on the theory of knowledge, and 24 lectures on the logic of science and mathematics. Students will be expected to undertake some independent reading. Full lists of references will be given in class.

G7c Philosophy (Conversion).

The full course of 72 hours for conversion students will consist of three parts, each of 24 hours. Part I, given in First Term, will be devoted to logic, as outlined under course G1 above; Part 2,

given in Second Term, will be an introduction to modern philosophy along the lines of course G2 above; Part 3, in Third Term, will be devoted either to moral theory, or to the theory of knowledge, or to the logic of science and mathematics. If numbers permit, students will be able to make their own choice from these three possibilities for Part 3. Reading lists will be given in class.

G8 PHILOSOPHY (COMPULSORY IF G1 AND G2 NOT TAKEN).

This course, which is taken by students in part-time courses of the Faculty of Engineering, is a combination of G1 Logic and G2 Introduction to Modern Philosophy.

G10 ENGLISH (COMPULSORY).

A course of 48 lectures on Language and Literature given to all undergraduates. The lecturers will be Mr. Elkin, Mr. Ginges, Mr. Burgess and Mr. Geering.

In the Language part of the course consideration will be given to the following: the determining factors in the development of the English language, the formation of its vocabulary and the principles of its structure, the criterion of good and bad writing, the critical appraisal of prose passages, practice in the writing of various kinds of prose, and modern English usage.

Recommended Books—

Simeon Potter—*Our Language.* Penguin.
King & Ketley—*The Control of Language.* Longmans.

The Literature part of the course is directed towards an appreciation of fiction and drama through selected short stories, novels and plays. Such questions will be considered as: How do we go about studying literature? What are the methods of literary criticism? What do we mean by the terms, theme, subject, form, structure, texture, style? How can we tell good literature from bad? What are the distinguishing characteristics of fiction and drama? To what extent are novelists and playwrights bound by the practical demands of their media? What are the means by which a writer sets the mark of his personality on his work? These general questions will be discussed in the light of a detailed study of the selected short stories, novels and plays.

Recommended Books—

Fiction—

Hadfield, J. (Ed.)—*Modern Short Stories.* Dent.
Balchin, Nigel—*Mine Own Executioner.* Pan.
Isherwood, Christopher—*Mr. Norris Changes Trains.* Penguin.
Sassoon, Siegfried—*Sherston's Progress.* Penguin.
Steinbeck, John—*The Grapes of Wrath.* Penguin.
Waugh, Evelyn—*Vile Bodies.* Penguin.

Drama—

Ferguson, J. (Ed.)—*Seven Famous One-Act Plays*, 2. Penguin.
Galsworthy, John—*Justice*. Duckworth.
Shaw, George Bernard—*Pygmalion*. Penguin.
Wilde, Oscar—*The Importance of Being Earnest*. Penguin.

G11 English (Minor Elective).

One of the following may be chosen:

G11.1 *Modern Satire.*

Satire is likely to appeal strongly to those who are more interested in the critical content than the aesthetic quality of literary works. So the novels below will be studied partly for their criticisms of contemporary life. They will be studied mainly, however, for their more strictly literary properties, for the light they throw on satire as a literary genre; and the topics for discussion will be—the relationship between realism and satire and between satire and allegory, the conventional masks and devices of the satirist, the modes of irony in satire, the characteristic traits of the protagonists of satire, and the ways in which a satirical intention predetermines the plot and characterisation of a novel.

Recommended Books—

Orwell, George—*Animal Farm*. Penguin.
Nineteen Eighty Four. Secker & Warburg.
Waugh, Evelyn—*The Loved One*. Penguin.
Decline and Fall. Penguin.
Huxley, Aldous—*Brave New World*. Chatto.
Lewis, Sinclair—*Babbitt*. J. Cape.
Gibbons, Stella—*Cold Comfort Farm*. Penguin.

This course of 24 lectures for full-time third year students will be given by Mr. Elkin, Mr. Ginges and Mr. Geering.

G11.2 *The Science of Speech.*

On the side of theory this course will be concerned with the phonetics of English, with Australian speech and its relationship to other forms of English and with speech variations within Australia. On the practical side, students will be expected by means of the tape-recorder to make observations of their own and others' speech and will take active part in various speech-situations.

This course will be given by Mr. Burgess.

G12 English (Major Elective).

A course of 72 hours in Terms 1 and 2 for full-time students in their fourth year, given by Mr. Elkin, Mr. Ginges, Mr. Burgess and Mr. Geering.

This is a course on modern literature, English, American and Australian. It contains a core of works for compulsory detailed study and some additional literature for more rapid and selective reading. The texts are chosen for their individual merit and their representative character. The aim of the course is to indicate the variety and main concerns of modern literature and to encourage critical appreciative reading.

The course will include discussions, play-readings and recordings as well as lectures. The drama is to be studied with reference, whenever possible, to current films and stage productions.

Main Texts—

Students may use any editions which are available.

(a) *Drama—*

Anderson, Maxwell—*Winterset.*
Eliot, T. S.—*The Cocktail Party.*
Miller, Arthur—*Death of a Salesman.*
O'Neill, Eugene—*The Emperor Jones.*
Shaw, George Bernard—*Man and Superman.*
Stewart, Douglas—*Ned Kelly.*

(b) *Fiction—*

Cary, Joyce—*The Horse's Mouth.*
Collins, Tom—*Such is Life.*
Fitzgerald, Scott—*The Great Gatsby.*
Hemingway, Ernest—*A Farewell to Arms.*
Koestler, Arthur—*Darkness at Noon.*
Lawrence, D. H.—*Sons and Lovers.*

G13c English (Conversion).

A course of 72 lectures, given by Mr. Elkin, Mr. Geering, Mr. Ginges and Mr. Burgess.

This course is a combination of G10 English, Language and Literature, and G11 Modern Satire. G10 will be taken in first and second terms and G11 in third term.

G20 and G20b History (Compulsory).

This course of 48 lectures is divided into two sections. Both sections must be taken by all students.

G20.1 *The Background to Western Civilisation.*

This section of 36 lectures is designed to give the student some acquaintance with the principles and foundation of western civilisation by means of a survey of the development of human society from

the earliest times to the present day. After a preliminary discussion of the nature and meaning of history, lectures will consider such selected topics as the Egyptian, Greek and Roman contributions to western civilisation; the rise of Christianity; feudalism; the relationship between religion and politics in the Middle Ages; the significance of the Renaissance; the Reformation, Wars of Religion and the development of religious toleration; the Industrial Revolution; the French Revolution; democracy, nationalism and imperialism; the idea of evolution; the rise of the Modern State; and the contemporary problem of achieving international peace and security.

Art and literature, thought and ideas will be stressed throughout, and every effort will be made to present as vivid a picture as possible of the different ways of life that men have followed and fought over, their material achievements and standards of living in different societies, the laws and institutions through which they have organised their societies, and the philosophical and religious ideas by which they have sought to interpret and explain their lives. The course will emphasise the unchanging nature of man's fundamental problems and the relevance of the ideas and achievements of the past to the modern world; and by providing the student with standards of comparison with societies and ways of life and thought different from his own it is hoped to develop in him a sense of perspective, tolerance and critical approach to the problems of to-day.

G20.2 *Australian History.*

This section of 12 lectures attempts in brief outline to present the political, cultural and economic background of the modern Australian Commonwealth, and to give an understanding of the living problems of the contemporary world in their special reference to Australia.

G21 History (Minor Elective).

G21.1 *Geography and Civilisation.*

A course of 24 lectures given by Professor Griffith Taylor. In these lectures such topics as the following will be discussed: Changing Environments; Race, Language, Nation and Religion; Evolution and Distribution of Languages; Greece as a course of culture; the Folk-Wandering and New Nations; Chinese and Japanese problems; problems of South-East Asia; the Evolution of Sydney; Geopolitics and Geopacifics.

G21.2 *The United States,* 1860-1914.

A course of 24 lectures. After a brief review of American history in colonial and early independence times, this course will examine the causes and effects of the Civil War. The development of the United States will then be examined up to the conclusion of World War I.

In particular, attention will be paid to the economic and political problems involved in the United States' advance to world leadership of the democratic nations.

Recommended Book—

Nichol, J. F.—*The American Union.* Penguin.

G22 History (Major Elective).

History of Australia.

This course of 72 lectures is designed to survey the more important aspects of Australian history up to the present day. It will avoid an insular approach, and will discuss Australian history in its broader setting of British and World History, with constant references to the British background and to the stories of Canada, New Zealand and South Africa. The preliminary part of the course deals with the opening up of the Pacific and with the maritime explorers. Then follows an analysis of the 18th century background to make more apparent the reasons for the decision to establish a penal settlement in eastern Australia in 1788. Subsequent lectures trace the gradual evolution from penal to free settlements. Explorers open up the continent and the pastoral industry expands and flourishes; immigration from the United Kingdom is encouraged; and the foundadations of an urban society laid; and the cessation of transportation to eastern Australia heralds the advent of representative and responsible government to the several colonies. All these developments (1815-1850) are related to the English background of the Industrial Revolution, industrial unrest and post-war political and social discontent culminating in Chartism. At the same time, progress in Australia is compared and contrasted with developments in Canada, New Zealand and South Africa, with their problems of national and racial contacts. After a survey of the colonies of settlement and of British colonial policy generally, the story returns to Australia, where the discovery of gold in New South Wales and Victoria in 1851, with its accompanying flood of immigrants, confronts the colonies with recognisably modern problems. There is a moderately successful agitation for political democracy against the interests of the squatters and their allies, and the bitter struggle between farmers and squatters "to unlock the land". Immigration stimulates secondary industry and Australia's "Industrial Revolution", trade unionism and the rise of the Labor Party. The 1890's are a decade of crisis, involving the country in a disastrous depression and in a series of strikes and lock-outs. In the political sphere, Federation is achieved at the end of the century. In the last 50 years Australia's domestic history has not been without incident—e.g., the principle of the Basic Wage, the political conflict between Labor and non-Labor, and the depression of the 1930's—but events have forced the nation to define more exactly its attitude to European and Pacific affairs and to relations

with Britain and other members of the British Commonwealth. Participation in two world wars and in the League of Nations and the United Nations demonstrates Australia's growing realisation of her duties as a member of the community of nations.

G22c History (Conversion).

The outline of this course is the same as that given for G22.

G30 Government (Minor Elective).

The American Political System.

A study of American political institutions and dominant political ideas, especially in recent years. The course will include some historical and social background but will deal chiefly with the recent working of political parties, trade unions, etc., and of the institutions of State and Federal Government in the United States.

Reference Books—

Laski, H. J.—*The American Presidency.*

Key, V. O.—*Politics, Parties and Pressure Groups.*

Brogan, D.—*The American Political System.*

G31 Government (Major Elective).

A course of 72 lectures. The course will be divided into two parts, the first dealing mainly with description and analysis of political institutions, the second with some important questions in political theory.

Part A will examine the working of Parliamentary government in Australia, dealing with such topics as—

The Constitution—formation, growth, present working;

Political parties and pressure groups;

Parliamentary institutions—State and Federal;

The electoral system;

The social framework in which the government works, etc.,

and making comparative studies of similar aspects of the British, the American and at least one other political system.

Part B will examine critically some representative political theories of the past and present and so attempt some appreciation of the problems involved in such topics as—

Democracy, Socialism, Communism;

Constitutions and constitutional government;

Political power, political rights, political equality;

The State and the individual.

Recommended Books—

Part A—

Crisp—*Parliamentary Government in the Commonwealth of Australia.*
Overacker—*The Australian Party System.*
Denning—*Inside Parliament.*
Greenwood—*The Future of Australian Federalism.*
Jennings—*The British Constitution.*
Laski—*Parliamentary Government in England.*
Key—***Politics, Parties and Pressure Groups.***
Nicholas—*The American Union.*

For general reading, such books as—

Reynolds—*Edmund Barton.*
Whitington—***The House will Divide.***
Evatt—***Australian Labor Leader.***
Eggleston—***Reflections of an Australian Liberal.***

Part B—No general textbooks will be set. References will be given in lectures on specific topics.

G31c Government (Conversion).

This course of 72 lectures will be the same as that described under G31.

G40 Psychology (Minor Elective).

Heredity and some Social Issues.

This topic is offered as a means of directing students to a critical examination of a number of related social questions which are commonly approached with an uncritical acceptance of current prejudices and practices.

It is intended that an approach to these questions be made through an understanding of scientifically determined facts in order that the dangers of mere opinion or "commonsense" shall be seen as a questionable approach to social questions, in the same way as it is to those technical fields which may be regarded by the student, as an intending technologist, as his major field of study.

As part of this intention, the reality of the distinctions, as well as the inter-relationships between heredity and environment, will be examined from the standpoint of causal elements in social behaviour. An examination will then be made of the methods and findings of typical investigations into relevant psychological aspects of these social questions.

The lectures will be given by Mr. Olley.

Synopsis—

1. A statement of main issues.
2. The mechanism of heredity.
3. The limits of heredity—what we do and do not inherit.

4. The nature and effects of environment.
5. Heredity and sex differences.
6. Heredity and "race" differences.
7. Heredity and "class" differences.
8. Heredity and delinquency and crime.
9. Heredity and social customs.

Reference Books—

Scheinfeld, A.—*You and Heredity.*
Blackburn, J.—*The Framework of Human Behavior.*
Anastasi, A. & Foley—*Differential Psychology.*
Klineberg, O.—*Social Psychology.*

G41 Psychology (Minor Elective).

The principal aim of this course is to acquaint the student with psychology as a cultural subject.

Beginning with the discoveries of Freud and stemming from them, dynamic psychology has made a profound impact on thought in almost all fields of enquiry, notably the social sciences. As a consequence, the findings of psychology have led to a clearer understanding of custom, convention, morality and the like.

A general account will be given of the basic tenets of psychoanalytic theory and their modification in recent years. This will be followed by an account of the influence of psychoanalytic concepts on literature, art, religion, social theory, anthropology, education and of the manner in which psychology has thrown light on various social problems such as sexual morality, conventionalism, the social deviant, censorship and values.

The principal objective of the course is to develop criticism by encouraging the student to see things as they are and through such objectivity to assist him to see through the assumptions and illusions current in the conventional virtues and customs.

The lectures will be given by Mr. Martin.

Reference Book—

Freud, S.—*Introductory Lectures on Psychoanalysis.*

G42 Psychology (Major Elective).

This course will be confined to a treatment of general psychology with a social emphasis. The usual topics of general psychology—perceiving, thinking, remembering, intelligence, personality, motivation and emotion—will be covered and their social aspects considered. An attempt will also be made to suggest how psychology might be integrated with ethnology and social interaction generally, as well as the social determinants of personality which will be emphasised.

Lectures will be given by Mr. Haynes, Mr. Olley, Mr. Martin and Mr. Kenna.

Reference Books—

Stagner, R. & Karwoski, T. S.—*Psychology.* McGraw Hill, New York. 1952.

Klineberg, O.—*Social Psychology.*

Hartley & Hartley—*Fundamentals of Social Psychology.*

G42o Psychology (Conversion).

The outline of this course is the same as that given for G42.

G50 Economics (Minor Elective).

Twenty-four lectures given by Professor Hartwell, Mr. Runcie and other members of the Economics Department. This is a course in Descriptive Economics, giving an account of the development and present structure of the Australian economy. It may be taken by itself as a self-contained course, or as a descriptive introduction to the fourth-year Major Elective in Economics.

A brief outline follows:—

> Stages and events in the development of the Australian economy; the prison farm; the pastoral and gold era; industrialisation. The growth of Australia's national income; how it is now made up and to whom it is distributed. Structure of the economy; size and location of industries; survey of economic resources. Population: growth and present distribution. Key industries: wool, wheat, coal, steel, transport and irrigated agriculture. Foreign trade: imports, exports and the balance of payments; the tariff system. The Australian banking system. Government finance: taxation, Loan Council, the Budget, State finances; other activities of governments in the economy. Trade unions: organisation and policies; the Arbitration Court; joint consultation; incentive schemes.

Recommended Books—

Commonwealth Year Book (most recent).

Andrews, J.—*Australia's Resources and Their Utilisation,* Parts 1 and 2.

G51 Economics (Major Elective).

This course will be divided into two parts:—

A. *Economic Theory* (48 lectures). This part of the course will introduce the student to the main departments of economic theory.

(*a*) The Theory of the Firm and the Industry: An examination of the theory of the particular firm and industry; determination of price and output in various market situations.

(*b*) The Theory of the Level of Economic Activity: A critical review of various theories of the trade cycle; application of this branch of theory to domestic and international monetary problems and the problems of public finance.

(*c*) The Theory of Economic Development: Some aspects of the theory of economic development with particular reference to the problems of "underdeveloped" countries.

B. *Economic History* (24 lectures). The Industrial Revolution: An examination of the industrial revolution in Great Britain and of the world economy in the nineteenth century.

The lectures will be given by Professor Hartwell, Mr. Runcie and other members of the Economics Department.

Recommended Book—

Samuelson, P. A.—*Economics, an Introductory Analysis* (2nd Edition. 1951).

Reference Books—

A reading list will be supplied.

G51c Economics (Conversion).

This course of 72 lectures will be the same as that described under G51.

TEXT BOOKS.

The following text books are recommended for 1955.*

PHYSICS—1.01 to 1.92.

Subject.		Text Book.
1.11 1.11A	Physics	Lemon and Ference—*Analytical Experimental Physics.* Starling—*Mechanical Properties of Matter.*
1.11D Part I 1.41 1.41D 1.91	Physics ...	Lemon and Ference—*Analytical Experimental Physics.*
1.12 1.92	Physics ...	Robertson—*Introduction to Physical Optics.* Gilbert—*Electricity and Magnetism.* Milton—*Heat.* Stranathan—*Particles of Modern Physics.* *OR* Starling and Woodall—*Physics.*
1.11D Part II 1.42 1.42D	Physics ...	Starling—*Mechanical Properties of Matter.* Milton—*Heat.* Noakes—*Text Book of Light* (for 1.42 only). Noakes—*Text Book of Electricity and Magnetism.*
1.13	Physics	Harnwell—*Principles of Electricity and Electromagnetism.* Kittel—*Introduction to Solid-State Physics.* Rojansky—*Introductory Quantum Mechanics.* Zemansky—*Heat and Thermodynamics.* Hardy and Perrin—*Principles of Optics.*
1.14	Physics	Shockley—*Electrons and Holes in Semi-Conductors.* McCrea—*Relativity Physics.*

Optometrical Science.

Advanced Visual Physiology and Physiological Optics.	Adler—*Physiology of the Eye.* Ogle—*Researches in Binocular Vision.* Hartridge—*Recent Advances in the Physiology of Vision.*

Reference.

Wright—*Researches in Normal and Defective Colour Vision.*
Duke-Elder—*Textbook of Ophthalmology.*
Polyak—*The Retina.*
Dudley—*Stereoptics.*
Tschermak—*Physiological Optics.*
Granit—*Sensory Mechanisms of the Retina.*
Gibson—*The Perception of the Visual World.*
Hering—*Spatial Sense and Movements of the Eye.*
Luneburg—*Mathematical Analysis of Binocular Vision.*

* Note.—Text books for subjects not listed will be recommended by lecturers in those subjects.

APPLIED CHEMISTRY—2.01 to 2.97.

SUBJECT.	TEXT BOOK.
2.111 Chemistry for Engineers...	Latimer and Hildebrand—*Reference Book of Inorganic Chemistry* (Revised Edition, 1940).
	Bound with
	Hildebrand—*Principles of Chemistry* (5th Edition, 1947).
	Sydney Technical College—*First Year Practical Chemistry Notes*—Union Store.
	Read—*Textbook of Organic Chemistry* (3rd Edition).
	OR
	English and Cassidy—*Principles of Organic Chemistry.*
	OR
	Garside and Phillips—*Textbook of Pure and Applied Chemistry* (1953).
2.122, 2.122D, and 4.912 Engineering Chemistry and Metallurgy.	Gyngell—*Applied Chemistry for Engineers* (2nd Edition, 1951).
	Carman—*Chemical Constitution and Properties of Engineering Materials.*
	Reference.
	Leighou—*Chemistry of Engineering Material* (4th Edition, 1942).
2.184 Botany	McLean and Cook—*Textbook of Theoretical Botany.*
	Reference.
	Smith—*Cryptogamic Botany* (2 vols.).
	Fritsch—*The Structure and Reproduction of the Algae* (2 vols.).
	Gaumann and Dodge—*Comparative Morphology of the Fungi.*
	Campbell—*Mosses and Ferns.*
	Bower—*Primitive Land Plants.*
	Coulter and Chamberlain—*Morphology of the Gymnosperms.*
	Chamberlain—*The Living Cycads.*
	Eames—*Morphology of Vascular Plants.*
	Randle—*Classification of Flowering Plants* (2 vols.).
	Hutchinson—*The Families of Flowering Plants.*
	Sinnott, Dunn and Dobzhansky—*Principles of Genetics.*
	Huxley—*Evolution : the Modern Synthesis.*
2.194 Zoology	Imms—*Textbook of Entomology.*
	Grove and Newell—*Animal Biology.*
	Storer—*General Zoology.*
	Reference.
	Borradaile et al.—*The Invertebrata.*
	Parker and Haswell—*Textbook of Zoology.*
	Tillyard—*Insects of Australia and New Zealand.*

APPLIED CHEMISTRY—2.01 to 2.97—*continued.*

	SUBJECT.	TEXT BOOK.
		Reference.
2.194	Zoology—*contd.* ...	Sinnott et al.—*Principles of Genetics.*
		Dobzhansky—*Genetics and the Origin of Species.*
		Mays, Linsley and Usinger—*Methods and Principles of Systematic Zoology.*
		Bullough—*Practical Invertebrate Anatomy.*
2.32 2.32A 2.32D	Physical Chemistry	Weichert—*Anatomy of Chordates.* Glasstone—*Elements of Physical Chemistry.*
		Reference.
		Glasstone—*Textbook of Physical Chemistry.*
		Eastman and Rollefson—*Physical Chemistry.*
		Hammett—*Introduction to the Study of Physical Chemistry.*
		Practical.
		Palmer—*Practical Physical Chemistry.*
		Practical Notes—*Physical Chemistry I and II.*
2.33	Physical Chemistry ...	Glasstone—*Elements of Physical Chemistry.*
		Reference.
		Glasstone—*Textbook of Physical Chemistry.*
		Eastman and Rollefson—*Physical Chemistry.*
		Hammett—*Introduction to the Study of Physical Chemistry.*
		Practical.
		Practical Chemistry Notes—*Physical Chemistry I and II.*
		Reference.
2.34 2.34D	Physical Chemistry	Alexander and Johnson—*Colloid Science.*
		Harrison, Lordand and Loofbourow—*Practical Spectroscopy.*
		Steiner—*Chemical Thermodynamics.*
		Nachtreib—*Spectrochemical Analysis.*
		Laidler—*Chemical Kinetics.*
		Hinshelwood—*The Structure of Physical Chemistry.*
2.41 2.41A 2.41B	Chemistry	Latimer and Hildebrand—*Reference Book of Inorganic Chemistry* (Revised Edition, 1940)
		Bound with
		Hildebrand—*Principles of Chemistry* (5th Edition, 1945).
		Brown—*A Simple Guide to Modern Valency Theory.*
		English and Cassidy—*Principles of Organic Chemistry.*
		OR
		Read—*Textbook of Organic Chemistry* (3rd Edition).
		General Chemistry Practical Notes—University of Technology.
		Vogel—*Textbook of Qualitative Chemical Analysis* (3rd Edition, 1945).

APPLIED CHEMISTRY—2.01 to 2.97—*continued.*

	SUBJECT.	TEXT BOOK.
2.42	Inorganic Chemistry	Sidgwick—*Chemical Elements and their Compounds* (2 vols.). Emeleus and Anderson—*Modern Aspects of Inorganic Chemistry.* Brown—*A Simple Guide to Modern Valency Theory.*
2.52 2.52A	Quantitative Analysis.	Vogel—*A Textbook of Quantitative Inorganic Analysis.* *OR* Kolthoff and Sandell—*A Textbook of Quantitative Inorganic Analysis.* Sydney Technical College—*Quantitative Analysis I Practical Notes*—Union Store.
		Reference.
2.53	Quantitative Analysis	Hildebrand and Lundell—*Applied Inorganic, Analysis.* Willard and Diehl—*Advanced Quantitative Analysis.* Lundell and Hoffman—*Outlines of Methods of Chemical Analysis.* Walton—*Principles and Methods of Chemical Analysis.* Welcher—*Organic Analytical Reagents.* Sandell—*Colorimetric Determination of Traces of Metals.* A.S.T.M.—*Methods of Chemical Analysis of Metals.* *British Standard Methods of Analysis for Iron and Steel.* Sydney Technical College—*Quantitative Analysis II, Practical Notes*—Union Store.
		Reference.
2.54 2.54D	Quantitative Analysis.	Balston and Talbot—*A Guide to Filter Paper and Cellulose Powder Chromatography.* Pollard and McOmie—*Chromatographic Methods of Inorganic Analysis.* Kolthoff and Lingane—*Polarography.* Kolthoff and Furman—*Potentiometric Titrations.* Samuelson—*Ion Exchangers in Analytical Chemistry.* Luder and Zuffanti—*Electronic Theory of Acids and Bases.* Audrieth and Kleimberg—*Non-Aqueous Solvents, Applications as Media for Chemical Reactions.*
2.62	Organic Chemistry	English and Cassidy—*Principles of Organic Chemistry.* *OR* Noller—*Chemistry of Organic Compounds.*

APPLIED CHEMISTRY—2.01 to 2.97—*continued.*

	Subject.	Text Book.
2.63 2.63A	Organic Chemistry	Finar—*Organic Chemistry* *OR* Fieser and Fieser—*Organic Chemistry* *OR* Noller—*Chemistry of Organic Compounds.* Turner and Harris—*Organic Chemistry.*
2.64 2.64A 2.64D	Organic Chemistry	Wilde—*Characterisation of Organic Compounds* *OR* Openshaw—*Characterisation of Organic Chemistry.*
		Reference.
2.72	Mathematical Chemistry I.	Worthing and Geffner—*The Treatment of Experimental Data.* Hitchcock and Robinson—*Differential Equations in Applied Chemistry.* Crumpler and Yoe—*Chemical Computation and Errors.* Bridgman—*The Method of Dimensions.* Barbor and Thiessen—*How to Solve Problems in Physical Chemistry.*
2.73	Mathematical Chemistry II.	Brownlee—*Industrial Experimentation.* Moroney—*Facts from Figures.*
		Reference.
		Bennett and Franklin—*Statistical Analysis in Chemical Industry.* Davies, O. L. (Ed.)—*Statistical Methods in Industry and Research.* Davies, O. L. (Ed.)—*Design and Analysis of Industrial Experiments.*
		Reference.
2.91	Biochemistry (Wool Technology).	Bell—*Carbohydrate Biochemistry.* *Practical Notes*—2.91 *Biochemistry*—Union Store.
2.911	Biology	Smith et al.—*Textbook of General Botany.* Grove and Newell—*Animal Biology.* Bucksbaum—*Animals without Backbones.*
		Reference.
		Murray—*Biology.* McLean and Cook—*Biology.* Rogers et al.—*Man and the Biological World.* Storer—*General Zoology.* Sinnott—*Botany—Principles and Problems.* Hill et al.—*Botany.* Scheinfeld—*You and Heredity.* Borradaile—*Manual of Zoology.* Peacock—*Elementary Microtechniques.* Briggs—*Anatomy of Animal Types.* Ward and Whipple—*Freshwater Biology.* Tansley—*Introduction to Plant Ecology.* McLean and Cook—*Practical Field Ecology.* Carey—*Botany by Observation.* Besley and Meyer—*Field Work in Animal Biology.*

APPLIED CHEMISTRY—2.01 to 2.97—*continued.*

Subject.		Text Book.
2.912	Biology	Smith et al.—*Textbook of General Botany.* Grove and Newell—*Animal Biology.* **Reference.** Borradaile—*Manual of Zoology.* de Beer—*Vertebrate Zoology.* Romer—*Man and the Vertebrates.* Maximon and Bloom—*Textbook of Histology.* Schafer—*Essentials of Histology.* Gillison—*Histology of the Body Tissues.* Eames and MacDaniels—*Introduction to Plant Anatomy.* Jones—*Introduction to Floral Mechanisms.* Swingle—*Textbook of Systematic Botany.* Hutchinson—*Families of Flowering Plants.* Berkeley—*Practical Plant Anatomy.* Saunders and Manton—*Practical Vertebrate Morphology.* Harris—*Wild Flowers of Australia.*
2.913	Physiology	Suitable books will be recommended by lecturers after the commencement of classes.
2.92	Biochemistry (Wool Technology and Food and Nutrition).	Baldwin—*Dynamic Aspects of Biochemistry.* **Reference.** **Fruton and Simmonds**—*General Biochemistry.* *Practical Notes*—2.92 *Biochemistry*—Union Store.
2.924	Microbiology	Salle—*Fundamental Principles of Bacteriology.* Clifton—*An Introduction to the Bacteria.* Gardner—*Bacteriology for Medical Students and Practitioners.* Bigger—*Handbook of Bacteriology.* Fairbrother—*A Textbook of Medical Bacteriology.* **Reference.** Muir and Ritchie—*A Manual of Bacteriology.* Mackie and McCartney—*An Introduction to Practical Bacteriology.* Smith and Martin—*Zinsser's Textbook of Bacteriology.* Wilson and Miles—*Principles of Bacteriology and Immunity.* Topley and Wilson. Anderson—*An Introduction to Bacteriological Chemistry.*
2.925	Microbiology	Gale—*The Chemical Activities of Bacteria.* Wilson and Miles—*Principles of Bacteriology and Immunity.* Topley and Wilson. **Reference.** Baumgartner—*Canned Foods—An Introduction to their Microbiology.* Prescott and Dunn—*Industrial Microbiology.* Jensen—*Microbiology of Meats.* Tanner—*Microbiology of Foods.*

APPLIED CHEMISTRY—2.01 to 2.97—*continued.*

SUBJECT.		TEXT BOOK.
		Reference—*contd.*
2.925	Microbiology—*contd.*...	Lodder and Kreger—*The Yeasts—A Taxonomic Study.*
		Werkman and Wilson—*Bacterial Physiology.*
2.926	Microbiology	Alexopaulos—*Introductory Mycology.*
		Bessey—*Morphology and Taxonomy of Fungi.*
		Reference.
		Wolf and Wolf—*The Fungi* (Vols. I and II).
		Ainsworthy and Bisby—*Dictionary of the Fungi.*
		Large—*The Advance of Fungi.*
		Smith—*Introduction of Industrial Mycology.*
		Buller—*Researches on Fungi* (Vols. I–VI).
		Hawker—*Physiology of the Fungi.*
		Wacksman—*Principles of Soil Microbiology.*
		Forster—*Chemical Activities of the Fungi.*
		Cartwright and Findlay—*Decay of Timber and its Prevention.*
2.95	Biochemistry ...	Baldwin—*Dynamic Aspects of Biochemistry.*
		Fruton and Simmonds—*General Biochemistry.*
		Reference.
		Sumner and Somers—*Chemistry and Methods of Enzymes.*
		Practical Notes—2.95 *Biochemistry I*—Union Store.
2.96 2.97	Biochemistry ...	Sumner and Somers—*Chemistry and Methods of Enzymes.*
		Tauber—*The Chemistry and Technology of Enzymes.*
		Reference.
		Dixon—*Multi-Enzyme Systems.*
		Sumner and Mybach—*The Enzymes.*

CHEMICAL ENGINEERING 3.01 to 3.75.

3.14 3.14A	Industrial Chemistry	Riegel—*Industrial Chemistry* (5th Edition).
		Shreve—*Chemical Process Industries.*
		Groggins—*Unit Processes in Organic Synthesis.*
3.24 3.24D	Chem. Engineering Unit Operations.	Brown and Associates—*Unit Operations.*
		Perry—*Chemical Engineers' Handbook.*
		Badger and McCabe—*Elements of Chemical Engineering.*
		Kern—*Process Heat Transfer.*
		Rouse—*Elementary Mechanics of Fluids.*
		Reference.
		McAdams—*Heat Transmission.*
		Riegel—*Chemical Machinery.*
		Robinson and Gilliland—*Fractional Distillation.*
		Treybal—*Liquid Extraction.*
		Sherwood and Pigford—*Absorption Extraction.*

CHEMICAL ENGINEERING—3.01 to 3.75—*continued.*

	SUBJECT.	TEXT BOOK.
3.34 3.34D	Chemical Engineering Design.	Low—*Pocket Book for Mechanical Engineers.* *OR* *Mechanical World Pocket Book.* Faires—*Design of Machine Elements.* *OR* Maleev—*Machine Design.* Perry—*Chemical Engineers' Handbook.* Stoever—*Applied Heat Transmission.* *OR* McAdams—*Heat Transmission.* *B.S. Code* 1500 *Fusion Welded Pressure Vessels.* *S.A.A. British Specification* 436 (*Gears*). Institution of Engineers—*Australian Standard Engineering Drawing Practice* (1952 Edition). **Reference.** Hesse and Rushton—*Process Equipment Design.* Marks—*Mechanical Engineers' Handbook.* American Society for Metals—*Metals Handbook.* *A.S.M.E.—Boiler Construction Code.* *S.A.A. Boiler Code, C.B.* 1. *S.A.A. Code for Corrosion Resistant Steel Boilers, C.B.* 10. *S.A.A. Welding Code, C.A.* 8. *S.A.A. Code for Structural Steel in Buildings, C.A.*1. *S.A.A. Code for Reinforced Concrete.* *S.A.A. Crane and Hoist Code.*
3.44	Chemical Engineering Calculations.	Hougen and Watson—*Chemical Process Principles* (Vol. 1.) **Reference.** Sherwood and Reed—*Applied Mathematics in Chemical Engineering.* Davis, D. S.—*Empirical Equations and Nomography.* Chambers—*Statistical Calculations.* Brownlee—*Industrial Experimentation* (4th Edition, 1949). Hitchcock and Robinson—*Differential Equations* (2nd Edition, 1936). Lipka—*Graphical and Mechanical Computations.* Haslam and Russell—*Fuels and Their Combustion.* Davies, O. L.—*Statistical Methods in Research and Production.* Worthing and Geffner—*Treatment of Experimental Data.* I. S. & E. S. Sokolnikoff—*Higher Mathematics for Engineers and Physicists.*
3.54	Chemical Engineering Materials.	Stevens and Donald—*Rubber in Chemical Engineering,* 1949.

CHEMICAL ENGINEERING—3.01 to 3.75—*continued.*

	SUBJECT.	TEXT BOOK.
		Reference.
3.54	Chemical Engineering Materials—*contd.*	Vivian—*Essential Metallurgy for Engineers*, 1948. Rollason—*Metallurgy for Engineers*, 1947. Smith, Paul I.—*Plastics for Production*, 1944. Barron—*Modern Plastics*, 1949. Burton, W. E. (Ed.)—*Engineering with Rubber*, 1949. U.S. Department of Interior, Bureau of Reclamation—*Concrete Manual.* Norton—*Refractories*, 1949. Morey, G. W.—*Properties of Glass*, 1938.
3.65	Chemical Engineering Thermodynamics and Kinetics.	Smith, J. M.—*Introduction to Chemical Engineering Thermodynamics.* **Reference.** Hougen and Watson—*Chemical Process Principles* (Vols. II and III.) Dodge—*Chemical Engineering Thermodynamics.* Guggenheim—*Thermodynamics.* Hinshelwood—*Kinetics of Chemical Change.*
	Food Technology I ...	Baumgartner, J. G.—*Canned Foods.* Tressler, D. K. and Evers, C. F.—*The Freezing Preservation of Foods.* Loesecke, H. W. v.—*Outlines of Food Technology.* **Reference.** Jacobs, M. B.—*Food and Food Products* (3 vols.).
	Food Technology II...	Bate-Smith, E. C. and Morris, T. N.—*Food Science.* Bailey, E. A.—*Industrial Oil and Fat Products.* Jensen, L. B.—*Meat and Meat Foods.* **Reference.** Mrak, E. M. and Stewart, G. F.—*Advances in Food Research* (Vols. I–V).

METALLURGY—4.01 to 4.912.

4.12	General Metallurgy	Alexander, W. and Street, A.—*Metals in the Service of Man.* Penguin. Brown A. and Orford, A.—*The Iron and Steel Industry.* Farwell, G.—*Down Argent Street.* Johnson, Sydney. Butts, A.—*Metallurgical Problems* (2nd Edition). McGraw-Hill. Newton, J.—*Introduction to Metallurgy* (2nd Edition). Wiley.

METALLURGY—4.01 to 4.912—*continued.*

	SUBJECT.	TEXT BOOK.
4.22	Metallurgical Engineering.	Schummann—*Metallurgical Engineering* (Vol. I). Norton—*Elements of Ceramics.* Butts—*Metallurgical Problems.* Darken and Gurry—*Physical Chemistry of Metals.* Thring—*The Science of Flames and Furnaces.*
4.32	Physical Metallurgy	Cottrell, A. H.—*Theoretical Structural Metallurgy.* Arnold. Hume-Rothery, W.—*The Structure of Metals and Alloys.* Inst. Metals. Kehl, G. L.—*Principles of Metallographic Laboratory Practice.* (3rd Edition). McGraw Hill. Hollomon, J. and Jaffe, L.—*Ferrous Metallurgical Design.* Wiley. Sachs, E. and van Horn, K.—*Practical Metallurgy.* A.S.M.
4.33	Physical Metallurgy	Boas, W.—*An Introduction to the Physics of Metals and Alloys.* Melbourne University Press. Hume-Rothery, W.—*Atomic Theory for Students of Metallurgy.* Inst. Metals. Bassett, C. S.—*Structure of Metals* (2nd Edition). McGraw-Hill. Rayner, G. V.—*An Introduction to the Electron Theory of Metals.* Inst. Metals. Cottrell, A. H.—*Dislocations and Plastics Flow in Crystals.* Oxford University Press. Read, W. T.—*Dislocations in Crystals.* McGraw-Hill. Bain, E. C.—*Functions of the Alloying Elements in Steel.* A.S.M. Bullens, D. K.—*Steel and Its Heat Treatment.* Wiley. Grossmann, M. A.—*Elements of Hardenability.* A.S.M.

MECHANICAL ENGINEERING—5.01 to 5.94.

5.101	Engineering Drawing & Materials.	Institution of Engineers, Australia—*Australian Standard Engineering Drawing Practice* (CZ1—1946). Sydney Technical College—*Lecture Notes for Mechanical Engineering I.*

MECHANICAL ENGINEERING—5.01 to 5.94.—*continued.*

SUBJECT.		TEXT BOOK.
5.11 5.11D	Engineering Drawing.	Institution of Engineers, Australia—*Australian Standard Engineering Drawing Practice* (CZ1—1946). Sydney Technical College—*Lecture Notes for Mechanical Engineering I.*
5.12 5.12D	Mechanical Engineering Design.	Black, Paul H.—*Machine Design.* *OR* Faires—*Design of Machine Elements* (2nd Edition, 1941).
5.13 5.13D	Mechanical Engineering Design.	Black, Paul H.—*Machine Design.* *OR* Faires—*Design of Machine Elements* (2nd Edition, 1941). Den Hartog—*Fluid Mechanics* (1st Edition, 1948). *B.S.S. Spur Gears.* *B.S.S. Worm Gears.* *S.A.A. Crane and Hoist Code, C.B.* 2. *N.S.W. Scaffolding and Lifts Act.*
5.32 5.32D	Engineering Mechanics.	Bevan, Thomas—*Theory of Machines* (2nd Edition 1943). Sydney Technical College—*Lecture Notes for Mechanical Engineering IIIA.*
5.33 5.33D	Theory of Machines	Bevan, Thomas—*Theory of Machines* (2nd Edition, 1943). Sydney Technical College—*Lecture Notes for Mechanical Engineering IIIA.*
5.34 5.34D	Theory of Machines	Bevan, Thomas—*Theory of Machines* (2nd Edition, 1943). Den Hartog—*Mechanical Vibrations* (3rd Edition, 1947). **Reference.** Rosenauer and Willis—*Kinematics of Mechanisms,*
5.41 5.41D	Descriptive Geometry.	Abbot, W.—*Practical Geometry and Engineering Graphics* (5th Edition, 1951).
5.52	Fluid Mechanics ...	Vennard—*Elementary Fluid Mechanics* (3rd Edition, 1954.)
5.53 5.53D	Fluid Mechanics ...	Hunsaker and Rightmire—*Engineering Applications of Fluid Mechanics.* **Reference.**
5.54 5.54D	Fluid Mechanics ...	Wislicenus—*Fluid Mechanics of Turbo-Machines.* Stephanoff—*Centrifugal and Axial-flow Pumps.* Vincent, E. T.—*Theory of Gas Turbines and Jet Engines.*

MECHANICAL ENGINEERING—5.01 to 5.94—*continued.*

	SUBJECT.	TEXT BOOK.
5.72 5.72D	Thermodynamics ...	Inchley—*Theory of Heat Engines.* Wrangham—*Theory and Practice of Heat Engines.* Faires—*Heat Engines.*
5.73 5.73D	Thermodynamics ...	Wrangham—*Theory and Practice of Heat Engines.* Wright Baker—*Inchley's Theory of Heat Engines.* Lewitt—*Thermodynamics Applied to Heat Engines.* Pye—*The Internal Combustion Engine.*
5.74 5.74D	Thermodynamics ...	Wrangham—*Theory and Practice of Heat Engines.* Kearton—*Steam Turbine Theory and Practice.* Cohen and Rogers—*Gas Turbine Theory.*
	Seminars	Willis, A. H.—*The Technical Lecture.*

ELECTRICAL ENGINEERING—6.01 to 6.95.

6.12 6.12D	Electric Circuit Theory.	Kerchner and Corcoran—*Alternating Current Circuits* (3rd Edition, 1951). Timbie and Bush—*Principles of Electrical Engineering* (4th Edition). **Reference.** Frazier—*Elementary Electric Circuit Theory.*
6.13 6.13A 6.13B	Electric Circuit Theory.	Kimbark, Edward W.—*Electrical Transmission of Power and Signals*, 1949. Kerchner and Corcoran—*Alternating Current Circuits* (3rd Edition, 1951).
6.214	Electric Power Engineering A.	Starr, A. T.—*Generation, Transmission and Utilization of Electric Power* (2nd Edition, 1942).
6.224	Electric Power Engineering B.	Fitzgerald and Kingsley—*Electric Machinery* (1st Edition, 1952). Say—*Performance and Design of Alternating Current Machines.* **Reference.** M.I.T. Staff of Dept. of Electrical Engineering—*Magnetic Circuits and Transformers.* Westinghouse Electric Mfg. Co.—*Electrical Transmission and Distribution Reference Book* (3rd Edition, 1944). Pestarini, J. M.—*Metadyne Statics.* Wiley. Knowlton, A. E.—*Standard Handbooks for Electrical Engineers.* McGraw-Hill. Kimbark, E. W.—*Power System Stability* (2 vols.). Wiley. Carr, T. H.—*Electrical Power Stations* (2 vols.). Chapman & Hall. Waddicor, H.—*Principles of Electric Power Transmission.* Chapman & Hall.

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SUBJECT.	TEXT BOOK.
	Reference—*contd.*
6.224 Electrical Power Engineering B—*contd.*	Stigant, S. A. and Lacey, H. M.—*J. & P. Transformer Book.* Johnson & Phillips.
	Wagner, C. F. and Evans, R. D.—*Symmetrical Components.* McGraw-Hill.
	Stubbings, G. W.—*Automatic Protection of A.C. Circuits.* Chapman & Hall.
	Concordia, C.—*Synchronous Machines, Theory and Performance.* Wiley.
	Lawrence, R. R.—*Principles of A.C. Machinery.* McGraw-Hill.
	Langsdorf, A. S.—*Principles of Direct Current Machines.* McGraw-Hill.
	Sah, A. P. T.—*Fundamentals of Alternating Current Machines.* McGraw-Hill.
	Parker Smith, S. and Say, W. G.—*Electrical Engineering Design Manual.* Chapman & Hall.
6.23, 6.23A, 6.23B } Electric Power Engineering.	Clayton—*Performance and Design of Direct Current Machines.*
	Say—*Performance and Design of Alternating Current Machines.*
6.303, 6.303A, 6.303B } Electronics ...	Parker—*Electronics,* 1950.
	Langford-Smith, F.—*Radiotron Designer's Handbook* (4th Edition).
	Amalgamated Wireless Valve Co.—*Radiotron Valve Data Book.*
6.304, 6.304A, 6.304B } Industrial Electronics and Control.	Cage, J. M.—*Theory & Applications of Industrial Electronics* (1951).
	Chestnut & Mayer—*Servomechanisms and Regulating System Design.*
	Reference.
	Jaeger, J. C.—*An Introduction to the Laplace Tranformation.* Methuen.
	Brown, G. S. and Campbell, D. P.—*Principles of Servomechanisms.* Wiley.
	Porter, A.—*An Introduction to Servomechanisms.* Methuen.
	Thaler and Brown—*Servomechanism Analysis.* McGraw-Hill.
	Reyner, J. H.—*The Magnetic Amplifier.*
6.314 High Frequency Engineering A.	Seely, S.—*Electron Tube Circuits.* McGraw-Hill.
6.324 High Frequency Engineering B.	Arguimbau, L. B.—*Vacuum Tube Circuits* (1943).
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	Reference.
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SUBJECT.		TEXT BOOK.
		Reference *contd.*
6·324	High Frequency Engineering B—*contd.*	Amalgamated Wireless Valve Co.—*Radiotron Valve Data Book.*
		American Radio Relay League—*The Radio Amateur's Handbook* (latest Edition).
		Bronwell and Beam—*Theory and Application of Microwaves.*
		Langford-Smith, F.—*Radiotron Designer's Handbook* (4th Edition).
		Cherry, C.—*Pulses and Transients in Communication Circuits.* Chapman and Hall.
		Parker, P.—*Electronics.* Arnold.
		Puckle, O. S.—*Time Bases.* Chapman and Hall.
		Westinghouse Electric Mfg. Co.—*Industrial Electronics Reference Book.* Wiley.
		Williams—*Antenna Theory and Design.*
		Starr, A. T.—*Radio & Radar Techniques.* Pitman.
		Starr, A. T.—*Electronics.*
		Bode, H.—*Network Analysis & Feedback Amplifier Design.* Van Nostrand.
		C.S.I.R.—*Textbook of Radar.*
		Seely, S.—*Answers to Electron Tube Circuits.*
6.83 6.83D	Electrical Engineering.	Cook, A. L. and Carr—*Elements of Electrical Engineering* (5th Edition, 1947).
6.94	Electrical Engineering	Erickson and Bryant—*Electrical Engineering Theory and Practice,* 1952.
		Reference.
	Professional Elective—Measurements.	Golding, E. W.—*Electrical Measurements and Measuring Instruments.* Pitman.
		Hague, B.—*A.C. Bridge Methods.* Pitman.
		Terman and Pellit—*Electronic Measurements.* McGraw-Hill.
		Karo—*Electrical Measurements* (Vols. I and II).
		Harris—*Electrical Measurements.*
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MINING ENGINEERING AND APPLIED GEOLOGY—7.001 to 7.583.

7.001	Mining Processes and Practice.	Elford and McEwan—*Coal Mining in Australia.* Lewis—*Elements of Mining.*
		Reference.
		Statham—*Coal Mining.*
		Watts—*Geology for Beginners.*
		N.S.W. Mines Department—*Prospectors' Guide.*
7.002	Mining	Moss—*Gases, Dust and Heat in Mines.*
		Penman and Penman—*Principles and Practice of Mine Ventilation.*

MINING ENGINEERING AND APPLIED GEOLOGY—7.001 to 7.583—*contd.*

SUBJECT.	TEXT BOOK.
7.002 Mining—*continued* ...	Whitaker, J. W.—*Mine Lighting.* Whitaker and Willet—*Colliery Explosions and Recovery Work.* Haldane and Graham—*Method of Air Analysis.* Statham—*Coal Mining.* **Reference.** *N.S.W. Coal Mines Regulation Act.* *N.S.W. Mines Inspection Act.* Forster Brown—*Shaft Sinking.*
7.003 Mining...	Penman and Penman—*Principles and Practice of Mine Ventilation.* Statham—*Winning and Working.* Given—*Mechanical Loading of Coal Underground.* **Reference.** Peele—*Mining Engineers' Handbook* (2 vols., 3rd Edition, 1941). Du Pont—*Blaster's Handbook.*
7.004 Mining	Broughton—*Electric Winders* (2nd Edition, 1948). Staley—*Mine Plant Design.* Young—*Elements of Mining.* Peele—*Mining Engineers' Handbook* (2 Vols., 3rd Edition, 1941). Wheeler, H. R.—*Manual of Modern Underground Haulage Methods.*
7.013 Metalliferous Mining	Young—*Elements of Mining.* **Reference.** Peele—*Mining Engineers' Handbook* (2 Vols., 3rd Edition, 1941). Downey—*Timbering of Metalliferous Mines.* Beringer—*Underground Practice in Mining* (3rd Edition, 1947). Aust. Inst. Min. and Met.—*Mining Methods in Australia* (Vol. II, 5th Empire Mining Congress).
7.014 Coal Mining	Fritzsche and Potts—*Horizon Mining.* Whitaker and Willet—*Colliery Explosions and Recovery Work.* Penman and Penman—*Principles and Practice of Mine Ventilation.* Waltham—*Mine Rescue and First Aid.* **Reference.** Peele—*Mining Engineers' Handbook* (2 Vols., 3rd Edition, 1941). Aust. Inst. of Min. and Met.—*Coal Mining in Australia* (Vol. III, 5th Empire Mining Congress).

MINING ENGINEERING AND APPLIED GEOLOGY—7.001 to 7.583—*contd.*

SUBJECT.	TEXT BOOK.
7.024 Metalliferous Mining	Jackson and Hedges—*Metal Mining Practice.* Truscott—*Mine Economics.*
	Reference.
	Peele—*Mining Engineers' Handbook* (2 Vols., 3rd Edition, 1941). Jeppe—*Gold Mining on Witswaterand* (2 Vols.). Staley—*Mine Plant Design.* A.S.T.M.—*Methods of Chemical Analysis of Metals.* Bugbee—*Textbook of Fire Assaying.*
7.034 Preparation of Minerals.	Mitchell, D. R.—*Coal Preparation.* Gaudin—*Principles of Mineral Dressing.*
	Reference.
	Taggart, A. F.—*Handbook of Mineral Dressing.* Taggart, A. F.—*Elements of Ore Dressing.* Richards and Locke—*Textbook of Ore Dressing.* Wark and Sutherland—*Principles of Flotation.* Edwards—*Texture of the Ore Minerals.* Short—*Microscopic Determination of the Ore Minerals.*
7.502 7.502A } Geology	Emmons, Thiel, Stauffer and Allison—*Geology—Principles and Processes* (3rd Edition, 1949). *OR* Longwell, Knopf and Flint—*Physical Geology* (3rd Edition).
	Reference.
	Cotton, C. A.—*Germorphology* (5th Edition, 1949) Hills, E. S.—*Outlines of Structural Geology* (2nd Edition, 1944). Park, J.—*Textbook of Geology.* Roberts, A.—*Geological Structures and Maps* (1947).
7.503 7.503A 7.503B } Petrology	Ries and Watson—*Engineering Geology* (5th Edition, 1948). Tyrrell—*The Principles of Petrology* (9th Edition, 1948). Rogers and Kerr—*Optical Mineralogy* (1942).
	Reference.
	Pettijohn—*Sedimentary Rocks* (1949). *OR* Krumbein and Sloss—*Stratigraphy and Sedimentation* (1951). Harker—*Metamorphism.* Hatch, Wells and Wells—*The Petrology of the Igneous Rocks* (10th Edition, 1949).
7.504 Advanced Mineralogy and Petrology.	Ford, W. E.—*E. S. Dana's Textbook of Mineralogy,* (4th Edition). New York, John Wiley & Sons.
	Reference.
	Winchell, A. N.—*The Microscopic Characters of Artificial Inorganic Solid Substances or Artificial Minerals* (2nd Edition). New York, John Wiley and Sons, 1931. (With a chapter on the universal stage, by R. C. Emmons.)

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SUBJECT.	TEXT BOOK.
	Reference—*contd.*
7.504 Advanced Mineralogy and Petrology—*contd.*	Hartshone, N. H. and Stuart, A.—*Crystals and the Polarising Microscope.* London, Edward Arnold and Co., 1950.
	Chamot, E. M. and Mason, C. W.—*Handbook of Chemical Microscopy* (2 Vols., 2nd Edition). New York, John Wiley and Sons, 1949.
7.513 } Mineralogy and 7.513A } Crystallography.	Phillips, F. C.—*An Introduction to Crystallography.* London, Longman's Green and Co., 1951.
	Hurlbut, C. S.—*Dana's Manual of Mineralogy.* (15th Edition) New York, John Wiley and Sons, 1952.
	Reference.
	Ford, W. D.—*E. S. Dana's Textbook of Mineralogy* (4th Edition). New York, John Wiley and Sons.
	Rogers, A. F. and Kerr, P. F.—*Optical Mineralogy* (2nd Edition). New York, McGraw-Hill Book Co.
	Henry, N. F. M., Lipson, H., and Wooster, W. A.—*Interpretation of X-ray Diffraction Photographs.* London, Macmillan Co., 1951 (selected chapters only.)
7.514 Mining Geology, Mineral Economics, Mine Valutation.	Andrews, E. C.—*The Mineral Industry of N.S.W.* Department of Mines, 1929.
	Edwards, A. B.—*Geology of Australian Ore Deposits* (Vol. I, 5th Empire Mining Congress.)
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	Reference.
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	Lovering, J. S.—*Wall Rock Alteration as a Guide to Ore* (Monograph No. 1, Economic Geology, 1949).
	N.S.W. Mining Act.
	Reference.
7.523 } Stratigraphy and 7.523A } Palaeontology. 7.523B }	David, T. W. E.—*Geology of the Commonwealth of Australia* (Vol. I, 1950).
	Shrock, R. R. and Twenhofel, W. H.—*Principles of Invertebrate Palaeontology* (2nd Edition, 1953).
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SUBJECT.	TEXT BOOK.
7.533 7.533A 7.533B } Economic Geology	Lindgren, W.—*Mineral Deposits* (4th Edition, 1933). *OR* Bateman, A.—*The Formation of Mineral Deposits* **Reference.** Newhouse, W.—*Ore Deposits as related to Structural Features* (1942). Niggli, P.—*Rocks and Mineral Deposits* (English Translation, 1954).
7.534 Advanced Engineering Geology.	Leggett—*Geology and Engineering* (1939). **Reference.** Paige, S.—*Application of Geology to Engineering Practice* (Berkey Volume, 1950). Tolman, C. F.—*Groundwater* (1937).
7.543 7.543A 7.543B } Geophysics and Geotectonics.	Dobrin—*Introduction to Geophysicsal Prospecting* (1st Edition, 1952). **Reference.** Gutenburg, B.—*Internal Constitution of the Earth* (1951). Heiland, C. A.—*Geophysical Exploration* (1940). Limbgrove—*The Pulse of the Earth* (1947).
7.544 Geology of Fuels ...	Landes— *Petroleum Geology* (1951). **Reference.** Paige, S.—*Application of Geology to Engineering Practice* (Berkey Volume, 1950). Tolman, C. F.—*Groundwater* (1937).
7.553 Geology	Rutley—*Elements of Mineralogy* (24th Edition, 1948). Smith, H. G.—*Minerals and the Microscope* (4th Edition, 1940). **Reference.** Rogers and Kerr—*Optical Mineralogy* (1942). David—*The Geology of the Commonwealth of Australia.* Harker—*Petrology for Students* (7th Edition). Hatch, Wells and Wells—*The Petrology of the Igneous Rocks* (10th Edition, 1949). Tyrrell—*The Principles of Petrology* (9th Edition, 1948). Dana—*Textbook of Mineralogy* (4th Edition). Emmons—*Geology of Petroleum* (2nd Edition). Lahee—*Field Geology* (4th Edition, 1941). Bateman, A. M.—*Economic Mineral Deposits* (2nd Edition, 1950). Lindgren—*Mineral Deposits* (4th Edition, 1933). Reports of Scientific Societies and Geological Surveys. Andrews, E. C.—*The Mining Industry of N.S.W.* Department of Mines, N.S.W., 1929.

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SUBJECT.	TEXT BOOK.
	Reference—*contd.*
7.553 Geology—*contd.* ...	Edwards, A. B.—*Geology of Australian Ore Deposits* (Vol. I, Empire Mining Congress). McKeown, M. R.—*Coal in Australia* (Ibid., Vol. VI).
	Reference.
7.554 Geology	Forrester, J. D.—*Principles of Field and Mining Geology.* McKinstry—*Mining Geology.* Raistrick and Marshall—*Nature and Origin of Coal and Coal Seams.* Stutzer and Noe—*Geology of Coal.* Lindgren—*Mineral Deposits* (4th Edition, 1933). Bateman, A. M.—*Economic Mineral Deposits* (2nd Edition, 1950). Leggett—*Geology and Engineering.* Heiland—*Geophysical Exploration.*
	Reference.
Geology (General Science).	Shepard, F. P.—*Submarine Geology.* Harper New York, 1948. Lonsdale, D.—*Crystals and X-rays.* G. Bell & Sons, London, 1948. Winchell, A. N. and Winchell, H.—*Elements of Optical Mineralogy* (4th Edition, 3 Vols.). Chapman & Hall, New York. Wahlstrom—*Optical Crystallography.* Wiley, New York, 1945. Merril—*Rocks, Rock Weathering and Soils.*

CIVIL ENGINEERING—8.01 to 8.94.

	Reference.
8.112 8.112D } Theory of Structures	Den Hartog—*Strength of Materials.* Salmon, E. H.—*Materials and Structures* (Vol. I, *Elasticity and Strength of Materials*). Timoshenko and MacCullough—*Elements of Strength of Materials* (3rd Edition, 1949).
8.113 Structures	*S.A.A. Code CA2.*
	Reference.
	Stewart, D. S.—*Practical Design of Simple Steel Structures* (Vols. I and II—3rd and 2nd Editions, respectively). Grinter, L. E.—*Design of Modern Steel Structures.* Pippard and Baker—*Analysis of Engineering Structures* (2nd Edition, 1943). Husband and Harby—*Structural Engineering* (5th Edition, 1947). Salmon—*Materials and Structures* (Vols. II–VI, *Theory and Design of Structures*). Sutherland, H. and Reese—*Introduction to Reinforced Concrete Design* (2nd Edition, 1943).

CIVIL ENGINEERING—8.01 to 8.94—*continued.*

	SUBJECT.	TEXT BOOK.
8.114	Structures	Same as for 8.113—Structures, and— Magnel, G.—*Prestressed Concrete.*
8.122	Structures	*S.A.A. Interim Codes* 350, 351, 352. **Reference.** Stewart, D. S.—*Practical Design of Simple Steel Structures* (Vols. I and II—3rd and 2nd Editions, respectively). Grinter, L. E.—*Design of Modern Steel Structures.*
8.123	Structures	Same as for 8.113—Structures. **Reference.**
8.22	Materials of Construction.	Salmon, V. I.—*Materials and Structures* (Vol. I). Davis, H. E., Troxell and Wiskocil—*Testing and Inspection of Engineering Materials.* *A.S.A., B.S.S., and A.S.T.M. Specifications.* (Where applicable.) Murdock—*Concrete Materials and Practice.* **Reference.**
8.23 8.23D	Materials of Construction.	U.S. Bureau of Reclamation—*Concrete Manual.* Bateman, J. H.—*Materials of Construction.* Bauer—*Plain Concrete* (3rd Edition, 1949). Lea and Desch—*The Chemistry of Cement and Concrete.* Murdock—*Concrete Materials and Practice.* **Reference.**
8.33	Engineering Computations.	Allock and Jones—*The Nomogram* (4th Edition, 1950). Lipka, J.—*Graphical and Mechanical Computation,* Part II. Southwell, R. V.—*Relaxation Methods in Engineering Science.* Whittaker, E. T., and Robinson—*The Calculus of Observations* (4th Edition, 1944). **Reference.**
8.53	Fluid Mechanics ...	Rouse—*Elementary Mechanics of Fluids.* Vennard—*Elementary Fluid Mechanics* (2nd Edition, 1947). Dodge and Thompson—*Fluid Mechanics.* Wislicenus—*Fluid Mechanics of Turbo-Machinery* **Reference.**
8.54	Applied Hydraulics ...	Rouse (Ed.)—*Engineering Hydraulics.* Addison—*Hydraulic Measurements.* Bakmeteff—*Hydraulics of Open Channels.* Allen—*Scale Models in Hydraulic Engineering.* Streeter—*Fluid Dynamics.*
8 63	Civil Engineering ...	Wisler and Brater—*Hydrology.* Linsley, Kohler and Paulhus—*Hydrology.* Johnstone and Cross—*Elements of Hydrology.* Smith, H. G.—*Minerals and the Microscope.* Leggett—*Geology and Engineering.*

CIVIL ENGINEERING—8.01 to 8.94—*continued.*

SUBJECT.	TEXT BOOK.
	Reference.
8.64 Civil Engineering ...	Barrows—*Water Power Engineering.*
	Creager, Justin and Hinds—*Engineering for Dams.*
	Steel—*Water Supply and Sewerage.*
	Phelps—*Public Health Engineering.*
	Webb—*Railroad Construction.*
	Taylor—*Docks, Wharves and Piers.*
	Etcheverry—*Irrigation Practice and Engineering.*
8.73, 8.73D, 8.73H Soil Mechanics ...	Terzaghi and Peck—*Soil Mechanics in Engineering Practice.*
	Taylor, D. W.—*Fundamentals of Soil Mechanics.*
	Tshebotarioff, G. P.—*Soil Mechanics, Foundations and Earth Structures.* McGraw Hill.
	T. William Lambe—*Soil Testing for Engineers.*
	Terzaghi—*Theoretical Soil Mechanics.*
	A.S.T.M., 1950—*Soil Testing Procedures.*
8.92, 8.92B, 8.92C Properties of Materials.	Davis, H. E., Troxell and Wiskocil—*Testing and Inspection of Engineering Materials.*
	Salmon, V. I.—*Materials and Structures* (Vol. I).
	Reference.
	Beaumont, R. A.—*Mechanical Testing of Metallic Materials* (2nd Edition, 1944).
	Stanford, E. G.—*The Creep of Metals and Alloys.*
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	Gilkey, Murphy and Bergman—*Materials Testing.*
	Williams—*Hardness and Hardness Measurements.*
	A.S.T.M., B.S.S. specifications, special references, etc.
	Nadai, A.—*Theory of Flow and Fracture of Solids.*
	Reference.
8.94, 8.94D Properties of Materials.	Murphy, G.—*Advanced Mechanics of Materials.*
	Freudenthal, A. M.—*The Inelastic Behaviour of Engineering Materials and Structures.*
	Tee, G. H.—*An Introduction to Experimental Stress Analysis.*
	Nadai, A.—*Theory of Flow and Fracture of Solids.*

WOOL TECHNOLOGY—9.01 to 9.94.

	Reference.
9.104 Nutrition	Halnan and Garner—*Science and Practice of Feeding Farm Animals.*
	Morrison, F. B.—*Feeds and Feeding.*
	British Ministry of Agriculture Bulletin—*Rations for Livestock* (11th Edition).

WOOL TECHNOLOGY—9.01 to 9.94—*continued.*

SUBJECT.		TEXT BOOK. Reference—*contd.*
9.104	Nutrition—*contd.* ...	National Research Council—*Recommended Nutrient Allowances for Domestic Animals.* Maynard, L.—*Animal Nutrition.*
9.12	Sheep Husbandry ...	Belschner, H. G.—*Sheep Management and Diseases.*
9.114	Farm Livestock ...	Pearse, E.—*Sheep Farm and Station Management.* Fraser, A.—*Sheep Husbandry.* Fraser, A.—*Sheep Farming.* Thomas, J. F. et al.—*Sheep.* Hammond, J.—*Growth and Development of Mutton Qualities in Sheep.* Coffey—*Productive Sheep Husbandry.* Phillips, R. W.—*Breeding Animals Suited to Unfavourable Environments.* Beattie, W. A.—*Beef Cattle Breeding and Management.* Snapp, R. R.—*Beef Cattle.* Roberts, F. H.—*Insects Affecting Livestock.* Sisson—*Anatomy of Domestic Animals.* Dukes, H. H.—*Physiology of Domestic Animals.* Schafer, E.—*Essentials of Histology.* Allee, W. C. et al.—*Principles of Animal Ecology.* McMeekan, C.P.—*Principles of Animal Production.* Hammond, J.—*Farm Animals.* Nicholls, J. E.—*Livestock Improvement.* Ashton, L. G. (Ed.)—*Dairy Farming in Australia.* (N.S.W. Edition.)
9.22	Agronomy	Wadham and Wood—*Land Utilization in Australia.* Russell, E. J.—*Soil Conditions and Plant Growth.* Stephens, C. G.—*A Manual of Australian Soils.* C.S.I.R.O.—*The Australian Environment.*
9.24	Pastoral Agronomy ...	Semple, A. T.—*Improving the World's Grasslands.* Beadle, N. C.—*Vegetation and Pastures of Western N.S.W.* Black, J. M.—*Flora of South Australia* (Parts I and II). Levy, E. B.—*Grasslands of New Zealand.*
9.74	Fibre Science... ...	Preston, J. M.—*Fibre Science.* *British Wool Manual.* Luniak—*Identification of Textile Fibres.* Alexander and Hudson—*Wool—Its Chemistry and Physics.* Textile Institute of Dyers and Colourists—*Textile Progress.*

WOOL TECHNOLOGY—9.01 to 9.94—*continued.*

	SUBJECT.	TEXT BOOK.
		Reference—*contd.*
9.94	Genetics	Snyder, L. H.—*Principles of Heredity.* Lush, J. L.—*Animal Breeding Plans.* Lerver—*Population Genetics and Animal Improvement.* Dunn, L. C.—*Genetics in the 20th Century.* Mather—*Biometrical Genetics.* Snedecor, G. W.—*Statistical Methods.* Goldschmidt, R. B.—*Understanding Heredity.* Scheinfeld, A.—*You and Heredity.* Kelley, R. B.—*Principles and Methods of Animal Breeding.* Hagerdoorn, A.—*Animal Breeding.*

MATHEMATICS—10.01 to 10.92.

10.11	Mathematics ...	Durell, C. V., and Robson, A.—*Elementary Calculus*, Vols. I, II. Bell, London. Middlemiss, R.—*Analytic Geometry.* McGraw Hill, New York.
10.11B	Mathematics ...	Lamb, H.—*Dynamics.* Cambridge.
10.12	Mathematics ...	Rutherford, D. E.—*Vector Methods.* Oliver and Boyd, Edinburgh. Sokolnikoff, I. S. and E. S.—*Higher Mathematics for Engineers and Physicists.* McGraw Hill, New York. Jaeger, J. C.—*An Introduction to the Laplace Transformation.* Methuen, London. **Reference.** Synge, J. L., and Griffith, B. A.—*Principles of Mechanics.* McGraw Hill, New York. Bell, R. J. T.—*Co-ordinate Geometry of Three-dimensions.* Macmillan, London.
10.22	Mathematics ...	Students should not procure text books before consulting the lecturer concerned.
10.23	Mathematics ...	Students should not procure text books before consulting the lecturer concerned.
10.33	Mathematics ...	Churchill, R. V.—*Introduction to Complex Variables and Applications.* McGraw Hill, New York. Brainerd, J. G., Koehler, G., Reich, H. J. and Woodruff, L. F.—*Ultra-High-Frequency Techniques.* Nostrand, New York. **Reference.** Stratton, J. A.—*Electromagnetic Theory.* McGraw Hill, New York. Carslaw, H. S., and Jaeger, J. C.—*Operational Methods in Applied Mathematics.* Oxford.

MATHEMATICS—10.01 to 10.92—*continued.*

SUBJECT.	TEXT BOOK.
	Reference.
10.43 Mathematics	Anderson, R. L. and Bancroft, T. A.—*Statistical Theory in Research.* Mood, A. M.—*Introduction to the Theory of Statistics.* Weatherburn, C. E.—*A First Course in Mathematical Statistics.* Further references will be given in class.
10.91 Mathematics ...	Caunt, G. W.—*Elementary Calculus.* Oxford.
	Reference.
	Osgood, W. F. and Graustein, W. C.—*Plane and Solid Analytic Geometry.* Macmillan, London. Sokolnikoff, I. S. and E. S.—*Higher Mathematics for Engineers and Physicists.* McGraw Hill, New York.
	Reference.
10.92 Mathematics ...	Moroney, M. J.—*Facts from Figures.* Pelican, London. Fisher, R. A. and Yates, F.—*Statistical Tables.* Oliver & Boyd, Edinburgh. Wilks, S. S.—*Elementary Statistical Analysis.* Princeton University Press. Quenouille, M. H.—*Introductory Statistics.* Butterworth Springer, London.

ARCHITECTURE—11.01 to 11.96.

	Reference.
11.101 Structures I	Reynolds and Kent—*Introduction to Structural Mechanics.*
	Reference.
11.102 Structures II ...	Reynolds and Kent—*Introduction to Structural Mechanics.*
	Reference.
11.103 Structures III ...	Reynolds and Kent—*Structural Steelwork.* Stewart, D. S.—*Practical Design of Simple Steel Structures* (Vols. I and II). Husband and Harby—*Structural Engineering.* Sutherland and Reece—*Introduction to Reinforced Concrete Design.*
	Reference.
11.11 Descriptive Geometry	Lee, L. A., and Reekie, R. F.—*Descriptive Geometry for Architects and Builders.* Faulkner, Ziegfield and Hill—*Art Today.*
11.164 Acoustics and Sound Insulation.	Cullum, D. J. W.—*Practical Application of Acoustic Principles.* Knudsen and Harris—*Acoustical Designing in Architecture.* Constable, J. E. R. & K. M.—*The Principles and Practice of Sound Insulation.* Vagenal, Hope—*Practical Acoustics.* Post War Building Studies No. 14—*Sound Insulation and Acoustics.*

ARCHITECTURE—11.01 to 11.96—*continued.*

Subject.		Text Book.
11.31 11.32	Architectural Studies and Design.	Holmes, John—*Applied Perspective.* Scott, Robert Gillam—*Design Fundamentals.* Graves, Maitland—*The Art of Colour and Design.* Rathbone, Richard Adams—*Introduction to Functional Design.* Ostwald, Wilhelm—*Colour Science.* Munsell, A. H.—*A Colour Notation.* Evans, Ralph M.—*An Introduction to Colour.* Moholy-Nagy, L.—*Vision in Motion.* Kepes, Gyongy—*The Language of Vision.*
11.41 11.42 11.43	History of Architecture.	Fletcher, Sir Banister—*History of Architecture—On the Comparative Method.* Briggs, M. S.—*Architecture.*
		Reference.
		Statham, H. H.—*A History of Architecture* (3rd Edition, 1950). Normand—*A Parallel of the Orders of Architecture.* Anderson, W. J. and Stratton—*Architecture of the Renaissance in Italy.* Ward, W. H.—*Architecture of the Renaissance in France* (Vols. I and II). Whittick, A.—*European Architecture in the 20th Century.* Mumford, L.—*Culture of Cities.* Giedion, S.—*Space, Time, and Architecture.* Pevsner, N.—*European Architecture.* Herman, M.—*The Early Australian Architects and Their Work.*
11.51	Building Science ...	Geeson—*Building Science* (Vol. I). Fitzmaurice—*Principles of Modern Building.*
		Reference.
		Barrow—*Building Science.* Knight, B. H.—*Builders' Materials.* Shute—*Modern Building Materials.*
11.52	Building Science ...	Same as for 11.51—Building Science.
11.71 11.72	Building Construction.	*Local Government Ordinance*, No. 71. *Sydney Corporation Act, By-laws* 51 to 58 inclusive. Mitchell, G. A.—*Building Construction—Elementary Course.* Mitchell, G. A.—*Building Construction—Advanced Course.*
		Reference.
		McKay, W. B.—*Building Construction* (Vols. I, II and III.) Mackey, G. F.—*Gregory's Modern Building Practice in Australia.* Sharp, W.—*Australian Methods of Building Construction.*

ARCHITECTURE—11.01 to 11.96—*continued.*

SUBJECT.		TEXT BOOK.
		Reference—*contd.*
11.71 11.72	Building Construction—*contd.*	Fitzmaurice, R.—*Principles of Modern Building* (Vol. I).
11.82 11.82A 11.83	Theory of Architecture.	Robertson, Howard—*Principles of Architectura Composition.*

APPLIED PSYCHOLOGY—12.01 to 12.70.

12.01 Psychology I. ... Munn, N. L.—*Psychology.* Houghton Mifflin.

OR

Woodworth and Marquis—*Psychology.* Methuen.

Reference.

Anastasi, A. and Foley, J. P.—*Differential Psychology.* Macmillan.

Boring, Langfeld and Weld—*Foundations of Psychology.* Wiley.

Crafts, L. W. et al.—*Recent Experiments in Psychology* (1st and 2nd Editions).

Valentine and Wickens—*Experimental Foundations of General Psychology.* Rinehart.

Drever, J.—*A Dictionary of Psychology.* Pelican.

Warren—*A Dictionary of Psychology.* Houghton Mifflin.

Klineberg, O.—*Social Psychology* (Holt).

Ruch, F.—*Psychology and Life.* Scott Foresman.

12.02 Psychology II ... Stagner, R.—*Psychology of Personality.* McGraw-Hill.

Morgan, C. J. and Stellar, E.—*Physiological Psychology.* McGraw-Hill.

Young, P. T.—*Motivation of Behaviour* (Wiley)

Reference.

Carmichael, L. (Ed.)—*Manual of Child Psychology* Wiley.

Werner, H.—*Comparative Psychology of Mental Development.* Follett.

Zubek and Solberg—*Human Development.* McGraw-Hill.

Barker, R., Kounin, J. S. and Wright, H. F.—*Child Behaviour and Development.* McGraw-Hill.

12.03 Psychology III ... Eysenck, H. J.—*The Structure of Human Personality.* Methuen.

OR

Cattell, R. B.—*Personality.* McGraw-Hill.

APPLIED PSYCHOLOGY—12.01 to 12.70—*continued.*

SUBJECT.		TEXT BOOK.
		Reference.
12.03	Psychology III—*contd.*	Allport, G.—*Personality.* Constable. Murray, H. A. et al—*Explorations in Personality.* Oxford University Press. Lewin, Kurt—*Dynamic Theory of Personality* McGraw-Hill. Hunt, J. McV.—*Personality and the Behaviour Disorders.* Ronald.
12.10 12.11 12.11A	Psychological Assessment.	Students should not procure textbooks before consulting the lecturer concerned.
12.20	Psychology IV—Social.	Hartley and Hartley *Fundamentals of Social Psychology.* Asch, S.—*Social Psychology.*
12.21	Psychology V—Applied Social.	Students should not procure textbooks before consulting the lecturer concerned.
12.30	Industrial Psychology	Ghiselli and Brown—*Personnel and Industrial Psychology.* McGraw-Hill. Chapanis, Garner and Morgan—*Applied Experimental Psychology.* Wiley.
		Reference.
		Viteles, M.S.—*Motivation and Morale in Industry.* Staples Bros. Ltd. Blum, M. L.—*Readings in Experimental Industrial Psychology.* Prentice Hill. Viteles, M. S.—*Industrial Psychology.* Karn, H. W. and Gilmer, B. V.—*Readings in Industrial and Business Psychology,* McGraw-Hill. Poffenberger, A. T.—*Principles of Applied Psychology.* Appleton Century.
	Industrial and Labour Relations.	Students should not procure textbooks before consulting the lecturer concerned.
12.40	Personnel Techniques	Students should not procure textbooks before consulting the lecturer concerned.
		Reference.
		Johnson, Boise and Pratt—*Job Evaluation.* Wiley. Tead and Metcalf—*Personnel Administration.* McGraw-Hill. Ghiselli and Brown—*Personnel & Industrial Psychology.* McGraw-Hill. Scott, Clothier, Mathewson and Spriegel—*Personnel Management.* McGraw-Hill.
		Reference.
12.70	Principles of Counselling.	Dollard and Miller—*Personality and Psychotherapy.* McGraw-Hill. Rogers, C. R.—*Counselling and Psychotherapy.* Houghton Mifflin.

APPLIED PSYCHOLOGY—12.01 to 12.70—*continued.*

SUBJECT.	TEXT BOOK.
	Reference—*contd.*
12.70 Principles of Counselling—*contd.*	Rogers, C. R. (Ed.)—*Client Centred Therapy.* Houghton Mifflin.
	Evelison, E. H.—*Childhood and Society.* Mertin and Co.
	Slavsen, S. R.—*Analytic Group Psychotherapy.* Columbia University Press.
	Blum, M. L. and Balinsky, B.—*Counselling & Psychotherapy.* Prentice Hill.
	Berdin, E. S.—*Trends in Student Personnel Work.* Minnesota Press.
	Mowrer, O. H.—*Learning Theory and Personality Dynamics.* Herald Press.
	Robinson, F. P.—*Principles and Procedures in Student Counselling.* Harper Bros.
	Fenickel—*Psychoanalytic Theory of Neurosis.*

HUMANITIES AND SOCIAL SCIENCES—G1 to G51.

Recommended text books are indicated under Description of Subjects, pages 306 to 318.

REPORT

of the

COUNCIL OF THE NEW SOUTH WALES UNIVERSITY OF TECHNOLOGY.

For the year ended 30th June, 1954.

The Council of the New South Wales University of Technology, in pursuance of the provisions of section 47 (1) of the Technical Education and New South Wales University of Technology Act, 1949, has the honour to transmit to the Minister for Education the following report upon the proceedings of the University during the period of twelve months ended 30th June, 1954.

General.

A number of major developments in University policy and organisation during the period under review has made this a notable year for the University, and one in which several important objectives of the Council have been attained. The standard of instruction in the sciences and in the various branches of technology set in previous years has been maintained and an extensive research programme followed. At the same time the facilities for both advanced training and research have been appreciably expanded.

Enrolments in degree courses continue to increase, the number of students in day degree and conversion courses being 626, as compared with 563 in 1953, while 169 students are working for higher degrees as against last year's 103. Enrolments in part-time courses (diploma and degree) for 1954 are 2,956, compared with 2,746 in 1953. At Newcastle University College enrolments in technical degree courses have increased from 15 to 33, and 95 students are enrolled in the Arts courses established at Newcastle at the beginning of 1954.

The provision of special and graduate courses, designed to keep practising scientists and technologists acquainted with the latest advances in their respective fields, has become a noteworthy feature of the University's activities. Sixteen of these courses were offered during the year and were attended by a total of 520 students. Council is pleased to report that in each case the income from fees met the additional lecturing costs involved in providing the course.

Among the more far-reaching developments which have taken place during the year was the introduction of part-time degree courses in the Faculties of Science and Engineering as from the beginning of 1954. Council had felt that it had a responsibility to

provide the best possible facilities by which students might gain specialised tertiary education in science and technology by part-time study supplemented by practical industrial experience. In previous years a considerable number of Technical College diplomates had taken the opportunity for gaining higher qualifications provided by the part-time conversion courses of the University. The interest of students and of industry in the conversion courses was especially gratifying to Council, and it clearly indicated the need of industry and of the students for professional tertiary courses on a part-time basis. The splendid response to the wholly part-time degree courses since their inception in February, 1954, is further evidence that in providing advanced part-time instruction the University is carrying out a necessary and important function, one which has created wider opportunities for those wanting to specialise in a scientific or technological field, and one which must make a positive contribution to the advancement of industry and commerce in this country. Part-time degree courses are offered in Applied Biology, Applied Chemistry, Chemical Engineering, Food Technology, General Science, Industrial Chemistry, Leather Chemistry, Metallurgy, Applied Geology and Civil, Electrical and Mechanical Engineering.

As was stated in the last annual report of Council, it had been felt that in view of the high rate of student wastage in diploma courses over many years certain changes in the content and structure of these courses were desirable to ensure, firstly, that they satisfy the current training needs of industry and also that the students might derive maximum benefit from the time spent at the University. With the concurrence of the Technical Education Advisory Council the proposed changes were incorporated in the first stage of a number of diploma courses at the beginning of 1954, and in those cases where there exists a corresponding part-time degree course, the courses have been integrated and in the early stages follow a common syllabus.

Following the declaration in May of 1st July, 1954, as the "appointed day", the day on which, in terms of section 33 of the Technical Education and New South Wales University of Technology Act, 1949, complete authority in matters related to the control of the University is to be vested in the Council, plans were prepared for the reorganisation of the University's administrative structure. Additional Committees of Council were created and the functions of the various Committees were re-defined and more closely co-ordinated. Details of the administrative changes to be effected from the "appointed day" are given later in this report. When approving these changes the Council recorded its appreciation of the assistance given to the University of Technology by the New South Wales Public Service Board, by officers of the Board and officers of the Public Service, particularly those within the Department of Technical Education.

Council is pleased to record that continued progress in research in the various Schools of the University has been evident throughout the year. The numerous requests received from industrial undertakings and government authorities for investigations into specific problems and for information on more general research projects are indicative of the confidence of industry in the University's research activities. The University's first Research Report, covering the years 1949-1953, was published during the period under review and contains an already impressive account of research activity.

A number of senior staff appointments were made during the year and these included the filling of the Chairs of Applied Psychology, Civil Engineering, Electrical Engineering and Mechanical Engineering. Associate Professors in Architecture, History and Economics were appointed, the two latter appointments being to the Newcastle University College. A list of senior staff appointed within the period is included in the report.

The area of the University site at Kensington was increased during the year by the acquisition of two pieces of land, one adjoining and one close by the original site. A total area of 70 acres, 1 rood and 23¾ perches is now held at Kensington. A concentrated drive on ground improvements has been made in recent months and the areas around the permanent building now present wide expanses of lawn bordered by paths and a pleasing variety of shrubs and trees. Work on the first major building is nearing completion and by the beginning of the 1955 academic session the new building will be occupied by seven Schools and the University administration. Further details of the development at Kensington appear elsewhere in the report.

Progress at Newcastle University College has been marked by two developments of major importance. The first of these was the provision of instruction in Arts courses from the beginning of 1954 by staff of the School of Humanities and Social Sciences. These courses are provided by arrangement with the University of New England, which acts as the examining and degree conferring body, though the students are registered students of the University of Technology and are taught by this University's staff. The second major development was the appointment of an Advisory Committee for the Newcastle University College, which had its initial meeting at Newcastle on 17th June, 1954. Further reference to these developments appears in the section of the report headed "Newcastle University College."

The Royal Visit, February, 1954.

On 4th February, 1954, during the Royal Visit to Sydney, His Royal Highness, the Duke of Edinburgh, honoured the University of Sydney and the New South Wales University of Technology by

visiting the University of Sydney and meeting representatives of both Universities. Fellows of the Senate of the University of Sydney and Members of the Council of the University of Technology were presented to His Royal Highness during a ceremony held in the Great Hall of the University of Sydney.

The Council.

In accordance with the provisions governing the appointment of members of Council, as set out in section 19 of the Technical Education and New South Wales University of Technology Act, 1949, Council was reconstituted in July, 1953.

The first meeting of the new Council was held on 13th July, 1953, and at this meeting Mr. Wallace C. Wurth, C.M.G., LL.B., was re-elected President of the University for the ensuing term of two years.

The Council held five ordinary meetings and two special meetings during the year. Membership of Council and the attendances at meetings are set out in Appendix I to this report.

At a special meeting held on 29th March, 1954, Council adopted the recommendations of the Executive Committee as to the re-organisation of the administrative arrangements of the University consequent upon the declaration of 1st July, 1954, as the "appointed day". Much of the organisational structure existed previously but the transfer of authority meant that many more day-to-day problems had to be dealt with, giving a need for some elaboration of executive methods in the interests of efficiency and economy. Accordingly, an Appeals Committee, an Academic Committee and two Sub-Committees of the Executive Committee to deal with Finance and Personnel were created. The various Committees are now more closely co-ordinated with the Executive Committee of Council by a provision that the Chairman of each other Committee shall be a member of the Executive Committee. Following this re-organisation, the standing Committees of Council are as follows:—

Executive Committee.
Finance Sub-Committee of the Executive Committee.
Personnel Sub-Committee of the Executive Committee.
Academic Committee.
Appeals Committee.
Buildings and Equipment Committee.
Library Committee.
Newcastle College Committee.
Public Relations Committee.

Membership of these Committees is set out in Appendix II.

Advisory Panels.

Meetings of the following Advisory Panels related to University courses were held on the dates indicated:

24th August, 1953.—Mechanical Engineering Advisory Panel.
24th August, 1953.—Metallurgy Advisory Panel.
25th August, 1953.—Civil Engineering Advisory Panel.
26th August, 1953.—Applied Geology Advisory Panel.
27th August, 1953.—Electrical Engineering Advisory Panel.
3rd November, 1953.—Humanities Advisory Panel.
25th March, 1954.—Textile Technology Advisory Panel.
26th March, 1954.—Humanities Advisory Panel.
21st April, 1954.—Production Engineering Advisory Panel.
22nd April, 1954.—Aeronautical Engineering Advisory Panel.
13th May, 1954.—Optometry Advisory Panel.

Enrolments.

Details of enrolments for 1954 are as shown hereunder:

Day Degree and Conversion Courses.

Course.	1st Year.	2nd Year.	3rd Year.	4th Year.	5th Year.	Conversion.	Total.
Applied Chemistry ...	13	6	10	5	...	33	67
Applied Physics ...	1	1	...	2	...	4	8
*Architecture	20	10	8	6	5	...	49
Chemical Engineering	7	10	2	6	...	21	46
Civil Engineering ...	51	39	23	17	...	8	138
Electrical Engineering	37	19	25	20	...	28	129
General Science ...	4	...	...	...	...	...	4
Mechanical Engineering	23	25	15	9	...	28	100
Metallurgy	1	...	...	...	...	21	22
Mining Engineering ...	11	5	4	5	...	...	25
Optometrical Science	...	...	...	...	...	18	18
Wool Technology ...	9	5	2	4	...	...	20
	177	120	89	74	5	161	626

* The Architecture degree course is of six years' duration. The course was introduced in 1950; the 6th year will operate in 1955.

Higher Degree Courses.

Master of Science	77
Master of Engineering	41
Doctor of Philosophy	51
	169

Arts Courses (Newcastle University College).

Ninety-five students are enrolled in the Arts courses established at the beginning of 1954 at Newcastle University College.

Special and Graduate Courses.

Enrolments in special and graduate courses conducted in the various Schools during the year totalled 520. A list of the courses provided appears on pages 358 and 359 of this report.

Diploma Courses and Part-time Degree Courses.

	1st Year.	2nd Year.	3rd Year.	4th Year.	5th Year.	6th Year.	Miscellaneous.	Total Metropolitan and Country.
Aeronautical Engineering	23	14	5	6	...	...	...	48
Applied Biology ...	13	10	4	3	4	2	...	36
Applied Chemistry ...	108	60	71	65	72	8	...	384
Applied Geology ...	1	...	...	...	...	...	...	1
Applied Physics ...	6	4	6	2	4	...	...	22
Architecture	33	24	24	36	28	39	...	184
Building	5	11	2	11	7	...	...	36
Chemical Engineering	51	30	21	21	23	24	...	170
Civil Engineering ...	94	72	83	72	77	...	...	398
Electrical Engineering	95	76	69	62	44	...	...	346
Food Technology ...	7	2	4	2	4	3	...	22
Industrial Chemistry	26	6	4	2	...	...	...	38
Leather Chemistry ...	2	1	...	1	...	1	...	5
Mechanical Engineering	144	155	155	99	104	...	...	657
Metallurgy	41	22	15	16	20	19	...	133
Mining Engineering ...	4	3	5	4	1	...	...	17
Naval Architecture ...	3	6	2	4	2	...	...	17
Optometry	4	14	6	7	11	...	...	42
Production Engineering	20	18	10	7	9	...	...	64
Quantity Surveying	3	6	1	4	2	...	...	16
Radio Engineering ...	35	19	32	16	15	...	...	117
Science	17	12	10	9	17	1	...	66
Miscellaneous Diploma Subjects	...	...	...	...	...	...	137	137
Total	735	565	529	449	444	97	137	2,956

Instruction in degree courses was provided at Sydney and Newcastle and in diploma courses at Sydney, Newcastle, Wollongong, Lithgow and Broken Hill.

Scholarships, Bursaries and Fellowships.

The Council gratefully acknowledges the following Scholarships, Bursaries, and Fellowships which were made available during the year:—

The Broadcasting Radio Electrical Industries Fellowship Club, Sydney, Scholarship.

The A. E. Goodwin Memorial Scholarship.

The John Heine Memorial Foundation Scholarship.

The Imperial Chemical Industries of Australia and New Zealand Research Fellowship.

Twelve Joint Coal Board Scholarships.

Two Mining and Metallurgical Bursaries Fund Scholarships.

The Monsanto Research Scholarship.

Two New South Wales Combined Colliery Proprietors' Association Scholarships.

Two Wool Industry Fund Scholarships.

The Zinc Corporation Scholarship.

Four Public Bursaries.

One hundred and sixty-eight Commonwealth Scholarships.

Particulars of the awards are given in Appendix III.

Conferring of Degrees.

The University's third graduation ceremony was held on 20th March, 1954, in the Great Hall of the University of Sydney. His Excellency the Governor of New South Wales, Lieutenant-General Sir John Northcott, attended.

The President of the University, Mr. Wallace C. Wurth, conferred degrees on 81 students, six being admitted to the degree of Master of Science, 22 to the degree of Bachelor of Science, two to the degree of Master of Engineering and 51 to the degree of Bachelor of Engineering. His Excellency delivered the Occasional Address and the Honourable R. J. Heffron, M.L.A., Minister for Education, also addressed the gathering.

The Council records its gratitude to the Senate of the University of Sydney for making the Great Hall available for the occasion.

A list of the recipients of degrees is given in Appendix IV.

Newcastle University College.

In conjunction with the establishment of the University of New England in January, 1954, as an autonomous body with authority to confer degrees, arrangements were made to provide Arts courses at Newcastle University College in co-operation with the University

* 53122—12 K 137

of New England. Under these arrangements the syllabuses of study are prescribed by the University of New England, which is also the examining body, and instruction is provided by members of the School of Humanities and Social Sciences of the University of Technology to registered students of the University of Technology taking these courses.

Council approved in March, 1954, of the establishment of an Advisory Committee for the Newcastle University College. Invitations to serve on the Committee were extended to a number of prominent citizens, representative of a wide range of educational, industrial and cultural interests. The Advisory Committee will meet at least three times in each year and the first meeting of 33 members of the Committee, with Mr. Wallace C. Wurth, President of the University, as Chairman, met at Newcastle on 17th June, 1954.

Enrolments at Newcastle in 1954 are as shown hereunder. These are included in the general enrolment figures of the University as given on pages 351 and 352.

Applied Science and Engineering.

Day Degree Courses:

Applied Chemistry	3
Applied Physics	1
Chemical Engineering	3
Civil Engineering	8
Electrical Engineering	2
General Science	4
Mechanical Engineering	7
Mining Engineering	5
Total	33

Diploma Courses and Part-time Degree Courses:

Applied Biology	4
Applied Chemistry	44
Architecture	19
Chemical Engineering	15
Civil Engineering	33
Electrical Engineering	28
Industrial Chemistry	2
Mechanical Engineering	100
Metallurgy	33
Science	6
Miscellaneous Diploma Subjects	25
Total	309

Conversion Courses:

Applied Chemistry	4
Chemical Engineering	1
Electrical Engineering	2
Mechanical Engineering	8
Metallurgy	11
Total	26

Higher Degrees:

Master of Science	7
Master of Engineering	2
Doctor of Philosophy	4
Total	13

In addition to the above, 95 students (day and evening) are enrolled in Arts courses at Newcastle University College.

Total number of students enrolled at Newcastle, 476.

Transitional Provisions of Technical Education and New South Wales University of Technology Act, 1949.

Section 33 of the Technical Education and New South Wales University of Technology Act, 1949, provides that until a day to be appointed by the Governor and notified by proclamation published in the *Gazette*, the provisions of the Public Service Act, 1902, shall apply to staff appointments to the University.

At its meetings on 9th November, 1953, Council decided to recommend to the Governor, through the Minister for Education, that 1st July, 1954, be proclaimed as the "appointed day". The proclamation was published in the *Gazette* dated 14th May, 1954.

The vesting in the University Council of the authority and responsibility in relation to the University previously discharged by the Public Service Board required certain changes in the administrative arrangements of the University. These included the establishment of a Personnel Division under the direction of the Bursar, Mr. J. O. A. Bourke, and the reorganisation of the Council's Committees. Along with these changes Council approved that under the provision of Section 34 of the Act, the University would continue to use the services of the Department of Technical Education with respect to Examinations, Accounting, Purchasing, Educational Research, Library, etc.

Senior Staff.

Appointments of senior staff during the year were as follows:—

Professor of Applied Psychology:

J. F. Clark, M.A., B.Sc., Dip.Ed. Syd., Ph.D. Lond., 1st January, 1954.

Professor of Civil Engineering:

C. H. Munro, B.E. Syd., F.R.San.I., A.M.I.E. Aust., 1st January, 1954.

Professor of Electrical Engineering:

R. E. Vowels, M.E. Adel., A.M.I.E. Aust., M.I.E.E., 1st February, 1954.

Professor of Mechanical Engineering:

A. H. Willis, B.Sc.(Eng.), Ph.D. Lond., A.M.I.E. Aust., Wh.Sc., 19th June, 1954.

Bursar:

J. O. A. Bourke, B.A. Syd., 6th April, 1954.

Associate Professor of Architecture:

S. W. Lucas, A.R.I.B.A., F.R.A.I.A., 20th January, 1954.

Associate Professor of History:

J. J. Auchmuty, M.A., Ph.D. Dublin, M.R.I.A., F.R.Hist.S., 8th February, 1954.

Associate Professor of Economics:

C. C. Renwick, M.Ec. Syd., 1st March, 1954.

Senior Lecturer in Chemical Engineering (Newcastle University College):

J. S. Ratcliffe, A.S.T.C., A.R.A.C.I., A.M.I.E. Aust., A.M.I.R.E. (Aust), 1st September, 1953.

Senior Lecturer in Chemical Engineering:

G. H. Roper, M.Sc., A.S.T.C., A.R.I.C., A.R.A.C.I., 1st September, 1953.

Senior Lecturer in Applied Chemistry:

L. N. Short, M.Sc., Dip.Ed. Syd., D.Phil. Oxon., 16th October, 1953.

Senior Lecturer in Metallurgy:

J. S. Bowles, M.Sc., Melb., 19th October, 1953.

Senior Lecturer in Applied Chemistry:

J. R. A. Anderson, M.Sc., A.S.T.C., F.R.A.C.I., F.R.I.C., 1st January, 1954.

Senior Lecturer in Mechanical Engineering:

P. S. Barna, M.E. Syd., A.M.I.E. Aust., 1st January, 1954.

Senior Lecturer in Mechanical Engineering:

A. J. Carroll, B.E. Syd., A.M.I.E. Aust., 1st January, 1954.

Senior Lecturer in Chemical Engineering:

F. L. Connors, A.S.T.C., A.M.I.E. Aust., 1st January, 1954.

Senior Lecturer in Modern Languages (Newcastle University College):

O. Spindler, D.phil., Dip.Ed. Vienna, 2nd February, 1954.

Senior Lecturer in Applied Chemistry:

G. J. Sutton, M.Sc., A.S.T.C., F.R.A.C.I., A.R.I.C., 1st April, 1954.

Senior Lecturer in Applied Chemistry:

R. M. Gascoigne, M.Sc. Syd., Ph.D.Liv., A.R.A.C.I., 3rd April, 1954.

Senior Lecturer in Electrical Engineering:

H. S. A. Rosenthal, Dr. Ing. Berl.T.U., 21st June, 1954.

In May, 1954, Council re-appointed Professors A. E. Alexander, D. W. Phillips, and F. E. Towndrow as Deans of the Faculties of Applied Science, Engineering and Architecture, respectively, for the period 1st July, 1954, to 30th June, 1955.

Study leave for the following members of the University staff was approved during the year under review:

R. H. J. Clarke, Lecturer, School of Electrical Engineering—one year's study leave from January, 1954.

A. Bryson, Senior Lecturer, School of Applied Chemistry—one year's study leave from June, 1954.

W. J. Dunstan, Lecturer, School of Applied Chemistry—one year's study leave from July, 1954.

S. E. Bonamy, Senior Lecturer, School of Mechanical Engineering—one year's study leave from August, 1954.

J. F. McConnell, Senior Lecturer, School of Applied Physics—one year's study leave from August, 1954.

N. R. Davies, Lecturer, School of Applied Chemistry—one year's study leave from September, 1954.

Professor R. M. Hartwell, Head of the School of Humanities and Social Sciences—six months' study leave from January, 1955.

Other members of staff on study leave during the period were:

Professor F. E. Towndrow, School of Architecture and Building.

R. E. Corbett, Senior Lecturer, School of Mechanical Engineering.

A. S. Hall, Senior Lecturer, School of Civil Engineering.

A. K. Johnston, Senior Lecturer, School of Mechanical Engineering, Newcastle University College.

H. R. Vallentine, Senior Lecturer, School of Civil Engineering.

G. A. Barclay, Lecturer, School of Applied Chemistry.

G. E. Ferris, Lecturer, School of Mathematics.

J. R. Anderson, Technical Officer, School of Applied Chemistry.

Courses of Study.

The provision in 1954 of part-time degree courses in the Faculty of Applied Science had been approved by Council in May, 1953. In furtherance of Council's aim to provide facilities enabling students in all Faculties to proceed to the degrees of the University by part-time study, courses conducted in the Faculty of Engineering were reviewed during 1953 and part-time Engineering degree courses were introduced at the beginning of the 1954 academic session. In addition to the courses in Civil, Electrical, Mechanical and Mining Engineering, full-time and part-time degree courses in Applied Geology were offered in 1954. The Engineering diploma courses were revised and with the approval of the Technical Education Advisory Committee the revised courses were introduced at the beginning of 1954.

In September, 1953, Council approved the establishment of a full-time and a part-time degree course in Metallurgy and the revision of the Metallurgy diploma course. These courses are now operating.

Minor amendments to the Wool Technology degree course were made during the year.

During December, 1953, a series of lectures for senior school pupils was conducted in the School of Applied Chemistry. The lectures were designed to stimulate the interest of the pupils in the work of the University and in science training in particular.

The following special and graduate courses were conducted during the year:

School of Applied Chemistry.

Recent Developments in Inorganic Chemistry.

Recent Advances in Cytochemistry.

School of Applied Physics.

Ultra-high Frequency Valves.

Emission Spectroscopy in Industry.

Illumination II.

Optical Aids to Sub-normal Vision.

School of Chemical Engineering.

Synthetic Textiles.

Unit Operations—Heat Transfer, Fluid Flow and Mass Transfer.

School of Civil Engineering.

Pre-stressed Concrete Design.

Modern Developments in Structural Analysis and Design.

School of Electrical Engineering.

Illumination I.

Industrial Electronics.

Protection Engineering.

School of Mathematics.

Transform Methods and Allied Techniques in the Solution of the Equations of Physics and Engineering.

School of Mechanical Engineering.

Modern Developments in Mechanical Engineering.

School of Wool Technology.

Recent Developments in the Sheep and Wool Industry.

Research.

The research activities of the various Schools of the University continued to increase in number and scope throughout the year. In addition to the numerous research programmes instigated by the Schools, a number of specific problems was investigated at the request of industrial undertakings and Government Departments, who in some cases sponsored the projects. A particularly pleasing feature is the continued expansion in higher degree research at the University: the numbers pursuing such graduate studies rose from 103 in the previous year to 169 this year.

The first Research Report of the University, covering the period from the inception of the University to June, 1953, has now been published.

A list of research projects for this year, including higher degree studies and publications by members of the University, are set out in Appendix V.

Recognition of Science Degrees by Royal Australian Chemical Institute.

On 14th September, 1954, the Director announced to Council that the Council of the Royal Australian Chemical Institute had approved the Bachelor of Science degree (pass and honours) of the University of Technology in Applied Chemistry and Chemical Engineering as meeting the academic requirements for admission to Associateship of the Institute, and that the Master of Science degree had also been approved as meeting all the requirements of the Institute.

Presentation of the Douglas Hay Medal for 1953 to Professor D. W. Phillips.

Professor D. W. Phillips, Professor of Mining Engineering, was awarded the Douglas Hay Medal (1953) by the Institute of Mining Engineers in Great Britain for his outstanding contributions to mining engineering research, particularly towards the solutions of problems of strata control and the physical properties of coal-measure strata. The presentation was made by proxy to Professor Phillips' daughter, Miss Joan Phillips, at a meeting of the Institute held in London on 28th January, 1954. At the proceedings, the high regard in which Professor Phillips is held by his former colleagues in Great Britain was very evident, particular emphasis being placed on the great increase in mine safety as a result of his work.

Congress of Association of Universities of the British Commonwealth.

The University was represented at two meetings of the Association of Universities of the British Commonwealth held in Britain in July, 1953. The first meeting, for Executive Heads of Universities, held at Durham from 6th to 10th July, was attended by the Director, Professor J. P. Baxter. At the Seventh Congress of the Association, held at Cambridge from 13th to 17th July, the University was represented by the Director, Professor A. E. Alexander, Dean of the Faculty of Applied Science, and Mr. A. S. Hall, Senior Lecturer in Civil Engineering. During the Congress Professor J. P. Baxter presented one of the opening papers at a session on Higher Technological Education. The paper consisted of an account of the development and present position of the University of Technology.

Development of University Site at Kensington.

Considerable progress in the development of the University site at Kensington was made during the year. An additional area of 6 acres 3 roods and 6¾ perches on the western side of Anzac Parade, opposite the original site, and previously occupied by the Department of Government Transport, was vested in the University by the

Government on 25th June, 1954. The Government has also transferred to the University a strip of land comprising 3 acres 2 roods and 32 perches along the eastern side of Anzac Parade and adjacent to the University site. The total area of land now held at Kensington is 70 acres 1 rood and 23¾ perches.

Ground improvements being carried out include the fencing, levelling and draining of the site, the provision of a bore hole and water reticulation system, the planting of lawns, shrubs and trees, and the provision of roads, footpaths and car parking areas.

Work on the first major building has continued throughout the year and the building should be completed by the end of 1954. The top floor and portion of the second floor of the building have been occupied by the School of Architecture and Building since the beginning of 1954. The Schools of Humanities and Social Sciences, Applied Physics, Mathematics, Production Engineering, Mining Engineering and Applied Geology and the University administration will be transferred to the new building by the commencement of the 1955 academic session.

The School of Metallurgy has occupied four light-framed buildings on the northern side of the Kensington site since December, 1953. The Schools of Metallurgy and Chemical Engineering were officially opened by the Hon. R. J. Heffron, M.L.A., Deputy Premier and Minister for Education, on 11th May, 1954.

Student Hostel.

Work is proceeding on a programme of alterations and additions to the student hostel at Kensington. Increased single room accommodation is being provided by the division of the dormitories in the High Street buildings. On completion of this work there will be a total of 218 single rooms at the hostel.

The renovation of the recreational hall attached to the hostel is nearing completion. The hall is being re-lined and a new stage and a dressing room are being built.

In the dining room a new canteen has been provided. The kitchen is being remodelled and additional plant installed.

There were, in June, 1954, 160 students in residence at the hostel, including 92 Asians, many of whom are taking courses under the Colombo Plan.

Student Organisations and Activities.

On 1st January, 1954, the Sydney Technical College Students' Union was dissolved of its own motion, and its resources were transferred to the University of Technology Students' Union, which had been formed on 8th September, 1952. The latter organisation now

represents the general interests of all registered students of the University and its Constitution is undergoing final revision prior to submission for ratification by Council.

Throughout the year a keen interest in sport was maintained, due in part to the assistance given to the many University sporting clubs by the University of Technology Sports Association as the central controlling organisation of sporting activities. In the metropolitan competitions the University is now represented in most major amateur sports, and participation in Inter-Varsity competitions has increased in 1953-54 with the entry of swimming, hockey and tennis teams, the swimming team giving a particularly fine performance to win the competition for this University, while the tennis team finished second to the University of Queensland. Several new clubs were formed this year: the Soccer Football Club, the Basketball Club and the Boxing Club. In addition, non-competitive recreational sport now plays an important part, particularly fencing, golf, tennis and rifle-shooting, and Wednesday afternoons are regularly set aside for participation in these activities.

In July, 1953, another faculty society—the Civil Engineering Society—came into being. Modelled on the earlier Mining Society, it aims to promote extra-curricular activity and staff/student contact and co-operation in the School of Civil Engineering.

The 1952-53 "Engineering Yearbook", produced by the students of the Faculty of Engineering, maintained the high standard set by the first issue of the Yearbook last year. At its meeting held on 14th September, 1953, Council congratulated those responsible for the publication.

Another noteworthy event was the commissioning of four officers from the ranks of the University of Technology Regiment, an indication of this body's development. The Regiment held its second Annual Camp this year and stood guard in William Street during the Royal Progress on the occasion of the Royal Visit to Sydney.

Other student organisations active during the year were the Overseas Students' Association, which continues to promote closer cultural ties and understanding between the Australian people and students from other countries, the Music Club, the Student Christian Movement, the Newman Society and the Evangelical Union.

Benefactions.

The following benefactions, which were received during the year, are acknowledged with gratitude.

Grant of £5,000 by Joint Coal Board for Research on Gasification of High Sulphur Coal.—The Joint Coal Board has made

available a sum of £5,000 for research in the School of Chemical Engineering into the gasification of high sulphur coal.

Commonwealth Bank of Australia Rural Credits Development Fund Grant of £2,300.—A further grant of £2,300 was received from the Rural Credits Development Fund for research on the following projects:—

Investigation into sonic and ultrasonic characteristics of timber	£500
Magnetic separation and the magnetic properties of minerals	£300
Investigation of the chemistry of Australian ants	£750
Studies of the vector of the bean mosaic virus	£550
Investigation of the composition of Australian fruits	£200

Grant of £400 *by Australian Atomic Energy Commission for Research in School of Chemical Engineering.*—A grant of £400 was made by the Australian Atomic Energy Commission towards the cost of materials for research work in the School of Chemical Engineering on liquid metals heat transfer problems.

Establishment by Australian Atomic Energy Commission of Research Studentship in Metallurgy.—The Australian Atomic Energy Commission has established a studentship in Metallurgy tenable at the University. The studentship includes provision for University fees and an allowance of £500 or £600 per annum, according as the holder resides at or away from home.

Donations by Members of the Plastics Institute of Australia for School of Chemical Engineering Plastics Laboratory.—Contributions, totalling £800, towards the fitting out of the Plastics Laboratory of the School of Chemical Engineering were received from individual members of the Plastics Institute of Australia, New South Wales Section.

Donation by Australian Wool Realization Commission to Research Fund, School of Wool Technology.—A sum of £44 13s. 9d. was received from the Australian Wool Realization Commission as a donation to the Research Fund of the School of Wool Technology.

Accounts.

Statements showing the position of the various funds of the University as at 30th June, 1954, duly certified by the Auditor-General, are appended to this report.

WALLACE C. WURTH, President.

APPENDIX I.

The Council.

The Council held five ordinary meetings and two special meetings during the year. The attendance of members was as follows:

President of the University.

WALLACE CHARLES WURTH, C.M.G., LL.B., Chairman of the New South Wales Public Service Board—seven meetings.

Vice-President.

THE HON. JOHN SYDNEY JAMES CLANCY, LL.B., Justice of the Supreme Court—five meetings.

Director.

JOHN PHILIP BAXTER, O.B.E., B.Sc., Ph.D., A.M.I.Chem.E., F.R.A.C.I., Professor of Chemical Engineering, New South Wales University of Technology—six meetings.

Members.

FREDERICK WILLIAM AYSCOUGH, B.Sc., A.R.I.C., A.R.A.C.I., Senior Lecturer in Chemical Engineering, New South Wales University of Technology; Vice-President, Technical Teachers' Association of New South Wales—seven meetings.

GEOFFREY BOSSON, M.Sc., Professor of Mathematics, New South Wales University of Technology—seven meetings.

WILLIAM EDWARD CLEGG, M.I.E. Aust., F.C.A.A., Chairman, Newcastle Technical Education District Council; Director-Consultant, Commonwealth Steel Co. Ltd.—seven meetings.

HAROLD GRAYDON CONDE, M.I.E. Aust., Manager, Electric Light and Power Supply Corp. Ltd.; Electricity Commissioner, New South Wales—two meetings.

ARTHUR DENNING, B.Sc., Dip.Ed., A.S.T.C., F.R.S.A., Director, New South Wales Department of Technical Education—five meetings.*

JOHN PATRICK GLASHEEN, Dip.Ed., A.C.I.S., Member, New South Wales Public Service Board—five meetings.

WILLIAM MCCULLOCH GOLLAN, M.L.A., Minister for Mines—two meetings.

JOHN WILLIAM GOODSELL, C.M.G., F.A.S.A., Under Secretary and Comptroller of Accounts, New South Wales Treasury; Vice-President, Metropolitan Water, Sewerage and Drainage Board—six meetings.

WILLIAM GEORGE KETT, F.S.M.C., F.I.O. (Lond.), Past President, Australian Optometrical Association; Director, Mark Foy's Ltd.—seven meetings.

THE HON. ROBERT ARTHUR KING, M.L.C., Secretary, Labor Council of New South Wales—one meeting.*

JAMES NORMAN KIRBY, Managing Director, James N. Kirby Pty. Ltd.; Technical Director, Nuffield (Aust.) Pty. Ltd.; Technical Director, International Products—five meetings.

WALTER RAE LAURIE, B.Arch., F.R.I.B.A., F.R.A.I.A., Architect; Past President, Royal Australian Institute of Architects—three meetings.

JAMES KENNETH MACDOUGALL, M.I.E.E. (Lond.), A.M.I.E. Aust., Consultant to Rylands Bros. Aust. Pty. Ltd.—seven meetings.

THE HON. JAMES JOSEPH MALONEY, M.L.C., Minister without Portfolio—six meetings.

FRANCIS MACKENZIE MATHEWS, B.E., M.I.E., Aust., Chairman, Wollongong Technical Education District Council; Chief Engineer, Australian Iron and Steel Ltd.—seven meetings.

RICHARD GODFREY CHRISTIAN PARRY-OKEDEN, Managing Director, Lysaghts Works Pty. Ltd.; President, Chamber of Manufacturers of New South Wales—one meeting.*

DAVID WATKIN PHILLIPS, B.Sc., Ph.D., Dip. Met. Min., F.G.S., M.I.Min.E., M.Amer.I.M.E., M.Aus.I.M.M., Professor of Mining Engineering, N.S.W. University of Technology—five meetings.

STEPHEN HENRY ROBERTS, M.A., D.Sc., Litt.D., D.Sc.(Econ.), Vice-Chancellor, the University of Sydney—no meetings.*

ARTHUR ALFRED ROBINSON, M.B.S.I., Head of School of Footwear, New South Wales Department of Technical Education—seven meetings.

RAYMOND LOUIS ROGERSON, B.E., Assistant Engineer, Australian Glass Manufacturers Co. Pty. Ltd.—seven meetings.

GREGORY BEDE THOMAS, LL.B., B.Sc., B.E., Barrister—seven meetings.

FREDERICK EDWARD TOWNDROW, F.R.I.B.A., F.R.A.I.A., F.T.C.P.I. (Aust.)., Professor of Architecture, N.S.W University of Technology —three meetings.*

GEOFFREY WARD, B.E., Postmaster-General's Department—five meetings.

ROBERT JOSEPH WEBSTER, M.C., A.A.A., Past President, The Australian Institute of Management, Sydney Division; Chairman of Directors and Managing Director, Burlington Mills (Aust.) Ltd.; Managing Director, Bradford Cotton Mills Ltd.—four meetings.*

JOHN FELL DALRYMPLE WOOD, B.Sc., B.E., A.M.I.E. Aust., Associate Professor, Mechanical Engineering, N.S.W. University of Technology; President, Technical Teachers' Association of New South Wales—seven meetings.

HAROLD STANLEY WYNDHAM, M.A., Dip.Ed., Ed.D., Director-General, New South Wales Department of Education—three meetings.

*During the year leave of absence from Council meetings for various periods was granted to Professors Roberts and Towndrow and to Messrs. **Denning, King, Parry-Okeden and Webster.**

APPENDIX II.

Standing Committees of Council.

The membership of the standing committees of Council, as reconstituted by Council on 29th March, 1954, is as follows:

Executive Committee:

The President (Chairman).
The Vice-President.
The Director.
W. E. Clegg.
A. Denning.
J. W. Goodsell.
W. G. Kett.
W. R. Laurie.
J. K. MacDougall.
Professor D. W. Phillips.
Professor S. H. Roberts.
R. J. Webster.

Finance Sub-Committee of Executive Committee:
The President (Chairman).
The Vice-President.
The Director.
J. W. Goodsell.
W. R. Laurie.

Personnel Sub-Committee of the Executive Committee:
The President (Chairman).
The Vice-President.
The Director.
W. G. Kett.

Academic Committee:
The Vice-President (Chairman).
The Director.
A. Denning.
J. P. Glasheen.
W. G. Kett.
F. M. Mathews.
Professor D. W. Phillips.
R. L. Rogerson.
G. B. Thomas.
G. Ward.
Associate Professor J. F. D. Wood.
Dr. H. S. Wyndham.

Appeals Committee:
The President (Chairman).
The Vice-President.
The Hon. J. J. Maloney.

Buildings and Equipment Committee:
W. E. Clegg (Chairman).
The Director.
J. P. Glasheen.
The Hon. W. M. Gollan.
The Hon. R. A. King.
J. N. Kirby.
W. R. Laurie.
J. K. MacDougall.
Professor D. W. Phillips.
A. A. Robinson.
Professor F. E. Towndrow.

Library Committee:

W. G. Kett (Chairman).
The Director.
Professor G. Bosson.
The Hon. J. J. Maloney.
Professor D. W. Phillips.
G. B. Thomas.

Public Relations Committee:

R. J. Webster (Chairman).
The Director.
F. W. Ayscough.
H. G. Conde.
J. N. Kirby.
The Hon. J. J. Maloney.
F. M. Mathews.

Newcastle College Committee:

J. K. MacDougall (Chairman).
The Director.
W. E. Clegg.
A. Denning.
R. G. C. Parry-Okeden.
Dr. H. S. Wyndham.

APPENDIX III.

Awards of Scholarships for 1954.

Awards during the year were held as set out hereunder—

The Broadcasting, Radio, Electrical Industries Fellowship Club, Sydney, Scholarship—

A. Rosenauer—fourth year, Electrical Engineering.

The A. E. Goodwin Memorial Scholarship—

D. J. Melville—second year, Mechanical Engineering (Newcastle).

The John Heine Memorial Scholarship—

P. McDougall—Metallurgy conversion course.

The Imperial Chemical Industries of Australia and New Zealand Fellowship—

J. H. Green, M.Sc. Qld., Ph.D. Cantab.—Work on Radiochemistry.

The Mining and Metallurgical Bursaries Fund Scholarships—
W. H. Conrow—third year, Mining Engineering.
C. S. Fu—third year, Mining Engineering.

The Monsanto Research Scholarship—
G. G. Madgwick, B.Sc.—Master of Science candidate.

The Wool Industry Fund Scholarships—
J. P. Kennedy—second year, Wool Technology.
S. H. Chorlton—third year, Wool Technology.

Bursars.

J. P. Bolyai—third year, Applied Chemistry.
P. E. Garrity—fourth year, Electrical Engineering.
P. J. Happ—first year, Chemical Engineering.
J. H. Watson—second year, Mechanical Engineering.

Joint Coal Board Scholarships.

P. E. Cogar—fourth year, Mining Engineering.
D. J. Hay—fourth year, Mining Engineering.
F. E. Jaggar—second year, Mining Engineering.
G. R. Johnson—first year, Mining Engineering.
J. N. Kay—second year, Mining Engineering.
D. S. McCallum—fourth year, Mining Engineering.
E. C. McDonald—first year, Mining Engineering.
J. D. McDonald—first year, Mining Engineering.
R. C. Nolan—third year, Mining Engineering.
D. Saunders—fourth year, Mining Engineering.
G. J. Watkins—first year, Mining Engineering.
J. W. Wilton—first year, Mining Engineering.

Combined Colliery Proprietors' Association Scholarships.

N. F. Owers—second year, Mining Engineering.
J. W. Wilkinson—third year, Mining Engineering.

Commonwealth Scholarships.

D. B. Allen—third year, Architecture.
K. W. Arnold—fourth year, Applied Chemistry.
H. J. E. Audova—second year, Civil Engineering.
S. E. Behne—second year, Architecture.
R. T. E. Bell—first year, Applied Chemistry.

Commonwealth Scholarships—continued.

A. J. Benedetti—first year, Architecture.
R. F. E. Bolton—first year, Industrial Chemistry.
R. J. Bolton—third year, Applied Chemistry.
J. P. Bolyai—third year, Applied Chemistry.
A. S. Bowman—first year, Mechanical Engineering.
A. F. Boyle—second year, Electrical Engineering.
G. Bracs—second year, Architecture.
C. J. Bradys—second year, Mechanical Engineering.
D. B. Britten—fourth year, Electrical Engineering.
E. H. Brent—fourth year, Chemical Engineering.
M. G. Buchhorn—first year, Electrical Engineering.
D. N. Butler—second year, Applied Chemistry.
G. D. Byrne—first year, Electrical Engineering.
L. A. Cambey—fourth year, Applied Physics.
R. H. Chapman—second year, Civil Engineering.
P. Chiswell—fourth year, Civil Engineering.
K. G. Clancy—second year, Civil Engineering.
A. G. Clarke—second year, Civil Engineering.
J. E. Cleary—fourth year, Applied Physics.
I. M. Coggiola—first year, Applied Science.
J. S. Colman—third year, Architecture.
G. D. Cordingley—fourth year, Civil Engineering.
R. A. Corin—fourth year, Electrical Engineering.
A. J. Costoulas—third year, Applied Chemistry.
R. L. Cotham—third year, Chemical Engineering.
N. T. Cowper—third year, Civil Engineering.
M. A. Cox—third year, Electrical Engineering.
N. K. A. Cox—first year, Mechanical Engineering.
J. Coyle—third year, Electrical Engineering.
J. P. Crowe—third year, Electrical Engineering.
J. F. Cudmore—fourth year, Applied Chemistry.
W. P. Daniel—second year, Science.
B. K. Davis—first year, Wool Technology.
M. A. Day—first year, Civil Engineering.
J. A. Dembecki—fourth year, Electrical Engineering.
B. F. Denning—second year, Electrical Engineering.
R. C. M. de Plater—first year, Metallurgy.
M. Desmarchelier—first year, Chemistry.

Commonwealth Scholarships—**continued.**

R. H. Devine—third year, Architecture.
G. R. Draper—third year, Applied Chemistry.
N. C. Edgerton—first year, Applied Chemistry.
E. J. Elgood—fourth year, Chemistry.
D. J. Elliott—fourth year, Civil Engineering.
M. G. Ellis—first year, Mechanical Engineering.
R. J. Enright—first year, Mechanical Engineering.
K. A. Faulkes—fourth year, Civil Engineering.
L. S. E. Fennell—second year, Electrical Engineering.
B. T. Fitzgerald—first year, Chemical Engineering.
T. M. Florence—third year, Applied Chemistry.
R. J. Frost—third year, Civil Engineering.
G. G. Fuller—second year, Architecture.
P. E. Garrity—fourth year, Electrical Engineering.
K. G. Gately—first year, Electrical Engineering.
A. B. Goldhammer—third year, Electrical Engineering.
D. G. Graham—first year, Electrical Engineering.
T. J. Grainger—first year, Wool Technology.
P. A. Gralton—first year, Applied Chemistry.
A. H. Gray—second year, Chemical Engineering.
I. Gregory—fourth year, Applied Chemistry.
B. L. Grieve—third year, Electrical Engineering.
G. B. Guest—first year, Metallurgy.
H. E. Hamilton—third year, Electrical Engineering.
J. D. Hampton—third year, Electrical Engineering.
W. R. Hazell—first year, Civil Engineering.
G. D. Herman—third year, Chemical Engineering.
J. M. Higgins—second year, Civil Engineering.
K. Hillier—first year, Civil Engineering.
F. R. Hulscher—second year, Electrical Engineering.
R. W. Humphreys—first year, Applied Chemistry.
K. R. Hunt—fourth year, Applied Chemistry.
A. J. M. Irving—second year, Mechanical Engineering.
G. A. Ivers—first year, Electrical Engineering.
K. Jan—third year, Mechanical Engineering.
J. P. Jenkin—second year, Chemistry.
R. B. Jenkin—first year, Chemical Engineering.
R. C. Johnson—second year, Electrical Engineering.

Commonwealth Scholarships—continued.

T. Jumikis—fourth year, Civil Engineering.
A. Kadak—second year, Civil Engineering.
C. H. L. Kennard—third year, Applied Chemistry.
G. A. Kennedy—first year, Civil Engineering.
P. Kenny—second year, Applied Physics.
C. A. Kerr—second year, Chemical Engineering.
A. Kuru—third year, Civil Engineering.
A. M. Kuter—first year, Civil Engineering.
D. M. Kuter—second year, Civil Engineering.
C. W. Langby—second year, Wool Technology.
A. G. Leask—second year, Mechanical Engineering.
W. N. Leng—third year, Civil Engineering.
R. M. Lennon—third year, Electrical Engineering.
H. D. Locksley—fourth year, Applied Chemistry.
J. J. Lucas—first year, Chemistry.
E. H. Maidment—third year, Chemical Engineering.
K. H. Maggs—second year, Electrical Engineering.
J. A. Malins—third year, Civil Engineering.
A. M. Mathew—first year, Mechanical Engineering.
R. B. Meulman—second year, Mechanical Engineering.
R. A. Mills—second year, Mechanical Engineering.
G. Monk—fourth year, Civil Engineering.
I. P. MacPherson—second year, Civil Engineering.
R. G. McCarthy—third year, Electrical Engineering.
A. B. McDermott—first year, Electrical Engineering.
G. R. J. McDonagh—second year, Architecture.
R. C. McEwen—second year, Civil Engineering.
R. S. McKilligan—third year, Electrical Engineering.
K. H. Napier—second year, Applied Chemistry.
B. C. Newman—first year, Food Technology.
M. J. Nicholls—second year, Civil Engineering.
R. Nittim—third year, Civil Engineering.
E. M. O'Loughlin—first year, Civil Engineering.
P. J. J. O'Neill—second year, Electrical Engineering.
J. Orlovich—second year, Mechanical Engineering.
A. J. Owens—first year, Applied Chemistry.
E. T. Page—second year, Electrical Engineering.
L. Panozzo—third year, Mechanical Engineering.

Commonwealth Scholarships—continued.

R. Parker—first year, Applied Chemistry.
B. W. G. Penhall—fourth year, Electrical Engineering.
M. T. F. Pines—third year, Mechanical Engineering.
M. L. Pittaway—third year, Civil Engineering.
J. A. Purnell—second year, Electrical Engineering.
M. Randoja—second year, Civil Engineering.
D. W. Ray—third year, Architecture.
J. W. Ray—fourth year, Electrical Engineering.
K. M. Ray—second year, Electrical Engineering.
B. P. Rheinberger—fourth year, Electrical Engineering.
K. J. Rice—fifth year, Architecture.
L. P. Rossler—fourth year, Applied Chemistry.
M. L. Rothwell—fifth year, Chemical Engineering.
A. G. Roxborough—first year, Civil Engineering.
K. Ryan—third year, Electrical Engineering.
L. J. Salkeld—second year, Mechanical Engineering.
J. R. Sands—third year, Civil Engineering.
D. Savage—fourth year, Electrical Engineering.
J. M. Savage—third year, Mechanical Engineering.
W. Savage—first year, Mechanical Engineering.
W. E. Sawell—first year, Civil Engineering.
G. R. Sharpe—fourth year, Electrical Engineering.
R. E. Simpson—first year, Chemical Engineering.
J. N. Skinner—second year, Wool Technology.
R. J. Slater—first year, Civil Engineering.
H. G. Small—second year, Civil Engineering.
R. L. Smythe—second year, Civil Engineering.
T. G. Souter—second year, Applied Chemistry.
I. K. Spence—second year, Mechanical Engineering.
J. W. Spratt—third year, Electrical Engineering.
A. J. L. Stewart—second year, Electrical Engineering.
P. S. B. Stewart—first year, Applied Chemistry.
A. Tava—first year, Electrical Engineering.
G. R. Taylor—fourth year, Electrical Engineering.
G. Thieben—second year, Civil Engineering.
S. R. Tibbles—second year, Chemical Engineering.
B. E. Tindale—fifth year, Chemical Engineering.
A. Tinni—first year, Civil Engineering.

Commonwealth Scholarships—continued.

A Vainomae—fourth year, Mechanical Engineering.
A. M. Wallace—fourth year, Civil Engineering.
H. L. Wallace—fourth year, Mechanical Engineering.
R. E. Wallyn—third year, Electrical Engineering.
R. F. Warner—fourth year, Civil Engineering.
G. S. Watson—first year, Mechanical Engineering.
B. G. Wenham—second year, Civil Engineering.
D. Whitfield—third year, Chemical Engineering.
D. R. Woodman—first year, Electrical Engineering.
E. P. Woolley—first year, Chemical Engineering.
R. F. Young—first year, Electrical Engineering.

APPENDIX IV.

Degrees in Engineering and Science Conferred on 20th March, 1954.

Master of Science (*M.Sc.*).

SCHOOL OF APPLIED CHEMISTRY.

Gordon Hillis Aylward, B.Sc., A.S.T.C.
Douglas Lyons Ford, A.S.T.C.
John Lyndon Garnett, B.Sc., A.S.T.C.

SCHOOL OF APPLIED PHYSICS.

Leonard Oswald Bowen, B.E., B.Sc. W.Aust.

SCHOOL OF CHEMICAL ENGINEERING.

Francis Leslie Connors, A.S.T.C.
Harold Francis Melouney, A.S.T.C.

Bachelor of Science (*B.Sc.*).

SCHOOL OF APPLIED CHEMISTRY.

Honours.

Peter Nordon, A.S.T.C. (Class I and University Medal).
Ronald Charles Bitmead, A.S.T.C. (Class II).
David Alexander Lawe Davies, A.S.T.C. (Class II).
Bruce Malcolm Graham, A.S.T.C. (Class II).
Nicholas William Tschoegl, A.S.T.C. (Class II).

Pass.

Venn Cranmer, A.S.T.C.
Alan Rae Green, A.S.T.C.
Emanuel Mansberg.
Ronald Hugh Martin.
Michael Wetherill O'Connor.
Walter Laurence Routley, A.S.T.C.

SCHOOL OF CHEMICAL ENGINEERING.

Honours.

John Carter (Class II).
Reginald Carson Donnan (Class II).
Vincent Guiffre, A.S.T.C. (Class II).
George Graham Madgwick (Class II).
Peter Patrick Perry (Class II).
Geoffrey Craig Wall, A.S.T.C. (Class II).

Pass.

John Wentworth Johnson, A.S.T.C.
Lambert Ronald Little.
Bruce James Oglethorpe.
Ronald Kenneth Pym, A.S.T.C.
Robert George Upjohn.

Master of Engineering (*M.E.*).

SCHOOL OF MECHANICAL ENGINEERING.

Raymond Allan Wallis, A.S.T.C.

SCHOOL OF MINING ENGINEERING AND GEOLOGY

Russell George Burdon, A.S.A.S.M.

Bachelor of Engineering (*B.E.*).

SCHOOL OF CIVIL ENGINEERING.

Honours.

Colin Raymond Dudgeon (Class I).
Gordon Alan McKenzie (Class II).
Robert Keith Petersen, A.S.T.C. (Class II).

Pass.

Leslie John Bagust.
Andrew John Bell.
Sydney John Joseph Cashman.
William Raeburn Copeland.
Ronald Joseph Fletcher.
Kenneth John Griffith, A.S.T.C.
Bruce Edward Jenkins.
Keith McNair.
Trevor Arthur Newton.
Graham John Shields.
Alan John Joseph Wells.
Alan Charles Whitting, A.S.T.C.
Keith Robert Willing.

SCHOOL OF ELECTRICAL ENGINEERING.

Honours.

Ronald George Smart (Class I and University Medal).
Campbell George Cromarty (Class I).
Peter Thomas Bason (Class II).
Colin William Martin Freeland (Class II).
Geoffrey Healy (Class II).
Leslie Charles Hill (Class II).
Joseph Aloysuis O'Dwyer (Class II).
Kenneth Potter (Class II).
David Mervyn Saunderson (Class II).

Pass.

Gay Choy.
William Edward Darby.
John Anthony Donovan.
John Griffiths Engel.
Ronald Arthur Leverett.
Clive Shannon Liston.
George Mega.
William Alan Sampson.

SCHOOL OF MECHANICAL ENGINEERING.

Honours.

Malcolm Wesley Evans (Class II).
George Herbert Liney (Class II).
Cecil John Pengilley, A.S.T.C. (Class II).

Pass.

Ian Lindsay Budge.
Henry Livingstone Burn.
Geoffrey Erle Cox.
John Garthneill De Vos.
Ross William Hogg.
Neil William Walker.

SCHOOL OF MINING ENGINEERING AND GEOLOGY.

Honours.

James Junior Brooks (Class II).
Richard James Buchhorn (Class II).
Michael Owen Kefford (Class II).
Darrell Elwyn Morrow (Class II).
Robert Carl Williams (Class II).

Pass.

Colyn Harrison.
Thomas Alexander Nestel.
Owen John Richards.
Keith Phillip Tognetti.

APPENDIX V.

Research Activities.

The following research projects were conducted in the various schools of the University in 1953-54:—

SCHOOL OF APPLIED CHEMISTRY.

Department of Physical Chemistry.

(*a*) As a requirement for the degree of Doctor of Philosophy:—

(i) Spectroscopic studies of inter-and-intra molecular association—R. L. Werner.

(ii) Studies in chemical kinetics of gaseous reactions—E. S. Swinbourne.

(iii) Studies on natural waxes using techniques of surface chemistry—A. R. Gilby.

(iv) Studies in the colloidal and biological properties of organic insecticides—G. T. Barnes.

(v) The effect of A.C. voltages in polarography—G. S. Buchanan.

(vi) Electrical properties of organic compounds with particular reference to the phthalocyanines—B. E. Fielding

(*b*) As a requirement for the degree of Master of Science:—

(i) Correlation between colloidal and mechanical properties of soils—A. Herzog.

(ii) Studies on the chemistry of esters of titanium—G. Winter.

(iii) The effects of the structure on azo compounds of their adsorbability, heat of adsorption and reduction potential—P. Beckmann.

(iv) Partition co-efficients of metal ions between putanol and aqueous hydrochloric acid solutions—R. W. Maclay.

(v) Fundamental studies of emulsions and suspensions of biologically active compounds with special reference to D.D.T., benzene hexachloride and similar compounds—D. K. O'Neill.

(vi) Studies in the nature of inorganic colloid formation with special reference to Von Weirmarn's Law—V. A. Pickles.

(vii) The supercontraction of wool—Miss J. Griffith.

(viii) Formation and properties of monodispersed sulphur sols—P. D. Lark.

(ix) The penetration of D.D.T. through the cuticle of the cattle tick—W. J. Roulston.

(x) Physio-chemical studies of dough—N. W. Tschoegl.

(xi) Studies in ageing of wheat flour with special reference to redox potential and bromate requirements—R. C. Bitmead.

(*c*) *Other Projects*:—

(i) A.C. Polarography.

(ii) Electron microscopy.

(iii) Insect cuticle waxes.

(iv) The dielectric properties of complex salts.

(v) Study of the electrical resistance of pure metals as a function of temperature.

(vi) Determination of wetting agents.

(vii) Preparation of charge controlled colloids.

(viii) Application of distribution function to various physical properties.

(ix) Physico-chemical studies of wheaten doughs.

(x) Investigation of crystal growth with special consideration of screw dislocation.

(xi) Adsorption on solid surfaces from organic media.

(*d*) *Publications*:—

(i) The Kinetics of Adsorption from Solution to the Air/Water Interface. Part I Normal Aliphatic Alcohols. Part II Anionic and Cationic Soaps.

A. M. Posner and A. E. Alexander, *J.Coll.Sci.*, 1953, *8*, 575, 585.

(ii) The Chemical Nature and Physical Properties of Aluminium Soaps.

A. E. Alexander, *J.Oil & Colour Chemists* (in press).

(iii) The Electron Microscope and its Application to Metallurgy.

V. A. Pickles, *The Australasian Engineer*, 1953, 7, 61-69. (To be reprinted in 1954 *Transactions of the Australian Institute of Metals.*)

(iv) The Essential Oil of *Myroporum crassifolium*, Forst, Part II.

K. G. O'Brien, A. R. Penfold, M. D. Sutherland and R. L. Werner, *Aust.J.Chem.*, 1954, 7, 298.

(v) The Effect of A.C. Voltages on D.C. Polarography, Part I. Reversible Systems.

G. S. Buchanan and R. L. Werner, *Aust.J.Chem.*, 1954, 7, 239.

(vi) A Statistical Study of some Eleficin Absorption Bands in the Infra-red Region.

R. L. Werner and P. D. Lark, *J.Chem.Soc.*, 1954, 1152.

(vii) A Photoelectric Flow Rate Meter.

W. R. S. Briggs and R. L. Werner, *J.Sci.Inst.* (in press).

(viii) The Infra-red Spectra of the Mono-halogeno-naphthalenes.

J. Ferguson and R. L. Werner, *J.Chem.Soc.* (in press).

(ix) The Effect of A.C. Voltages on D.C. Polarography. Part II. Irreversible Systems.

G. S. Buchanan and R. L. Werner, *Aust.J.Chem.* (in press).

(x) The Infra-red Spectra of the Quinone Diazides.
R. J. W. Le Fevre and R. L. Werner, *J.Chem.Soc.* (in press).

(xi) Application of Statistical Analysis to Analytical Data.
P. D. Lark, *Anal.Chem.* (in press).

Department of Inorganic Chemistry.

(*a*) As a requirement for the degree of Doctor of Philosophy:—

(i) Co-ordination compounds of groups IB and VIII with chelate compounds of sulphur—J. R. Backhouse.

(ii) Research on the co-ordination compounds of group IB elements and related compounds—C. M. Harris.

(iii) Studies in magnetochemistry—B. N. Figgis.

(iv) Studies in co-ordination chemistry with particular reference to bridge compounds of palladium—S. E. Livingstone.

(v) Ditertiary arsine complexes of ruthenium and osmium—G. J. Sutton.

(vi) Organic compounds of boron—K. G. O'Brien.

(*b*) As a requirement for the degree of Master of Science:—

(i) Stereochemistry of complexes of nickel—Miss T. Christie.

(ii) Infra-red spectra of inorganic complexes—V. Cranmer.

(iii) Studies of metallic complexes of amino-acids and peptides—B. N. Gatehouse.

(iv) Complex carbonyls of platinum—E. A. Magnusson.

(v) Chemistry of platinum arsine compounds—D. A. Davies.

(vi) Stereochemistry of complex compounds—L. C. Lock.

(*c*) Other Projects:—

(i) Complexes of vanadium.

(ii) Five co-ordinate complexes.

(iii) Investigation of nickel in unusual valency states.

(iv) Application of infra-red spectroscopy to the study of nature of bonds in co-ordination complexes.

(v) Use of radio-isotopes in studies of metallic complexes.

(vi) Metallo-porphyrin complexes.

(vii) Studies of co-ordinating properties of poly-arsine chelate groups.

(viii) Ditertiary arsine complexes of ruthenium, osmium, rhodium and iridium.

(ix) Orbital contribution in magnetic moments of tetrahedral and octahedral cobalt II complexes.

(x) Studies in metallic carbonyl compounds.

(*d*) Publications:—

(i) Sexadentate Chelate Compounds. Part VII.

N. S. Gill, F. P. Dwyer, E. C. Gyarfas, F. Lions, *J.Amer. Chem.Soc., 76,* 383, 1954.

(ii) The Resolution of a Bis-tridentate Iron II Complex.

N. S. Gill, F. P. Dwyer, E. C. Gyarfas, F. Lions, *J.Amer. Chem.Soc., 75,* 384, 1953.

(iii) Magnetic Moments and Stereochemistry of Cobaltous Compounds.

B. N. Figgis and R. S. Nyholm, *J.Chem.Soc.,* 1954, 12.

(iv) Boron Trifluoride Co-ordination Compounds.

R. L. Martin and N. N. Greenwood, *Quart.Rev., Chem. Soc., Lond., 8,* 1, 1954.

(v) The Molar Volume of Co-ordinated Boron Trifluoride.

R. L. Martin and N. N. Greenwood, *J.Chem.Soc.*. 1953, 4132.

(vi) Vibrational Spectra in the Study of Co-ordination Com-Compounds.

L. N. Short, *Rev. Pure & Appl. Chem., 4,* 41, 1954.

(vii) The Structure of Nickel Tetracarbonyl and Some Disubstituted Derivatives.

L. N. Short and R. S. Nyholm, *J.Chem.Soc.*, 1953, 2670.

(viii) The Nature of the Metal Ligand Bond in Complex Compounds.

R. S. Nyholm, *Rev. Pure & Appl. Chem., 4,* 15, 1954.

(ix) The Stereochemistry and Valence States of Nickel.

R. S. Nyholm, *Chem.Rev., 53,* 263, 1953.

(x) Magnetism and Inorganic Chemistry.

R. S. Nyholm, *Quart.Revs., Chem.Soc.Lond., 7,* 377, 1953.

(xi) Mechanism, Kinetics and Stereochemistry of Octahedral Substitutions. Part I. Edge-displacement as a Hypothesis Linking Mechanism with Stereochemistry of Substitution.

D. D. Brown, C. K. Ingold and R. S. Nyholm, *J.Chem. Soc.*, 1953, 2674.

(xii) Mechanism, Kinetics and Stereochemistry of Octahedral Substitutions. Part III. Steric Course of Some Unimolecular Substitutions in the *cis*-Dichlorobisethylenediamine-Cobalt (III) Ion.

D. D. Brown and R. S. Nyholm, *J.Chem.Soc.*, 1953, 2696.

(xiii) Chemical Bonds Involving *d*-Orbitals. Parts I and II.

D. P. Craig, A. Maccoll, R. S. Nyholm, L. E. Orgel and L. E. Sutton, *J.Chem.Soc.*, 1954, 332.

(xiv) The Stereochemistry of Complex Compounds (Chapter IX of "Recent Progress in Stereochemistry").

R. S. Nyholm, Butterworth, London, 1954 (In press).

Department of Analytical Chemistry.

(*a*) As a requirement for the degree of Doctor of Philosophy:—

(i) Paper Partition chromatography—E. C. Martin.

(ii) The effect of substituents in the napthalene ring—A. Bryson.

(iii) Studies in chromatography—J. R. A. Anderson.

(*b*) As a requirement for the degree of Master of Science:—

(i) Studies on anti-fouling paints—W. E. Goodin.

(*c*) Other Projects:—

(i) Chromatographic examination of permissible food dyes.

(ii) The volumetric determination of aldehydes and ketones using 2,4 dinitrophenylhydrazine.

(iii) Kinetics of racemization of optically active inorganic ions.

(iv) The chromatographic examination of metal complexes.

(v) The use of the four isomeric ortho-amino-naphthoic acids as chelating compounds with metal ions.

(vi) The application of automatic electronic control to electrode separations.

(*d*) Publications:—

(i) The Separation of Zinc from other Elements by the use of Activated Copper.

A. Bryson and S. Lenzer-Lowy, *Analyst* (in press).

(ii) The Quantitative Separation of Copper, Lead and Tin by Cathodic Deposition.

G. H. Aylward and A. Bryson, *Analyst*, 1953, *78*, 651-53.

(iii) The Kinetics of Racemization of Optically Active Complex Ions of Group VIII Elements. Part III.

N. R. Davies, *Reviews of Pure & Appl. Chem.*, 1954, *44*, 66. *50*, 24.

(iv) The Mechanism of Racemization of Inorganic Complex Ions.

N. R. Davies, *Reviews of Pure & Appl. Chem.*, 1954, *4*, 66.

Department of Organic Chemistry.

(*a*) As a requirement for the degree of Doctor of Philosophy:—

(i) Studies on polystictin—J. R. Tetaz.

(ii) The constituents of *Siphonodon australe*—J. L. Courtney.

(iii) The synthesis of organo-phorphorus compounds—Miss M. H. Maguire.

(iv) Oxidation processes in organic chemistry—E. R. Cole.

(v) Studies on oxidation of phenols and related compounds—D. J. McIlugh.

(vi) Investigation of mechanism of reactions of unsymmetrical substituted phthalic acids and derivatives—K. A. Allen.

(vii) Some studies in the chemistry of cyclitols—P. T. Gilham.

(viii) The chemistry of ants—D. L. Ford.

(*b*) As a requirement for the degree of Master of Science:—

(i) Studies in the *iso*oxazolone series—Mrs. G. Sugowdz.

(ii) Triterpenes from the latex of *Ficus* Spp.—C. J. Miller.

(iii) The oxidation of some active methylene systems—D. H. Solomon.

(iv) Some oxidations with lead tetra-acetate—H. E. Barron.

(*c*) Other Projects:—

(i) Oxidation of hydrazines.

(ii) Studies on the freezing point of milk.

(iii) Studies on borate complexes.

(iv) Studies on fixed oils.

(v) The stereochemistry of camphorglycols.

(vi) Syntheses in the purine series.

(vii) Oxidation of phenols.

(viii) Triterpenoids from higher fungi.

(ix) The chemistry of *Castanospermum australe* ("Black Bean").

(x) The chemistry of *Emmenospermum alphitonioides* ("Bone wood").

(xi) The chemistry of *Sideroxylon Pohlmanianum.*

(xii) Methyl ethers of *meso*inositol.

(xiii) The tetranitromethane colour reaction with olefines.

(xiv) Investigation of plants poisonous to stock.

(*d*) Publications:—

(i) The structure of the Di-O-*iso*propylidene Derivatives of (—)—Inositol and Pinitol.

S. J. Angyal, C. G. Macdonald, and N. K. Matheson, *J.Chem.Soc.,* 1953, 3321.

(ii) The Preparation and Stability of Field's Stain.

E. R. Cole and A. K. Sewell, *Med. Journal of Aust.,* Sept. 21, 1953.

(iii) Solvent Influence in Oxidation Reactions with Lead Tetra-acetate.

H. E. Barron, G. W. K. Cavill, E. R. Cole, P. T. Gilham, D. Solomon, *Chem. and Ind.,* 1954, 76.

(iv) Organic Oxidation Processes. Part I. The Oxidation of Some Methyl Phenols with Lead Tetra-acetate.

G. W. K. Cavill, E. R. Cole, P. T. Gilham, D. J. McHugh, *J.Chem.Soc.,* 1954 (in press).

(v) A New Synthesis of Pyrimidines.

G. Shaw and Mrs. G. Sugowdz, *Nature,* 1953, *172,* 955.

(vi) *iso*Oxazolones. Part IV. The Bromination of Arylaminomethylene*iso*oxazolidones. A New Selective Anion-precipitant.

G. Shaw, *J.Chem.Soc.*, 1953, 3464.

(vii) *iso*Oxazolones. Part V. Arylaminoalkyl (or aryl) idene*iso*oxazolones and *iso*oxazolidones.

E. Mansberg and G. Shaw, *J.Chem.Soc.,* 1953, 3467.

(viii) *iso*Oxazolones. Part VI. The Hydrogenation of 5-Amino-*iso*oxazoles. A new Synthesis of Pyrimidines.

G. Shaw and Mrs. G. Sugowdz, *J.Chem.Soc.,* 1954, 665.

(ix) A New Synthesis of Imidazoles.

G. Shaw, *Chem. and Ind.*, 1954, 546.

(x) The Chemistry of Fungi. Part XVIII. The Cyclic System of Eburicoic Acid.

J. S. E. Holker, A. D. G. Powell, A. Robertson, J. J. H. Simes and R. S. Wright, *J.Chem.Soc.*, 1953, 2414.

(xi) The Chemistry of Fungi. Part XIX. The Structure of Eburicoic Acid.

J. S. E. Holker, A. D. G. Powell, A. Robertson, J. J. H. Simes, R. S. Wright and R. M. Gascoigne, *J.Chem.Soc.*, 1953, 2422.

(xii) The Saponin of *Doryanthes palmeri.*

W. Hill, J. L. Courtney, W. J. Dunstan and J. J. H. Simes, *Aust.J.Chem.*, *7*, 124.

(xiii) The Chemistry of Plant Growth-regulators, Part I. 2:4-Diochloro-6-hydroxy-phenoxy Acetic Acid and Related Compounds.

G. W. K. Cavill and D. L. Ford, *J.Chem.Soc.*, 1954, 565.

(xiv) The Chemistry of Plant Growth-regulators, Part II. Modification of the Side-chain of 2:4-Dichlorophenoxy Acetic Acid.

G. W. K. Cavill and D. L. Ford, *J.Chem.Soc.*, 1954, 1388.

Department of Biological Sciences.

(*a*) As a requirement for the degree of Master of Science:—

(i) Submerged culture techniques and the metabolism of fungi—J. Armstrong.

(ii) The relationship between chemical structures and antimicrobial activity—R. G. H. Barbour.

(iii) Mineral nutrition of fungi—B. R. Hewitt.

(iv) The cytology of the higher fungi—J. Sutton.

(*b*) Other Projects:—

(i) Ecology and systematics of N.S.W. *Drosophilidae.*

(ii) Growth characteristics of wood rotting fungi on various media.

(iii) New metabolites of wood rotting fungi.

(iv) Intracellular oxidation processes in fungi.

(v) Biosynthesis of purines.

(vi) Studies on azoles and hydrazines.

(vii) The microbial discolouration of processed meat.

(*c*) Publications:—

(i) Metal Complexes of Biological Interest.

B. J. Ralph, *Revs. Pure and Applied Chem.*, 1954, *4*, 85.

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(ii) Mutations of Different Bacteriophage Types of Staphylococci to Streptomycin Resistance.

R. G. H. Barbour and Anne Edwards, *J.Exp.Biol.*, 1953, *31*, 561.

(iii) Coastal Sand Drift Investigations in New South Wales. Part I.

B. R. Hewitt, *J.Soil Conservation Science of N.S.W.*, 1954, *10*, 45.

(iv) Coastal Sand Drift Investigations in New South Wales. Part II.

B. R. Hewitt, *J.Soil Conservation Science of N.S.W.*, 1954, *10*, 90.

(v) Triazoles. Part II. N-Substitution of Some 1:2:4-Triazoles. M. R. Atkinson and J. B. Polya, *J.Chem.Soc.*, 1954, 141.

(vi) Cleavage of 1:2:4-Triazole Rings.

M. R. Atkinson and J. B. Polya, *Chemistry and Industry*, 1954, 462.

(vii) Triazoles. Part III. Methylphenyl- and Dimenthyl-phenyl-1:2:4-Triazoles.

M. R. Atkinson and J. B. Polya, *J.Chem.Soc.* (in press).

(viii) Triazoles. Part IV. Ultra-violet Absorption Spectra of Some 1:2:4-Triazoles.

M. R. Atkinson, E. A. Parkes and J. B. Polya, *J.Chem.Soc.* (in press).

SCHOOL OF APPLIED PHYSICS.

(*a*) As a requirement for the degree of Doctor of Philosophy:—

(i) Metal spectroscopy—S. C. Baker.

(ii) Theoretical studies relating to the physics of the solid state—E. R. Lanczi.

(iii) X-Ray crystallographic studies—J. F. McConnell.

(iv) Condensation of and desorption from surfaces in vacuum—J. A. Milledge.

(v) Sonic and ultrasonic characteristics of timber—H. F. Pollard.

(*b*) As a requirement for the degree of Master of Science:—

(i) X-ray diffraction study of the stretching of wool—E. G. Bendit.

(ii) X-ray applications of proportional counters—N. R. Hansen.

(iii) Studies in physiological optics—J. Lederer.

(iv) Magnetic properties of ilmenite—L. G. Parry.

(v) Computational aids for X-ray structure determinations—A. Schwartz.

(vi) Electronic techniques applied to spectroscopy—W. G. Walker.

(vii) X-ray diffraction application of scintillation counters—J. B. S. Waugh.

(*c*) Other Projects:—

(i) Spectrographic and X-ray diffraction analysis of materials.

(ii) New methods of forming half-tone and colour plates for printing.

(iii) Development of spectrographic analytical techniques (Newcastle).

(iv) Design studies on high vacuum pumps.

(v) Electronic regulator circuits.

(vi) Visual aids for the partially-sighted.

(vii) Design studies on optical instruments.

(*d*) Publications:—

(i) A Symmetrical Cathode Follower Bridge Circuit for Direct Spectro-chemical Analysis.

W. G. Walker and S. C. Baker, *J.Sci.Instrum.*, 1953, *30*, 328.

(ii) Direct-reading Metal Spectroscopy with a D.C. Arc.

S. C. Baker, *Brit.J.Appl.Phys.*, 1954, *5*, 215.

(iii) The Prismatic Effects of Contact Lenses.

J. Lederer, *Aust.J.Opt.*, March, 1954, *37*, 105.

(iv) Visual Training.

J. Lederer, *Aust.J.Opt.*, April, 1954, *37*, 181.

(v) The Lederer Lenses—A New Development in Optical Aids to Sub-normal Vision.

J. Lederer, *Aust.J.Opt.*, July, 1954, *37*, 297.

(vi) An Electro-erosion Method of Strain Free Cutting.

J. A. James and C. J. Milner, *J.Sci.Instrum.*, 1953, *30*, 386.

(vii) Optical Diffraction Effects Produced by Amplitude and Phase Changes in the Wave Front.

G. H. Godfrey, *Aust.J.Phys.*, September, 1954, *7*, 389.

SCHOOL OF CHEMICAL ENGINEERING.

(*a*) As a requirement for the Degree of Doctor of Philosophy:—

(i) The kinetics of the decomposition of titanium tetra-iodide—K. McG. Bowling.

(ii) Study of anhydrous metal chlorides production in fluidised beds—W. R. S. Briggs.

(iii) The motion of liquids and dispersed bubbles, drops and solids in vibrating columns and its effect on mass and energy transfer—R. H. Buchanan.

(iv) Studies in heat transfer properties of vapours and liquids—R. C. Cairns.

(v) Industrial processing of thermoplastics—F. L. Connors.

(vi) The effect of conditions of growth on crystal form—E. R. McCartney.

(vii) Gas absorption accompanied by chemical reaction—G. H. Roper.

(viii) Studies in ion exchange and adsorption—P. Souter.

(ix) The development of fluorination processes—J. D. Smith.

(x) Absorption of zinc vapour in molten lead—N. A. Warner.

(xi) Studies in liquid-liquid extraction of inorganic compounds with organic solvents—R. K. Warner.

(xii) Studies in the utilization of gypsum for the production of heavy chemicals—S. M. Zahid.

(*b*) As a requirement for the degree of Master of Science:—

(i) Bacteriological aspects of process evaluation in vegetable products—J. C. Anand.

(ii) Studies in the polymerisation of vinyl chloride—P. D. Antoniades.

(iii) The fluidised roasting of sulphide ores—F. W. Ayscough.

(iv) Phase equilibrium and solid state reaction in the system Al_2O_3—ZrO_2—SiO_2—H. Fowler.

(v) The design of stirrer shafts—C. H. Hopkins.

(vi) The causes and mitigation of the corrosion of town's gas distribution systems—T. M. Hughes.

(vii) The investigation of the manufacture and uses of plaster of Paris for the building industry—C. H. Hunt.

(viii) Studies in food chemistry—N. S. Kapur.

(ix) Studies in the hydraulic gradients across bubble plates in fractionating columns—W. G. Kirchner.

(x) Studies in fluorination—J. Macmillan.

(xi) Studies in ion exchange membranes—G. Madgwick.

(xii) Studies in the crystallization of industrially important chemicals—M.I.M.A. Mirza.

(xiii) Studies in fixed oils—H. S. Nathan.

(xiv) Studies in heat transfer and sublimation at low pressure—J. Norman.

(xv) Side chain chlorination of toluene—J. S. Ratcliffe.

(xvi) Studies in the adhesion of polyester resins to glass surfaces—R. Robins.

(xvii) Studies on the extrudability of thermoplastic resins—N. T. Sorokin.

(xviii) Atmospheric pollution in New South Wales industrial areas—J. L. Sullivan.

(xix) The formation of resin-alum size on paper—N. A. Whiffen.

(xx) The science of spray drying—J. Willis.

(*c*) Other Projects:—

(i) Investigation of the unstable constituent in Nairne pyrites.

(ii) The gasification of high-sulphur coal.

(*d*) Publications:—

(i) Approximation Methods for the design of Cooler-condensers. R. C. P. Cairns, *Chem.Eng.Sci.*, 1954, *3*, (in press).

(ii) Heat and Mass Transfer at High Humidity. R. C. P. Cairns and G. H. Roper, *Chem.Eng.Sci.*, 1954, *3*, 97.

(iii) Hot Gas Welding of Plastics. Part I. F. L. Connors, *Australian Plastics*, April, 1954.

(iv) Hot Gas Welding of Plastics. Part II. F. L. Connors, *Australian Plastics*, May, 1954.

(v) Hot Gas Welding of Plastics. Part III. F. L. Connors, *Australian Plastics*, July, 1954.

(vi) Hot Gas Welding of Plastics, Parts I, II, III. F. L. Connors, *Welding and Fabrication of Thermo Plastics*. Aust. Trades Publ. (in press).

(vii) Condensation Polymerisation of Propylene Glycol Maleate. R. G. Robins, *Aust.J.Appl.Sci.*, 1954, *5*, 2, 187.

(viii) Absorption of Chlorine from Air by Solutions of Olefins in Carbon Tetrachloride.

G. H. Roper, *Chem.Eng.Sci.*, 1953, *2*, 247.

(ix) Gas Flow Characteristics of the Disc Absorption Column. N. A. Werner, *Chem.Eng.Sci.*, 1954, *3*, 77.

Department of Food Technology.

(*a*) As a requirement for the degree of Master of Science:—

Pigment in tomatoes—N. S. Kapur.

(*b*) Other Projects:—

Composition of Australian fruits and vegetables—citrus fruits.

SCHOOL OF METALLURGY.

(*a*) As a requirement for the degree of Master of Science:—

(i) An investigation of some of the factors affecting the welding of titanium—J. M. Newburn.

(ii) The technical development and prospects of the Australian copper industry—L. A. Lyons.

(iii) Some aspects of wire drawing at high hydrostatic pressures—J. P. Ryan.

(iv) The use of copper as an additive to, and as a substitute for, nickel in some stainless steels—C. G. H. Cooke.

(v) An investigation of the high pressure leaching of some Australian non-ferrous minerals—S. E. Coalstad.

(vi) Some aspects of the recovery of manganese from open hearth furnace slags—J. A. Gregory.

(vii) The detection by metallographic means of small amounts of plastic strain in metals, with particular reference to the effect of temperature—M. Hatherly.

(viii) The effect of aluminium and prior structure on spheroidisation of cementite in relation to plain carbon steels—M. W. Tayler.

(*b*) Other Projects:—

(i) Mechanism of ageing in copper-beryllium.

(ii) Crystallographic relationships in body-centred cubic to orthorhombic transformations, e.g., titanium.

(iii) Study of copper-gold superlattice.

(*c*) *Publications*:—

(i) Crystallography of Martensite Transformations. Part I.
J. S. Bowles and J. K. Mackenzie, *Acta Metallurgica II*, 1954, 129.

(ii) Crystallography of Martensite Transformations. Part II.
J. S. Bowles and J. K. Mackenzie, *Acta Metallurgica II*, 1954, 138.

(iii) Crystallography of Martensite Transformations. Part III.
J. S. Bowles and J. K. Mackenzie, *Acta Metallurgica II*, 1954, 224.

SCHOOL OF MATHEMATICS.

(*a*) As a requirement for the degree of Doctor of Philosophy:—
A problem in non-linear strain and its possible geophysical application—A. Keane.

(*b*) As a requirement for the degree of Master of Science:—
Some new types of quality control charts designed to reduce the amount of inspection and the sensitivity to non-normality of the parent distribution—H. Weiler.

(*c*) Other Projects:—

(i) Wave propagation in anisotropic media.

(ii) Statistical analysis of data relating to methods of sight screening—on behalf of Optometry Department (Computation Laboratory).

(iii) Analysis of storms and floods with reference to the deliberations of The Institution of Engineers Stormwater Standards Committee (Computation Laboratory).

(*d*) Publications:—

(i) On a Paper by J. L. Griffith.
G. Bosson, *J.Proc.Roy.Soc.N.S.W.*, 1954 (in press).

(ii) A Theorem on the Asymptotic Behaviour of Hankel Transforms.
J. L. Griffith, *J.Proc.Roy.Soc.N.S.W.*, 1954 (in press).

(iii) Variation of the Incompressibility of an Elastic Material Subjected to Large Hydrostatic Pressure.
A. Keane, *Nature*, 1953, *172*, 117.

(iv) An Investigation of Finite Strain in an Isotropic Material Subjected to Hydrostatic Pressure and its Seismological Applications.
A. Keane, *Aust.J.Phys.*, 1954, 7, 2, 322.

(v) The Use of Runs to Control the Mean in Quality Control. H. Weiler, *J.Amer.Stat.Assoc.*, 1953, *48*, 816.

SCHOOL OF WOOL TECHNOLOGY.

(*a*) As a requirement for the degree of Doctor of Philosophy:—

(i) Practical application of methods of selection promising to yield the greatest improvement in wool production—E. M. Roberts.

(ii) Nature and causes of dental irregularities in sheep—C. L. Goldstone.

(*b*) As a requirement for the degree of Master of Science:—

(i) The inter-relation of fleece and fibre characters with special reference to crimp—L. W. Lockart.

(ii) The measurement of wool fibre diameter—J. A. Lambert.

(iii) The effect of under-nutrition and hypoproteinonis on wool growth—K. Ozcan.

(iv) Standardisation of wool sampling methods with particular reference to Merino sheep—S. S. Y. Young.

(*c*) Other Projects:—

Fleece measurement for flock improvement.

(*d*) Publications:—

(i) The Sampling of Fleeces for Staple Length, Crimps Per Inch and Yield Measurement.

L. W. Lockart, *Aust.J.Agric.Research.*

(ii) Thoughts on the Technology of Wool Production.

P. R. McMahon, *J.Aust.Inst.Agric.Soc.*, September, 1954.

SCHOOL OF CIVIL ENGINEERING.

(*a*) As a requirement for the degree of Doctor of Philosophy:—

(i) Investigations of stresses in concrete members—H. Hodson.

(ii) Development of a steady magnetic field electro-magnetic flow meter—H. W. Holdaway.

(iii) Characteristics of orifice flow—H. R. Vallentine.

(iv) Concrete as a civil engineering material—W. S. Butcher.

(v) The interaction of superstructure and its foundation—G. J. Haggarty.

(*b*) As a requirement for the degree of Master of Engineering:—

(i) Influence of electro-osmosis activity upon the shear characteristics of soils—A. F. S. Nettleton.

(ii) The effect of natural pozzolans on the properties of mortars and concretes—G. B. Welch.

(iii) The effect of natural pozzolans on alkali aggregate reaction—C. R. Dudgeon.

(iv) The construction and design of thin concrete shells using pre-stressing methods—H. J. Brettle.

(v) The adequacy of hydrologic data in New South Wales—J. R. Learmonth.

(vi) The behaviour of slabs—R. W. Woodhead.

(vii) Advanced techniques in civil engineering—P. W. S. Ryan.

(viii) The analysis of stresses in flat slabs—A. S. Hall.

(ix) Analysis and application of thin concrete slabs pre-stressed in two directions with special reference to deck systems and roof shells—P. S. Balint.

(x) Studies of infiltration on a small experimental catchment—I. R. Wood.

(xi) Photo-elastic methods of the investigation of stresses in soils, —A. G. Douglas.

(*c*) Other Projects:—

Hydrology.

(i) An automatic integrator for the calculation of excess rainfall.

(ii) Short range flood forecasting.

(iii) Development of unit graphs.

(iv) Basic principles of urban storm drain design.

(v) Relation between rainfall and runoff on small experimental catchments.

Materials.

(i) Relations of physical and chemical properties of soils.

(ii) Determination of properties of Australian rocks.

Applied Mechanics.

(i) Buckling of rectangular plates uniformly compressed in the vertical direction with the upper edge simply supported and lower elastically built into a medium which is characterised by coefficient σ.

(ii) An elastic disc inside an elastic ring.

(iii) The effect of circular inclusions on stress distribution in plates which are uniformly compressed in z-direction.

(*d*) Publications:—

(i) Collection and use of Hydromatic Data in Undeveloped Countries.

C. H. Munro, International Conference (Tokyo) U.N.E.C. for Asia.

(ii) Importance of Hydrology to Engineering Profession in Australia.

C. H. Munro, *Commonwealth Engineer,* October, 1953.

(iii) Transportation of Sand in a Pipe.

H. R. Vallentine, *Commonwealth Engineer* (in press).

(iv) Hydraulic Research in the U.S.A.

H. R. Vallentine, *Australasian Engineer* (in press).

(v) Instruction and Research in Hydraulics.

H. R. Vallentine, Report to University Council.

(vi) Correlation between Dye Absorption Capacity and Mechanical Properties of Clays.

A. Herzog, Soil Science Conference, Adelaide, June, 1953.

(vii) Some Fundamental Colloidal Problems of Soil Stabilation.

G. Haggarty and A. Herzog, Symposium on Soil Stabilisation, held at School of Military Engineering, Liverpool, January, 1954.

SCHOOL OF ELECTRICAL ENGINEERING.

(*a*) As a requirement for the degree of Doctor of Philosophy:—

(i) Self-heating thermionic vacuum tubes—E. G. Hopkins.

(ii) Investigations into the climatic properties and behaviour of electrical materials—R. M. Huey.

(*b*) As a requirement for the degree of Master of Engineering:—

(i) The emission of oxide cathodes—K. K. Shrivastava.

(ii) The impulse testing of transformers and associated phenomena—E. G. Williams.

(iii) The application of electronic techniques to metrology—H. A. Ross.

(iv) Some effects of control grid current in radio receiving valves on associated circuits—E. Watkinson.

(v) Applications of magnetic modulations—R. G. Smart.

(vi) A study of metadynes—W. H. Arnold.

(*c*) Other Projects:—

The construction of an electrolytic tank for the solution of field problems and network synthesis.

(*d*) Publications:—

(i) The Application of Statistical Methods to Servo Mechanisms.

R. E. Vowels, *Aust.J.Appl.Sci.*, 1953, *4*, 4, 469.

(ii) Self-Heating Thermionic Tubes.

E. G. Hopkins, *Proc.I.E.E.* Part III, 1954, *101*, 70.

(iii) A Stroboscopic Flashlamp.

E. G. Hopkins, *Aust.J.Appl.Sci.*, 1953, *4*, 4, 508.

(iv) The Use of Thevenin's Equivalent Circuit to Determine the Conditions at the Termination of a Lossless Transmission Line on Arrival of a Surge.

G. C. Dewsnap, *Aust.J.Appl.Sci.*, 1954, *5*, 2, 132.

SCHOOL OF MECHANICAL ENGINEERING.

(*a*) As a requirement for the degree of Doctor of Philosophy:—

(i) The derivation and evaluation of design data for rubber components under shear, compressive and complex loading systems—A. J. Carmichael.

(ii) Hydraulic model studies related to erosion problems at Stockton Beach (Newcastle)—A. K. Johnston.

(iii) The design, construction and testing of a mechanical pumping plant for handling liquid sodium—J. Hirschhorn.

(iv) The control of machine tools by pre-established data—G. P. Taylor.

(*b*) As a requirement for the degree of Master of Engineering:—

(i) The mechanical properties of rubber under slow cyclic loading conditions—E. Betz.

(ii) The design, construction and experimental testing of a high pressure quick-steaming boiler—K. R. Bridger.

(iii) Investigation of phenomena occurring in pneumatic transmission lines—J. M. Carswell.

(iv) Transitory conditions in flow processes involving energy transfer—R. E. Corbett.

(v) Small scale utilisation of solar energy—C. M. Sapsford.

(vi) An investigation of the performance of high-powered piston aero engines, with notes on Australian operating conditions —K. R. A. O'Brien.

(vii) Automatic control applied to steam power plant—R. J. O'Connor.

(viii) Heat transfer in evaporative heat exchangers—R. T. B. McKenzie.

(ix) Surface finish standards—H. Selinger.

(x) Water and/or pilot injection for diesel machines—K. Weiss.

(*c*) Other Projects:—

(i) Philosophical studies in kinematics of mechanisms.

(ii) Study of tillage implements.

(iii) Research on fan performance.

(iv) The Effect of Compressibility on Heat Transfer (Heat Transfer of Air Flowing at High Speed)—P. S. Barna. Thesis submitted to the University of Sydney for award of Master of Engineering degree.

(*d*) Publications:—

(i) On the Acceleration Analysis of Complex Mechanisms.

N. A. Rosenauer, *J. Inst.Eng.Aust.*, 1953, *35*, 235.

(ii) Koolkhan Power Station

R. J. O'Connor and R. S. Rice, *Elec.Eng.&Merch.*, 1954, *30*, 22.

(iii) Acceleration Centre Curves.

N. A. Rosenauer, *Aust.J.Appl.Sci.*, 1954, *5*, 2.

SCHOOL OF MINING ENGINEERING AND APPLIED GEOLOGY.

(*a*) As a requirement for the degree of Doctor of Philosophy:—

(i) An investigation into the causes of landslides and their relationship to geological formations and structures, with special reference to conditions in the Illawarra District—F. N. Hanlon.

(ii) The nature and genesis of ore deposits of the Mole Tableland with special reference to tin and tungsten—L. J. Lawrence.

(*b*) As a requirement for the degree of Master of Engineering:—

(i) Mining and milling of Australian tin ores—R. G. Burdon.

(ii) Study of deuteric mineralization at Prospect, N.S.W.—R. O. Chalmers.

(*c*) Other Projects:—

(i) The use of spiral concentration for cleaning Hebburn fines.

(ii) Concentration of beach sands from Stradbroke Island.

(iii) Sands for use in chance coal washery.

(iv) Development of a process for treating oxidised copper ores from Burraga.

(v) Treatment of nickel ores from New Caledonia.

(vi) Beneficiation of high sulphur coals from Hebburn No. 2 Colliery.

(vii) Ventilation survey of State Coal Mine, Lithgow.

(viii) Investigation of stowage problems in northern coalfields.

(ix) The stratigraphy and nomenclature of the Permian and Mesozoic strata in the north-western and southern coalfields.

(x) Investigation on the crystallographic orientation of electric meter jewels (sapphire bearing).

(xi) Field investigation of Whipstick Molybdenum Mines, N.S.W.

(xii) Discovery and subsequent field and laboratory investigation of a major occurrence of vivianite (iron phosphate) near Cobargo, N.S.W.

(xiii) Field and laboratory investigation on spontaneous cracking of basalt.

(xiv) Investigation of a new zeolite mineral from Hartley, N.S.W.

(xv) Field investigation of a further occurrence of pyrophyllite near Wiseman's Creek, N.S.W.

(xvi) Report on occurrence of uraniferous material at Binghi, N.S.W.

(xvii) Field study of various uranium deposits in Mt. Isa-Cloncurry District, Queensland.

(xviii) Field investigation of clay deposits of the Gulgong-Puggoon-Home Rule area.

(xix) Field investigation of clay deposits of the Goulburn-Bungonia area.

(xx) Investigation of pozzolanic materials of the State in conjunction with the School of Civil Engineering. Deposits examined to date include the Tuff deposits of the Illawarra District and the opaline trachyte from Neville.

(xxi) Mineralogy of the Stradbroke Island beach sand deposits.

(*d*) Publications:—

Narrabeen Group: Its Sub-Divisions between the South Coast and the Narrabeen-Wyong Districts.

F. N. Hanlon, G. D. Osborne and H. G. Raggatt, *J.Proc. Roy.Soc.N.S.W.*, 1953, *87*, 106.

SCHOOL OF ARCHITECTURE AND BUILDING.

(i) The influence of sunlight and daylight in the design of buildings—R. O. Phillips.

(ii) A critical analysis and evaluation of contemporary design—P. Spooner.

(iii) Planning Research: Survey of Sydney's housing requirements, with the object of producing contemporary Australian designs for houses in brick and timber within the means of an average Sydney family—Group project, 5th year students.

SCHOOL OF HUMANITIES AND SOCIAL SCIENCES.

Economics and Economic History.

(i) Popular political economy in Australia, 1927-37—H. F. Cruise.

(ii) Investigation of economic material in *The Economist, The Bankers' Magazine,* and *The Journal of the Statistical Society* between 1837 and 1860—D. Donaldson.

(iii) Bond yields in Australia, 1945-54—N. Runcie.

(iv) Special accounts as a means of Central Bank control, 1941-54—N. Runcie.

(v) Trends in employee earnings in N.S.W. manufacturing industry, 1945-52—N. Runcie.

(vi) The Yorkshire woollen and worsted industry—R. M. Hartwell.

(vii) An economic history of Australia, 1820-1850—R. M. Hartwell.

(viii) The economics of the sheep and wool industries—F. M. Dunn.

(ix) Welfare and imperfect competition—F. M. Dunn.

(x) Theory of rent—F. M. Dunn.

Publications:—

(i) Economic Society of Australia and New Zealand.
N. Runcie, *Monograph No. 162,* 1954.

(ii) The Development of the Van Diemen's Land Economy, 1820-1850.
R. M. Hartwell, Melbourne University Press, 1954.

(iii) Colonial Money and Banking during the Industrial Revolution.

R. M. Hartwell, *The Economic Record,* May, 1954.

(iv) Review of E. V. Morgan's *Studies in British Financial Policy, 1914-1925.*

R. M. Hartwell, *The Economic Record,* 1953.

English.

(i) Research in the Australian novel in preparation of a book of selected narrative passages for schools—O. N. Burgess and P. K. Elkin.

(ii) An article on Leonard Woolf's *The Village in the Jungle.* This is the summary of a lecture given in September to the English Association, Sydney branch; it has been accepted for publication by *Southerly*—P. K. Elkin.

(iii) A critical analysis of Dryden's *The Hind and the Panther* with some general observations on allegory in poetry—P. K. Elkin.

(iv) A study of the principles of nineteenth century criticism—O. N. Burgess.

(v) Jargon in the social sciences: continuation of research begun in 1953—A. M. Ginges.

(vi) Joyce Cary and the modern novel: continuation of research begun in 1953—R. G. Geering.

History and Government.

(i) Communications between Melbourne and Sydney to 1867—J. P. S. Bach. Thesis submitted to the University of Sydney for award of Master of Arts (Hons.) degree, 1954.

(ii) David Syme and Victorian politics, 1860-1908—S. M. Ingham.

(iii) The N.S.W. Labour Movement, 1870-1900—N. B. Nairn.

(iv) The development of the provincial newspaper, 1700-1760—G. A. Cranfield. Book in preparation for Cambridge University Press.

(v) History of the Commonwealth Parliament since 1900—Miss R. M. Atkins.

Publications:—

(i) The Pastoral Ascendancy. (Chapter II of *Jubilee History of Australia,* Angus and Robertson, Sydney, 1954)—R. M. Hartwell.

(ii) Review article of *True Patriots All* (G. Ingleton).
G. A. Cranfield, *The Book Collector,* Winter, 1953.

(iii) New South Wales, article in the *Encyclopaedia Britannica*—R. M. Hartwell.

(iv) The Librarian and the Scholar.
R. M. Hartwell, *The Australian Library Journal,* October, 1953.

(v) The Concept of the Just War.
G. A. Cranfield, *The Australian Outlook* (in press).

Philosophy.

(i) The parts played, in the development of major scientific theories, by the attitudes and presuppositions characteristic of rationalism on the one hand and of empiricism on the other. Special attention has been given to (*a*) pre-Newtonian astronomy and to (*b*) the work of G. S. Ohm; and is now being given to (*c*) the work of A. Einstein—J. B. Thornton.

(ii) The place of deductive methods in the teaching of the physical sciences, with special attention to the work of L. Pauling —J. B. Thornton.

(iii) The nature and status of logic, and the relations between logic and scientific and other forms of enquiry—J. B. Thornton and C. F. Presley.

(iv) Theories of meaning, especially contemporary theories of (*a*) meaning as usage, and (*b*) meaning as unique reference —C. F. Presley.

(v) A critical examination of aims and schemes for the teaching of humanities subjects in scientific and technical courses —C. F. Presley.

(vi) The concept of individuation, especially as it appears in nineteenth century absolute idealism and in twentieth century realism—D. C. Stove.

(vii) A preliminary critical examination of some concepts of classical dynamics, with special reference to the work of E. Mach—D. C. Stove.

(viii) The concepts of process, interaction, independence and causation in psychological and other theories; with special reference to the work of F. H. Bradley, W. James and G. F. Stout—R. S. Walters.

(ix) The relations between symbolic logic and traditional logic, with special attention to the notions of form in these two systems—R. S. Walters.

Publications:—

(i) Materialism and its Critics.

J. B. Thornton, *Aust.J.Sci.*, 1953, *16*, 2, 39.

(ii) Laws and Theories in the Physical Sciences.

C. F. Presley, *Aust.J.Phil.*, 1954, *32*, 2, 79.

(iii) Why not Caloric?

J. B. Thornton, *Science Yearbook 1954*, Science Association, University of Sydney (in press).

THE NEW SOUTH WALES

STATUTORY ACCOUNT FOR FINANCIAL YEAR

GENERAL

EXPENDITURE.

	£	s.	d.	£	s.	d.
Salaries and Staff Charges	703,355	4	11			
Payroll Tax	17,709	1	2			
Employers Superannuation Contribution	53,678	18	11			
				774,743	5	0
Teaching Departments—General Maintenance and Purchase of Apparatus				65,425	7	11
Repairs and General Maintenance of Buildings				20,697	0	2
Books, Periodicals and Pamphlets				18,119	19	3
Power, Lighting and Heating				8,242	10	8
Printing, Stationery, Postages, etc.				6,720	13	10
Examination Expenses				4,940	4	2
Telephones, Advertising				3,646	13	11
Plant				3,625	14	0
Administrative Travelling and Other Expenses				2,715	15	6
Rates and Insurances				2,169	0	6
Expenses of New Appointments				2,092	13	5
Study Leave—Grants towards Travelling Expenses				1,954	10	0
Expenses of Transfer of Schools to Kensington				1,758	5	9
Expenses of Motor Vehicles				604	3	6
Contribution Vice-Chancellors Secretariat				500	0	0
Contribution to Applied Arts Fund				500	0	0
Bursaries				420	16	8
Contribution to the Chair of Town and Country Planning—Sydney University				375	0	0
Furniture				90	17	7
Miscellaneous Expenses				1,123	10	8
				£920,466	2	6

SPECIAL PURPOSES
(As per Schedule "A"

	£	s.	d.
Expenditure	45,193	16	7
Balances 30th June, 1954—*Carried forward*	178,268	6	2
	£1,143,928	5	3

J. P. BAXTER, Director.

The books and accounts of the New South Wales University of Technology of Section 43 of the Technical Education and New South Wales University of Technology

In my opinion this statement exhibits a true and correct view of the financial ended at that date, according to the best of my information and the explanations given to

Sydney, 21st October, 1954.

UNIVERSITY OF TECHNOLOGY

1st JULY, 1953, TO 30th JUNE, 1954.

FUNDS.

INCOME.

	£	s.	d.	£	s.	d.
Fees	50,051	12	3			
Other Income	4,592	8	7			
				54,644	0	10
Commonwealth Assistance Grants—						
Basic Grant	79,529	0	0			
Second Level Grant	77,065	0	0			
				156,594	0	0
Commonwealth Grant—C.R.T.S. Part-time Training (1951) ...				1,632	0	0
State Grants (Consolidated Revenue)				707,596	1	8
				£920,466	2	6

GRANTS
attached.)

	£	s.	d.
Balances, 1st July, 1953—*Brought forward*	39,706	12	9
Income Received...	183,755	10	0
	£1,143,928	5	3

E. H. DAVIS, Accountant.

have been audited for the year ended 30th June, 1954, in accordance with the provisions Act, 1949.

position of the University as at 30th June, 1954, and of the transactions for the year me and as shown by such books and accounts.

(Sgd.) W. J. CAMPBELL,
Auditor-General of New South Wales.

SCHEDULE

SPECIAL PURPOSES GRANTS EXPENDITURE AND

Source of Grant, etc.	Balance Brought Forward.	Income, 1953-1954.	Total.
	£ s. d.	£ s. d.	£ s. d.
Applied Arts Fund	.....	500 0 0	500 0 0
Australian Atomic Energy Commission Grant for Research in School of Chemical Engineering on Liquid Metals Heat Transfer Problems ...	.....	400 0 0	400 0 0
Australian Atomic Energy Commission Research Studentship in Metallurgy	.....	500 0 0	500 0 0
Australian Leather Research Association Fellowship Grant	.....	850 0 0	850 0 0
B.R.E.I.F. Club Scholarship	24 10 0	126 2 0	150 12 0
Chemistry Kit Deposits Trust Fund	2,220 10 0	2,879 10 0	5,100 0 0
Commonwealth Bank Grant from the Economic and Financial Research Fund for Research into the Significance of Tax Concessions on Commonwealth Bonds	.....	100 0 0	100 0 0
Commonwealth Bank Grants from Rural Credits Development Fund for Research	3,873 7 5	2,100 0 0	5,973 7 5
Commonwealth Bank Grant from Rural Credits Development Fund for Research and C.S.I.R.O. Project—Studies on the Composition of Australian Fruits and Fruit Products	750 0 0	300 0 0	1,050 0 0
Commonwealth Grant for the Training of Colombo Plan Students in Food Technology	12,963 5 9	10,970 13 6	23,933 19 3
Commonwealth Wool Industry Fund Scholarship ...	392 13 7	400 0 0	792 13 7
Commonwealth Scientific and Industrial Research Organisation Grant for Wool Research ...	.....	1,101 5 5	1,101 5 5
Commonwealth Scientific and Industrial Research Organisation Projects	906 16 1	2,508 13 6	3,415 9 7
Donations from Members of the Plastics Institute for Equipping the School of Chemical Engineering Plastics Laboratory	.....	800 2 9	800 2 9
Electricity Meter and Allied Industries Ltd. Donation towards Equipping School of Applied Physics Research Laboratory	2,611 8 2	.....	2,611 8 2
Food Technology Association Grant for Investigation into the Uses of Antioxidants in Food ...	100 0 0	.....	100 0 0
Imperial Chemical Industries of Australia and New Zealand Grant for Purchase of Books for School of Chemical Engineering Library...	7 19 4	.....	7 19 4
Imperial Chemical Industries of Australia and New Zealand Grant for Research in Production of Vinyl Chloride	8 13 1	.....	8 13 1
Imperial Chemical Industries of Australia and New Zealand Research Fellowship Grant	325 0 0	600 0 0	925 0 0
Joint Coal Board Grant towards equipping School of Mining Engineering	5,060 4 11	.....	5,060 4 11
Joint Coal Board Grant for Experimental and Research Work in Carbonisation of High Sulphur Coal	.....	5,000 0 0	5,000 0 0
Monsanto Scholarship	351 0 0	600 0 0	951 0 0
Nuffield Foundation Grant towards Research Chair in School of Mechanical Engineering	3,158 1 11	3,125 0 0	6,283 1 11
Rural Bank of N.S.W. Grant for Research in Agricultural Engineering	.....	1,200 0 0	1,200 0 0
School of Applied Physics—Optometry Research Fund	.....	36 11 0	36 11 0
School of Civil Engineering Research Fund ...	36 6 5	15 15 0	52 1 5
School of Wool Technology General Research Fund	.....	60 8 9	60 8 9
State Grant for Purchase of Plant for Nuclear Engineering Research	.....	125,000 0 0	125,000 0 0
Students' Hostel	5,761 4 4	16,149 17 11	21,911 2 3
Students' Sports Association Fees Trust Fund ...	55 0 0	1,607 19 0	1,662 19 0
Students' Union Fees Trust Fund	648 13 6	3,563 5 0	4,211 18 6
Sulphuric Acid Ltd. Grant for Investigation into the Unstable Constituent in Nairne Pyrites Concentrate	317 6 6	748 2 6	1,065 9 0
Suspense Account	134 11 9	2,012 3 8	2,146 15 5
Titanium and Zirconium Industries Pty. Ltd. Grant for Investigation into the Concentration of Certain Constituents of Beach Sands from Stradbroke Island, Queensland	.....	500 0 0	500 0 0
	£39,706 12 9	£183,755 10 0	£223,462 2 9

"A."

INCOME 1953–1954 FINANCIAL YEAR.

Expenditure 1953–1954.					Balance Carried Forward.
Salaries and Staff Charges.	Maintenance.	Furniture and Equipment.	Other.	Total	
£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
.....	.....	.....	.....	.....	500 0 0
.....	.....	.....	.....	.....	400 0 0
.....	.....	.....	.....	.....	500 0 0
.....	75 7 9	.....	226 16 10	302 4 7	547 15 5
.....	.....	.....	87 12 0	87 12 0	63 0 0
.....	.....	.....	2,459 0 0	2,459 0 0	2,641 0 0
.....	.....	.....	.....	.....	100 0 0
1,084 0 9	372 13 6	824 12 0	.....	2,281 6 3	3,692 1 2
758 7 4	40 5 6	.....	.....	798 12 10	251 7 2
8,367 4 2	2,372 18 3	3,324 15 0	.....	14,064 17 5	9,869 1 10
.....	.....	.....	673 7 0	673 7 0	119 6 7
.....	.....	.....	.....	.....	1,101 5 5
1,742 6 7	98 1 10	639 14 8	.....	2,480 3 1	935 6 6
.....	.....	.....	.....	.....	800 2 9
.....	.....	22 13 11	.....	22 13 11	2,588 14 3
52 3 7	.....	20 10 2	.....	72 13 9	27 6 3
.....	8 4	.....	.....	8 4	7 11 0
.....	.....	.....	.....	.....	8 13 1
395 5 6	30 0 0	.....	... ..	425 5 6	499 14 6
.....	.....	2,324 3 7	.....	2,324 3 7	2,736 1 4
.....	.....	.....	.....	.....	5,000 0 0
.....	.....	.....	568 0 2	568 0 2	382 19 10
2,578 0 1	30 0 11	.....	.....	2,608 1 0	3,675 0 11
.....	.....	.....	.....	.....	1,200 0 0
.....	.....	.....	.....	.....	36 11 0
.....	.....	.....	.....	.....	52 1 5
.....	.....	.....	.....	.....	60 8 9
.....	.....	.....	.....	.....	125,000 0 0
2,320 5 1	2,500 3 9	3,805 9 5	.....	8,625 18 3	13,285 4 0
.....	.....	.....	1,592 19 0	1,592 19 0	70 0 0
.....	.....	.....	3,330 19 6	3,330 19 6	880 19 0
553 12 2	30 0 0	18 11	.....	584 11 1	480 17 11
.....	.....	.....	1,390 19 4	1,390 19 4	755 16 1
369 16 4	40 16 0	89 7 8	.....	500 0 0	.....
£18,221 1 7	£5,590 15 10	£11,052 5 4	£10,329 13 10	£45,193 16 7	£178,268 6 2

STATEMENT OF BALANCES AND

LIABILITIES.

	£	s.	d.
CAPITAL FUNDS—			
Treasury General Loan Account—			
Provided to 30th June, 1953	1,142,068	13	4
Provided in 1953–1954	612,681	10	10
VESTMENTS—			
Vestment of Expenditure during 1949–50 and 1950–51 in Connection with McLeans Building and Kensington Annexe purchased from Department of Technical Education Funds but now being used for University Purposes	91,423	5	2
	£1,846,173	9	4
SPECIAL PURPOSES FUNDS—			
Applied Arts Fund	500	0	0
Australian Atomic Energy Commission Grant for Research in School of Chemical Engineering on Liquid Metals Heat Transfer Problems ...	400	0	0
Australian Atomic Energy Commission Research Studentship in Metallurgy	500	0	0
Australian Leather Research Association Fellowship Grant	547	15	5
B.R.E.I.F. Club Scholarship	63	0	0
Chemistry Kit Deposits Trust Fund	2,641	0	0
Commonwealth Bank Grant from the Economic and Financial Research Fund for Research into the Significance of Tax Concessions on Commonwealth Bonds	100	0	0
Commonwealth Bank Grants from Rural Credits Development Fund for Research	3,692	1	2
Commonwealth Bank Grant from Rural Credits Development Fund for Research and C.S.I.R.O. Project—Studies on the Composition of Australian Fruits and Fruit Products	251	7	2
Commonwealth Grant for the Training of Colombo Plan Students in Food Technology	9,869	1	10
Commonwealth Wool Industry Fund Scholarship	119	6	7
Commonwealth Scientific and Industrial Research Organisation Grant for Wool Research	1,101	5	5
Commonwealth Scientific and Industrial Research Organisation Projects ...	935	6	6
Donations from Members of the Plastics Institute for Equipping the School of Chemical Engineering Plastics Laboratory	800	2	9
Electricity Meter and Allied Industries Ltd. Donation towards Equipping School of Applied Physics Research Laboratory	2,588	14	3
Food Technology Association Grant for Investigation into the Uses of Antioxidants in Food	27	6	3
Imperial Chemical Industries of Australia and New Zealand Grant for Purchase of Books for School of Chemical Engineering Library ...	7	11	0
Imperial Chemical Industries of Australia and New Zealand Grant for Research in Production of Vinyl Chloride	8	13	1
Imperial Chemical Industries of Australia and New Zealand Research Fellowship Grant	499	14	6
Joint Coal Board Grant for Experimental and Research Work in Carbonisation of High Sulphur Coal	5,000	0	0
Joint Coal Board Grant towards Equipping School of Mining Engineering ...	2,736	1	4
Monsanto Scholarship	382	19	10
Nuffield Foundation Grant towards Research Chair in School of Mechanical Engineering	3,675	0	11
Rural Bank of N.S.W. Grant for Research in Agricultural Engineering ...	1,200	0	0
School of Applied Physics—Optometry Research Fund	36	11	0
School of Civil Engineering Research Fund	52	1	5
School of Wool Technology General Research Fund	60	8	9
State Grant for Purchase of Plant for Nuclear Engineering Research ...	125,000	0	0
Students' Hostel	13,285	4	0
Students' Sports Association Fees Trust Fund	70	0	0
Students' Union Fees Trust Fund	880	19	0
Sulphuric Acid Ltd. Grant for Investigation into the Unstable Constituent in Nairne Pyrites Concentrate	480	17	11
Suspense Account	755	16	1
	£2,024,441	15	6

J. P. BAXTER, Director.

ASSETS AS AT 30th JUNE, 1954.

ASSETS.

	£	s.	d.
BUILDINGS (AT COST)—			
On Land Vested for University Purposes	1,113,513	2	7
On Department of Technical Education Land—Contribution towards Cost of Construction and/or Reconstruction	156,879	6	6
Transport Migrant Hostel, Anzac Parade, Kensington	66,400	0	0
PLANT (AT COST)	457,972	9	5
FURNITURE (AT COST)	51,408	10	10
	£1,846,173	9	4
SPECIAL DEPOSITS ACCOUNT NO. 1228, N.S.W. UNIVERSITY OF TECHNOLOGY ...	178,268	6	2
	£2,024,441	15	6

E. H. DAVIS, Accountant.

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