University of Technology, Sydney

Department of Applied Physics

1989 Handbook

ERRATA

Page ~~iv~~ X

line 2: 10th floor → 12th floor

Page IX

at end of first paragraph add:

"An applied science degree graded with Honours is awarded to students satisfactorily completing the following requirements - "

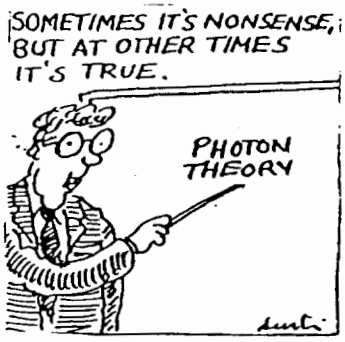
Page 1

under 'LECTURERS' add:

J M Bell BSc (Syd), PhD (NSW), MAIP

Page 2

where it says 'cartoon' add:



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63361 01 Microprocessors in Instrumentation

- day is not 'Wed' but 'Tue'.

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PAGE NO.

GENERAL INFORMATION

Administrative Matters

The Students Administrative Unit is responsible for administrating the Rules & Regulations which relate specifically to the students body.

Enquiries regarding administrative matters should be made at the **STUDENT INFORMATION OFFICE** which is located on level 4 of the Tower building. Information and assistance are available on courses, admission requirements, enrolment,examinations, variation of course/program and withdrawal from course.

Student Identification Card

An identification (ID) card will be issued to students during enrolment. This card should be carried at all times as such identification is required for the use of computer and library facilities and for admission to formal examinations.

Notification of Changes

It is the students responsibility to ensure that any changes, such as address and name changes be provided to the University. Forms are available at the Student Information Office. The University does not accept responsibility if official mail does not reach students due to a failure to notify a change of address.

Subject Exemptions/Admission with Advanced Standing

Students who have previously completed appropriate subjects of courses at recognised tertiary institutions may be granted subject exemptions. Students wishing to apply should fill in an Exemption Application Form available from the Student Information Office.

YOUR ENROLMENT AND THE HIGHER EDUCATION CONTRIBUTORY SCHEME (HECS)

Effect on Variation of Course Program/Addition or Withdrawal from Subjects.

With the introduction of the HECS (graduate tax) next year it is important that you are aware of the following:

1. You must pay this tax by 23rd March in Autumn Semester and 23rd August in Spring semester

OR

provide or apply for a taxation file number on enrolment.

If this is not done your enrolment is automatically terminated.

2. The last day you can add a subject is: 10th March in Autumn semester, 11th August in Spring semester.

3. The last day you can lodge an application to **drop a subject** or **withdrawal entirely** from a course, or apply to the Registrar for Leave of Absence **without incurring the HECS penalty is:**

- 30th March in Autumn semester,
- 30th August in Spring semester.

4. **NOTE:** If academic approval is subsequently gained to withdraw from a subject/course/or leave of absence you will **still be liable** to the Australian Taxation Office for HECS charges.

5. If you have been sick, had an accident or some other misfortune that has forced you to reduce your studies during the semester then you may appeal to the Commonwealth Government to seek a refund or have your liability reduced.

Forms for adding/dropping subjects and change of course are available from the Student Information Office or the Faculty Office (Building 4, Room 308).

The Student Information Office can be contacted by telephone. The number is 218-9145/9262.

Student Services

The student services unit is also located on level 3A of the Tower building and can be contacted by telephone on 218-9145/9147/9262. This unit is to assist students to perform to the best of their abilities and to gain the most from their education. It provides such services as

Student Counselling - Problems of a personal nature, study difficulties or anything else likely to affect a student's progress may be discussed with complete confidentiality.

Student Health Service - This service is staffed by a Medical Practitioner and nursing sister and provides a free service to all students.

Student Welfare Service - This service covers such things as accommodation, Austudy, help with appeals, disadvantaged and disabled students, students loan fund.

Library Facilities

The University's main library is located at the Markets Campus on the corner of Hay Street and Ultimo Road. Hours of opening are posted at the library and on notice boards at the Faculty Office students may borrow from the library on presentation of their University ID card. No limits are placed on the number of books which may be borrowed, but overdue items must be returned before further loans are made. There are audio-visuals in the library, including a wide variety of videotaped material. Photocopying facilities and computer terminals are available.

Students are encouraged to ask the librarians on duty at the information desk for any help they need in using the library. Library orientation tours are held early in each semester. Leaflets on the literature of various subjects are available.

Computing Services

The Computer Centre provides a comprehensive range of facilities and services to meet the major computing requirements of the University.The central computer installation is located on level 9 of the Tower. Collections of terminals are located at various positions. Tower Building, level 10, room 1013, Building 4, rooms 438 & 440.

Intending users of Computing Centre facilities must first register and production of ID card is required for collection of jobs and use of terminals.

For detailed information about the various administration, academic and social aspects of UTS get a copy of the UTS Brochure - Undergraduate Studies, 1989 from the Student Information Office or the Faculty of Physical Sciences Office.

The Calendar, the official information quide to courses, rules and regulations may be purchased from the Union Shop in the Tower. Copies of the Calendar are available for perusal at the Library and at the Student Information Office.

Academic Progression

ACADEMIC PROGRAM - Your academic program is selected and approved at the time of enrolment. As far as possible it should conform with the course patterns published in this handout. Obviously, when failures occur or timetable difficulties arise, this is not always possible. Careful attention should then be given to selecting subjects for which all the necessary pre-requisites have been completed. Combinations of subjects must not span more than three stages of the course. It is essential

that you seek advice at this stage and that your program is officially approved by a member of the academic staff.

Listings of current subject enrolments are produced in Weeks 5, 10 and 15 of each semester. These are displayed on the third floor of Building 4 in the case of Applied Chemistry, Applied Geology and Material Science students and on the tenth floor of Building 1 for Applied Physics students. You should check these listings to ensure that you are enrolled in the correct subjects and that any variations have been recorded.

EXAMINATION TIMETABLES - Provisional and final examination timetables are displayed on the notice boards. It is the students' responsibility to notify the Registrar if a clash of times occurs in their examination program.

ASSESSMENT - The measurement of performance in individual subjects may take into account work completed in the laboratory and in class tests and/or assignments given throughout each semester as well as results obtained at formal examinations.

The formal assessment periods for the courses within the School are as follows -

ATTENDANCE PATTERN	**ASSESSMENT PERIOD**
Full-time or sandwich	One semester
Part-time	Two semesters

This means that full-time or sandwich students will be formally assessed at the end of each semester. Part-time students will be formally assessed at the end of the Spring Semester, although results may be obtained at the Autumn Semester for subjects taken in that semester.

Formal assessment means that a student's overall performance in the assessment period will be expressed as a Weighted Average Mark (W.A.M.) and an appropriate progression category awarded.

The WAM measures the performance of a student in a particular assessment period and is calculated from the results of all subjects completed within that assessment period.

$$\text{WAM} = \frac{\text{Sum of (W.F. x mark)}}{\text{Sum of WF}}$$

Where WF = subject weighting factor (semester hours) and mark = subject assessment (%).

CONCEDED PASSES - In the event of failing one subject within an assessment period a student may be granted a conceded pass in that subject on the following conditions -

i a mark of 45 to 49 in that subject;
ii a WAM of at least 55% for that assessment period;
iii no previous failure in that subject.

PROGRESSION AND PROBATION - Students whose scholastic performance is satisfactory in a given assessment period will continue to proceed normally through the course (Progression Category A).

In the case of students whose scholastic performance is unsatisfactory, a system of academic probation applies. This system is not intended as a penalty, but is meant to assist students to remedy the deficiencies in their performance. However it should be recognised that failures, particularly failures sufficient to lead to probation, can give rise to consistent difficulties in selecting a program once you are 'out of phase' in a given course.

All students on probation or continuing probation are assigned an academic adviser whose assistance should be regularly sought in order to speed up a return to normal progression.

Students may be placed on probation (Progression Category P) at the end of an assessment period for any of the following reasons -

i a WAM less than 45%;
ii failure in all subjects taken in that period;
iii failure in a subject for a second time;
iv generally unsatisfactory performance.

A student on probation will continue on probation (Progression Category R) if his/her WAM at the end of the next assessment period is less than 50%.

EXCLUSION - A student may be excluded from the course in which he/she is enrolled for any of the following reasons -

i obtaining a WAM < 40% while on probation;
ii obtaining a WAM < 50% while on continued probation;
iii failure in a subject for the third time, regardless of Progression Category (A, P or R);
iv consistently unsatisfactory performance.

APPEALS AND RE-ADMISSION - Students may appeal against exclusion only on the grounds of clearly relevant accredited evidence. Readmission to a course after a period of exclusion is possible but not automatic.

FACULTY INFORMATION

THE FACULTY OF PHYSICAL SCIENCES

The Faculty of Physical Sciences consists of one School, the School of Physical Sciences. The principal academic and administration officers of the Faculty and School are:

Dean of Physical Sciences, Head of School and Professor of Chemical Technology
RJ Breakspeare, Ph D (Exeter), FRSC, CChem, ARACI,

Sub Dean
BJ Franklin BSc (Syd), MSc PhD (NSW), MAIG, FGAA

Deputy Head of School
RW Jones, BSc, Dip Ed (Melb), PhD (Cantab), C Chem, ARACI

NSWIT Reader
GB Smith, BSc (UNE), PhD (Monash), MAIP

Administrative Officer
BJ Kitto, BA (Macq)

The School is divided into four separate Departments, each of which offer a full degree program on a sandwich or part-time basis extending over four to six years. The Departments are:

Applied Chemistry
Applied Geology
Applied Physics
Materials Science

The degree courses all include a requirement of a minimum of one year's appropriate industrial experience which must be undertaken prior to, or concurrent with the final stage of the course.

(a) A high standard of achievement in the formal course work associated with the degree program.

(b) Presentation of an acceptable report on project work undertaken in conjunction with an industrial concern and/or within the University.

(c) Satisfactory completion of any advanced reading assignments, seminars, and such additional work as may be approved by the Head of Department.

(d) The completion of a program of study and industrial experience extending over a minimum of four years full-time. The program may be completed by an equivalent part-time pattern.

FACULTY OFFICE

To help students in the Faculty of Physical Sciences with any advice they need or difficulties they may experience a Faculty Information Office has been set up in Building 4, Room 308, directly opposite the Harris Street lifts. This office is open five days a week from 8-30 am to 1-00 pm & from 1-30 pm to 5-00 pm and students requiring information will be directed to the relevant academic and/or technical person.
In addition course & subject variation forms,examination timetables, etc are available from this office.

The Faculty Office can be contacted by telephone. The number is 218-9951.

The semester timetables, listing of current enrolments and examination results will be posted as they become available on notice boards adjacent to this office for students from all Departments, excepting

Applied Physics whose enrolment details and timetables will be available from the 10th floor, Tower Building. You should check these listings to ensure you are correctly enrolled and that any variations have been recorded.

STUDENT ADVICE

Because of the possible consequences you are to work hard to avoid probation, or if on probation to work even harder, and to avail yourself of as such assistance as possible, both in determining a suitable program and in carrying out the studies involved. This should mean regular communication with all your lecturers, and with your Head of Department or Head of School if particular difficulties arise.

Students seeking any advice should see the following:

(a) for **Applied Physics** subjects

Associate Professor A R Moon
Room 1/1230 (Tower building)
Tel. 218-9468

Dr P Logan
Room 1/1122A (Tower building)
Tel. 218-9525

(b) for **Applied Geology** subjects

Associate Professor E Leitch
Room 4/318B
Tel. 218-9457

Dr B Franklin
Room 4/324B
Tel. 218-9570

(c) for **Applied Chemistry** subjects

Associate Professor W Stern
Room 4/217
Tel. 218-9402

Dr G Norton
Room 4/430
Tel. 218-9462

(d) for **Materials Science** subjects

Associate Professor R McMillan
Room 4/427
Tel. 218-9460

DEPARTMENT OF APPLIED PHYSICS
ACADEMIC STAFF

HEAD OF DEPARTMENT
A R Moon BSc, PhD (Melb), FAIP

PROFESSOR
T M Sabine DSc (Melb), FAIP

N.S.W.I.T. READER
G B Smith BSc (UNE), PhD (Monash), MAIP

SENIOR LECTURERS
G R Anstis BSc (Monash), PhD (Adel), Dip Econ State (UNE), MAIP
D G Blair BSc, PhD (Syd), MAIP, MASEG
R W Cheary BSc, PhD (Aston)
P Logan MSc (Syd), PhD (ANU), Grad Dip Ed Stud (ACAE), MInstP

LECTURERS
S W Hogg BSc (WA), MAppSc (NSWIT), MAIP
W Kalceff BSc (Syd), PhD (NSW), Dip Ed (STC), MAIP
K McGuffie BSc (Edin), PhD (L'pool)
R L S Woolcott BSc, PhD (Syd), MAIP

TUTOR
J B Franklin BSc (ANU)

HONORARY ASSOCIATE
E P A Sullivan MSc, PhD (Syd), MAIP

PHYSICS PRIZES & SCHOLARSHIPS

1. Australian Instistute of Physics Prize
Awarded for the best performance in the final stage of the Applied Physics Degree. Cash award of $100 plus one year's free membership of the Australian Institute of Physics.

2. Physics Staff Prize
Awarded to the student who achieves the highest average WAM in the first three stages of the Applied Physics degree program, subject to certain conditions. Cash award of $100.

3. Horvath Energy International Prize
Awarded for the performance in the subject Energy Technology. Cash award of $150.

4. Francis E. Feledy Prize
Awarded to the part-time Physical Sciences student about to enter the final year of their course who has the best performance so far in their course. Cash award of $100.

THE UTS PHYSICS SOCIETY

The Physics Society is a social group run by Physics students for the benefit of students and staff. We hold BBQ's, parties, weekend trips, and a seminar service.

We also provide coffee and
tea facilities, magazines
and group membership to the
Australian Institute of Physics.

cartoon

COURSE INFORMATION
APPLIED PHYSICS DEGREE COURSE

The course has a strong vocational orientation, with considerable emphasis on the development of practical skills, especially in modern electronics and instrumentation, computing and measurement of materials properties. The Industrial Training program, which is built into the course, consolidate classroom theory with practical experience, ensuring that students are capable of full professional employment upon graduation.

Graduates meet the requirements for membership of the Australian Institute of Physics. Students are graduates are employed in a wide variety of industries including A.W.A., A.C.I., B.H.P., B.P., C.S.I.R.O., hospitals, Kodak, Philips, Plessey, Telectronics, and many, many more. Some graduates also go on to become Physics teachers, or continue on with higher study in Physics or Management.

ATTENDANCE PATTERNS

The course consists of six Stages which may be completed on a full-time (sandwich) or part-time basis.

Under a sandwich pattern of attendance, involving 24 hours per week at The University, a full Stage may be completed in one semester. Allowing for a minimum period of one year of vocational experience, the course may be completed in four years. The normal attendance pattern is the sandwich pattern which is as follows -

Year 1 Stage 1 full-time study
Stage 2 full-time study

Year 2 Stage 3 full-time study
Stage 4 full-time study

Year 3 First Industrial Period of six months

Second Industrial Period of six months

Year 4 Stage 5 full-time study
Stage 6 full-time study

Part-time attendance involves twelve hours per week at The University and with this form of attendance a full stage may be completed in one year. A student attending entirely on a part-time basis must satisfy the Head of Department that he/she is employed in an area which is relevant to the Academic program. It would require a minimum of six years to complete the course. Being in full-time employment, the student would usually attend classes for three evenings and one afternoon per week, assuming the commonly allowed day-release arrangements of one afternoon per week from employment.

COURSE PROGRAM

A revised course program was introduced in 1987. Students who began the course in 1987 or later and students who were pursuing the revised course in Spring 1987 should all follow the program shown below.

Students who were pursuing the old course in Spring 1987 should continue to follow this course.

If you have not passed a subject in the old program which is no longer offered, refer to an academic advisor.

For details of the old program see the 1987 Handbook.

SANDWICH

Each Stage corresponds to one semester of full-time attendance.

STAGE 1

Autumn Semester	**Hours/Week**
33160 Science Mathematics 1	6
91388 Concepts in Biology	6
or	
62311 Geology 1	6
62411 Chemistry 1	6
63211 Physics 1	6

STAGE 2

Spring Semester

33163 Science Mathematics 2	3
33164 Science Mathematics 3	3
62421 Chemistry 2	6
63221 Physics 2	6
63521 Materials Science 1	6

STAGE 3

Autumn Semester

33221 Engineering Mathematics 2A	3
31799 Computing 1	4
51368 Written & Oral Reporting	2
63196 Electrotechnology	2
63331 Physics 3	4
63332 Electronics	6
63335 Experimental Methods 1	3

STAGE 4

Spring Semester

33330 Physics Mathematic	3
63153 Energy Technology	3
63333 Applied Physics 1	6
63341 Quantum Physics 1	3
63348 Applied Mechanics	3
63352 Digital Electronics	3
..... Elective	3

Autumn Semester

63396 Industrial Training 1 6

Spring Semester

63397 Industrial Training 2 6

STAGE 5

Autumn Semester

63354 Solid State Physic 4
63355 Experimental Methods 2 3
63357 Applied Techniques 6
63358 Field Theory 3
63361 Microprocessors in Instrumentation 3
63366 Nuclear Physics 2
..... Elective 3

STAGE 6

Spring Semester

63152 Materials Physics 3
63342 Principles of Instrumentation 3
63351 Quantum Physics 2 3
63365 Physical Optics 3
63849 Project 9
..... Elective 3

PART-TIME

Each Stage corresponds to two semesters of part-time attendance.

STAGE 1

Autumn Semester

33159 Science Mathematics 1 P/T (2 sem) 3
91378 Concepts in Biology P/T (2 sem) 3
or
62312 Geology 1 P/T (2 sem) 3
62412 Chemistry 1 P/T (2 sem) 3
63212 Physics 1 P/T (2 sem) 3

Spring Semester

33159 Science Mathematics 1 P/T (2 sem) 3
91378 Concepts in Biology P/T (2 sem) 3
or
92312 Geology 1 P/T (2 sem) 3
62412 Chemistry 1 P/T (2 sem) 3
63212 Physics 1 P/T (2 sem) 3

STAGE 2

Autumn Semester

33163 Science Mathematics 2 3
51368 Written & Oral Reporting 2
62422 Chemistry 2 P/T (2 sem) 3
63222 Physics 2 P/T (2 sem) 3

Spring Semester

31799 Computing 1 4
33164 Science Mathematics 3 3
62422 Chemistry 2 P/T (2 sem) 3
63222 Physics 2 P/T (2 sem) 3

STAGE 3

Academic Requirements

Autumn Semester

33221 Engineering Mathematics 2A 3
63196 Electrotechnology 2
63331 Physics 3 4
63335 Experimental Methods 1 3

Spring Semester

63332 Electronics 6
63521 Materials Science 1 6

Industrial Requirements

63398 Industrial Training P/T 3

STAGE 4

Academic Requirements

Autumn Semester

63343 Applied Physics 1 P/T (2 sem) (vacuum) 3
63357 Applied Techniques 6
..... Elective 3

Spring Semester

33330 Physical Mathematics 3
63341 Quantum Physics 1 3
63343 Applied Physics 1 P/T (2 sem) (optics)* 3
63352 Digital Electronics 3
63153 Energy Technology ** 3

Industrial Requirements

63398 Industrial Training P/T 3

STAGE 5

Academic Requirements

Autumn Semester

63354 Solid State Physics 4
63355 Experimental Methods 2* 3
63361 Microprocessors in Instrumentation 3
63366 Nuclear Physics ** 2
..... Elective 3

Spring Semester

63152 Materials Physics ** 3
63153 Energy Technology * 3
63342 Principles of Instrumentation * 3
63343 Applied Physics 1 P/T (2 sem) (optics)** 3
63348 Applied Mechanics 3
63859 Project P/T (2 sem) 4.5

Industrial Requirements

63398 Industrial Training P/T 3

STAGE 6

Academic Requirements

Autumn Semester

63355 Experimental Methods 2 ** 3
63358 Field Theory 3
63366 Nuclear Physics * 2
63859 Project P/T (2 sem) 4.5

Spring Semester

63152 Materials Physics * 3
63342 Principles of Instrumentation ** 3
63351 Quantum Physics 2 3
63365 Physical Optics 3
..... Elective 3

Industrial Requirements

63398 Industrial Training P/T 3

NOTE: Subjects, with one or two stars (* or **) alternate between stages. If you enter Stage 4 in an odd year you should follow the program including subjects having one star (*). If you enter Stage 4 in an even year you should follow the program including subjects having two stars (**).

ELECTIVES

The degree course contains nine semester hours of Electives. Students may either select subjects from the list made available by the Department on Enrolment Day or propose subjects for the approval of the Head of Department.

A wide range of professional electives is available. Students may choose a sequence of elective subjects which allows them to develop their abilities in depth in a particular area. For example, a suitable sequence in Computational Physics would be:

42549 Numerical Analysis
63381 Computational Analysis of Physical Data
63382 Computer Modelling of Physical Systems

For the majority of Applied Physics students, it is recommended that Numerical Analysis be taken as the elective in Stage 4.

An external subject, i.e. a subject offered by an institution other than this University, may be taken as an elective, subject to the Head of Department's approval. In such cases credit may be given either by the awarding of a mark and grade, as with Univeristy subjects, or by the granting of an exemption.

PROJECT

The aim of the Project is to develop the student's ability to work independently or with minimum supervision in an area of some practical relevance. The work for the Project may be carried out at the University, at the student's place of employment, or at another approved location.

The Project forms a significant part of the final stage of the Applied Physics Degree program. It is, therefore, to be taken seriously and will demand a major effort from the student.

Students intending to enrol in the Project should choose their topic prior to the end of classes in the previous semester. For this purpose, a notice concerning available topics and the procedure for the approval of a topic will be placed on the "Urgent Physics Notices Board" after the Second Tutorial Week.

For students eligible for Honours, the Project carries extra weight in determining the grade of honours awarded.

HONOURS

The Department has adopted the following guidelines for the award of honours:

a) The (WAM)E (excluding the project) is calculated for the final four stages of the course. If (WAM)E is >= 65 the student is eligible for honours;

b) The report will be examined within the School by a committee of at least two examiners. The examining committee will determine a mark;

c) An honours WAM will be calculated as (WAM)H = 0.75 (WAM)E + 0.25 (project mark);

d)

$(WAM)_H$	> 75	First class Honours
$(WAM)_H$	70-75	Second class Honours Division I
$(WAM)_H$	65-70	Second class Honours Division II
$(WAM)_H$	< 65	Pass degree

e) The Institute Medal may be awarded to the student in the graduating class whose performance in the Applied Physics Degree course is the most meritorious. The award is only given to a First Class Honours graduand whose performance, moreover, is judged to be of sufficient merit.

SCIENCE DIPLOMA COURSE

The Science Diploma is an umbrella course with majors in Chemistry, Geology and Physics. The award for successful completion of the course is a Diploma in Technology (Science).

The Science Diploma course has no specific occupational requirements. It comprises five stages and thus can be completed by five years of part-time attendance or, subjects to approval from the appropriate Head of Department, equivalent periods involving part or full-time attendance.

PHYSICS MAJOR STRAND

The Physics Major in the Science Diploma has been accepted by the Australian Institute of Physics as a sufficient academic qualification for admission to the corporate grade of Graduate.

The first four stages are identical to those in the degree course (see earlier). Stage 5 comprises the following subjects:

	Hours/Week
63152 Materials Physics	3
63351 Quantum Physics 2	3
63355 Experimental Methods 2	3
63357 Applied Techniques	6
63361 Microprocessors in Instrumentation	3
..... Electives	6

The subjects listed above may be replaced by other subjects from Stages 5 and 6 of the degree course, subject to approval by the Head of Department, except that the subject Experimental Methods 2 must be taken.

SYNOPSES OF SUBJECTS AND PRE-REQUISITES

DEPARTMENT OF PHYSICS

63152 Materials Physics

Three semester hours (11/4 s/hrs lectures, 13/4 s/hrs practical/tutorial)

Pre-requisite: Electrotechnology or Electotromagnetism

Text: B Bleaney and B Bleaney - "Electricity and Magnetism"(3rd Ed) (Oxford)

Dielectric Properties: atomic theory, polarizing ability, relaxation, ferroelectrics, piezoelectronics, breakdown. Magnetic properties: moments in atoms, ions, metals, ferrites and garnets, ferromagnetism, B-H

loop, anisotropy, domains. Superconductivity: characteristics, flux trapping, type I and II applications.

63153 Energy Technology
Three semester hours (1 s/hr lecture, 1 s/hr seminar/tutorial, 1 s/hr practical)

Pre-requisite: Physics 3

The physics of modern energy technology: energy sources, conversion, transportation, storage; new hydrocarbon fuel technology; electricity generation from nuclear fission, nuclear fusion, solar, wind and geothermal power; other energy utilisation systems. The subject includes an excursion to the ANSTO Research Establishment of Lucas Heights.

63196 Electrotechnology
Two semester hours

Pre-requisites: Physics 2, Science Mathematics 2, Science Mathematics 3

Texts: Hughes - "Electrical Technology" (Longman)
B. Moore and J. Donaghy - "AC Circuits" (Pitman)
Sears, Zemansky and Young - "University Physics" (Addison-Wesley)

Application of electrostatics, magnetic effects of currents and electromagnetic induction; alternating current circuits using complex impedance; electrical measurements; magnetic materials; transformers and D.C. motors.

63211 Physics 1 F/T
63212 Physics 1 P/T (2 semesters)
Six semester hours (3 s/hrs/week over 2 semesters for part-time)

Co-requisite: Science Mathematics 1

Text: Sears, Zemansky and Young - "University Physics" (7th Ed) (Addison-Wesley)

Introduction to the fundamental laws of mechanics, thermal physics, wave motion and optics.

63221 Physics 2 F/T
63222 Physics 2 P/T (2 semesters)
Six semester hours (3 s/hrs/week over 2 semesters for part-time)

Pre-requisite: Physics 1

Text: Sears, Zemansky and Young - "University Physics" (7th Ed) (Addison-Wesley)

Introduction to electrostatics, electromagnetism and circuit analysis, properties of matter, optics, atomic and nuclear physics.

63331 Physics 3
Four semester hours (31/2 s/hrs lecture/tutorial, 1/2 s/hrs practical)

Pre-requisites: Physics 2, Science Mathematics 2

Texts: C.B.P. Finn - "Thermal Physics" (Routledge and Kegan Paul)
Wehr and Richards et al - "Physics of the Atom", 3rd Edition (Addison-Wesley)

Thermodynamics: Temperature scales; the First Law of Thermodynamics and various thermodynamic processes for solids, liquids and gases; the Second Law, entropy, and applications to heat engines; thermodynamic functions and Maxwell's relations; applications, e.g. specific heats, Joule-Kelvin effect, changes of phase.
Atomic Physics: Discovery of electron and isotopes, basic nature of the atom, work of Rutherford, Bohr theory; concepts of quantisation including work of Planck and Einstein; special relativity; nature of X-rays; wave nature of matter, introduction to wave mechanics; basic properties of nucleus, radioactivity, particle detectors, nuclear energy and interactions; elementary particles.

63332 Electronics
Six semester hours (2 s/hrs lecture/tutorial, 4 s/hrs practical)

Pre-requisites: Physics 2, Science Mathematics 2

Text: Floyd-"Electronic Devices" (C.E. Merrill, 1984)

Direct current circuits, alternating current circuits, semiconductor theory, bipolar transistor, field effect transistor, amplifiers including operational amplifiers, feedback (positive and negative), power supplies, introduction to digital electronics.

Emphasis is placed upon practical work. Experiments cover all topics included in the lecture course.

63333 Applied Physics 1
63343 Applied Physics 1 P/T (2 semesters)
Six semester hours (11/2 s/hrs lectures, 41/2 s/hrs practical/tutorial)

Pre-requisite: Physics 2

Co-requisite: Science Mathematics 2

Text: Yarwood - "High Vacuum Technique" (Chapman and Hall)

Vacuum Physics: Introduction to the production, measurement and application of vacuum pressures. Pumps for rough, medium and high vacuua. Gauges used measuring same. Production and measurement of ultra high vacuua. Leak detection. Applications eg. vacuum coating.

Optical Instruments and Photography: Extension of lens theory to include defects and aberrations; applications to cameras; densitometry.

Workshop Practice: Including use of tools, basic machines, welding. Engineering drawing, emphasising plan drawing of items for construction in a workshop.

63335 Experimental Methods 1
Three semester hours

Pre-requisite: Physics 2

Co-requisite: Science Mathematics 2

Text: J.R. Taylor - "An Introduction to Error Analysis" (Oxford)
E. Rabinowicz - "An Introduction to Experimentation (Addison-Wesley)
M.J. Usher "Sensors and Transducers" (MacMillan)

Analysis of the experimental process; planning an experiment, equipment design and selection, commissioning, experimental excution, data analysis, presentation of results; statistical methods; basis of experimental design; temperature measurement; excursion to National Measurement Laboratory.

63341 Quantum Physics 1
Three semester hours (lecture/tutorial)

Pre-requisite: Physics 3

Co-requisite: Engineering Mathematics 2A

Text: R. Eisberg and R. Resnick - 'Quantum Physics' (Wiley)

Brief historical introduction, the Schroedinger Equation. Time independent solution for harmonic oscillator, infinite and finite square wells, hydrogen atom, potential steps and barriers. Angular momentum. Orthonormality, interpretation of solutions.

63342 Principles of Instrumentation
Three semester hours (1 s/hr lecture/tutorial, 2 s/hrs practical)

Pre-requisite: Digital Electronics

Co-requisite: Physical Mathematics

Texts: To be announced

Characteristics of measurement: the role of electronics in instrumentation; signal conditioning; performance characteristics of instruments; noise and its reduction; analysis of signals and instruments.

63348 Applied Mechanics

Three semester hours

Pre-requisites: Physics 2, Engineering Mathematics 2A

The aim of this subject is to develop techniques and skills in problem solving in applied dynamics. Particle kinematics, kinetics in various co-ordinate systems, relative motion, systems of particles, rigid bodies, and Lagrangian and Hamiltonian mechanics are covered.

63351 Quantum Physics 2
Three semester hours (lecture/tutorials)

Pre-requisite: Quantum Physics 1

Co-requisite: Physical Mathematics or both Advanced Calculus and Ordinary Differential Equations

Texts: E. Eisberg and R. Resnick - 'Quantum Physics' (Wiley)
F. Mandl - 'Statistical Physics' (Wiley)

Quantum Mechanics: Time-independent perturbation theory, variational principle, applications. Rotational and vibrational spectra of molecules. Interpretation of quantum theory.
Statistical Mechanics: Probability calculations. Isolated systems, fixed-temperature systems, resulting distributions, partition function. Application to paramagnetic solid,ideal gases and other systems. Maxwell velocity distribution. Electrochemical potential, Fermi and Bose distribution functions. Kinetic theory, transport coefficients.

63352 Digital Electronics
Three semester hours (1 s/hr lecture/tutorial, 2 s/hrs practical)

Pre-requisite: Electronics

Texts: To be announced

Logic gates, boolean algebra , decoding and multiplexing, decision circuits, signal conditioning, digital data storage, counting techniques, A to D and D to A conversions.

63354 Solid State Physics
Four semester hours (2 s/hrs lectures, 2 s/hrs practical)

Pre-requisite: Quantum Physics 1

Text: M.A. Omar - 'Elementary Solid State Physics' (Addison-Wesley, 1975)

Electrons in Solids: Free electrons, chemical bonds, LCAO, band theory, insulators; metals and semiconductors; electrical and optical properties of semiconductors.
Lattice Vibrations: Phonons, specific heat, thermal conductivity and expansion.
Magnetism: Para-, dia- and ferromagnetism; Curie and Curie-Weiss law; resonance.

63355 Experimental Methods 2
Three semester hours

Pre-requisites: Experimental Methods 1, Electronics

Text: M.J.Usher - 'Sensors and Transducers' (MacMillan)

Least squares fitting procedures and analysis, numerical noise reduction techniques, transducers and sensors; data processing. Measurement of pressure, flow vibration, noise, heat flux, position, angle, surface morphology. Infra-red and optical detectors, photon noise.

63357 Applied Techniques
Six semester hours (2 s/hrs lecture/tutorial; 4 s/hrs laboratory)

Pre-requisite: Materials Science 1

Co-requisites: Physics 3, Applied Physics 1

Texts: L. Cullity - "Elements of X-ray Diffraction" (Addison-Wesley, 1978)
J. Goldstein et al - "X-ray Microanalysis with S.E.M." (Plenum Press, 1981)

X-ray generation, absorption and scattering; space group theory; crystal diffraction theory; application to structure analysis; defects and deformations in crystal, accurate cell dimensions. Quantitative XRF and XRD. Electron microscopy: electron optics, transmission e.m. and scanning e.m.; image formation and contrast mechanisms. Electron diffraction. X-ray microprobe analysis.

63358 Field Theory
Three semester hours

Pre-requisites: Physical Mathematics, Electrotechnology

Solution of electrostatic and magnetostatic problems using Laplace and Poisson equations. Fields in rectangular trough, around a split cylinder.

Dielectric sphere in a field. Separation of variables in rectangular, cylindrical and spherical coordinates. Maxwell's equations in integral and differential form. Derivation. Power flow. Poynting vector. Boundary conditions on E, B, D, H. Wave equation in free space. Plane wave solutions. Skin effect. Reflection at interfaces. Vector magnetic potential and current distribution. Electric dipole radiation. Waveguides, TE and TM modes.

63361 Microprocessors in Instrumentation
Three semester hours

Pre-requisites: Computing 1, Digital Electronics

Text: To be announced

Computer architecture; machine language, computer interfacing; applications of microcomputers in instrumentation; the FORTH language.

63365 Physical Optics
Three semester hours

Pre-requisites: Electromagnetism or Electromagnetic Fields or Field Theory; Applied Physics 1

Text: Hecht - "Optics" (Addison-Wesley, 1987)

Classical physical optics: dispersion, Fresnel equations; polarization; interference and interferometry; diffraction, the use of Fourier transforms in diffraction; spatial filtering; laser cavities and amplification; coherence, holography, fibre optics.

63366 Nuclear Physics
Two semester hours (1 1/4 s/hrs lecture, 3/4 s/hrs laboratory)

Pre-requisites: Energy Technology, Physics 3

Basic properties of nuclei, nuclear decay, nuclear electronics, passage of energetic particles through matter, biological basis of radiation protection, nuclear models, nuclear reactions, physics of fission reactors, nuclear forces and fields, radioactive analytic techniques.

63381 Computational Analysis of Physical Data
Three semester hours

Pre-requisites: Numerical Analysis, Experimental Methods 2

Co-requisite: Physical Mathematics

Text: Handouts

Analysis of data from a wide range of physical systems with particular emphasis on the physical aspects and the practical implementation in computer software.

Survey of physics areas using computational analysis, computing aspects, fitting of data to model predictions, case studies, spectral analysis, image digitisation and analysis.

63382 Computer Modelling of Physical Systems
Three semester hours

Pre-requisites: Physical Mathematics, Experimental Methods 1, Numerical Analysis

Text: To be announced

Modelling of a range of physical systems, with emphasis placed developing the student's skill in practical implementation on a computer, including packages.

Simulation of electrical network behaviour, including Fourier and Laplace transform methods. Monte Carlo methods, including spin lattices, diffusion,

multiple scattering. Modelling in mechanics, including particle trajectories, design of magnetic lens, energy eigenfunctions. Modelling of waves and fields, fluid flow, partial differential equations.

63849 Project - Nine semester hours

63859 Project (over 2 Semesters) - Nine semester hours

63293 Approved External Subject - Three semester hours

63296 Approved External Subject - Six semester hours

63396 Industrial Training 1 (Applied Physics)
Six semester hours

63397 Industrial Training 2 (Applied Physics)
Six semester hours

63398 Industrial Training P/T (Applied Physics)
Three semester hours

DEPARTMENT OF MATERIALS SCIENCE

63521 Materials Science 1 F/T
63522 Materials Science 1 P/T (two semesters)
Six semester hours

Pre-requisites: Chemistry 1; Physics 1; Science Mathematics 1

Subject is divided into two parts:

(i) Introduction to Materials Science - Four semester hours.

Text: Z.D. Jastrzebski - "The Nature and Properties of Engineering Materials".

An introduction to the crystalline structure and physical properties of solids: phase diagrams of metallic alloys; the mechanical properties of metals and their alloys in terms of modern theories; the control of structure and properties of commercially important alloys; corrosion.

An introduction to the structure and mechanical properties of organic polymers and the techniques employed to modify their properties.

An introduction to the mechanical testing of materials; the effects of loading rate, temperature, repetitive and sudden loadings on the behaviour of materials (tension, compression, hardness, impact, creep and fatique); the theory of brittle fracture.

(ii) Crystallography - Two semester hours.

Text: B.D. Cullity - "Elements of X-ray Diffraction"

An introduction to crystallography; stereographic projection; x-ray diffraction; Laue back reflection; powder photography method; indexing powder patterns; intensity calculations; reciprocal lattice.

DEPARTMENT OF APPLIED GEOLOGY

62311 Geology 1 F/T
62312 Geology 1 P/T (2 semesters)
Six semester hours (3 s/hrs/week over 2 semesters for part-time)

The Earth's surface and physical processes operating on it; properties and behaviour of the crust of the Earth; mineral products, especially power, metals and water; maps and geological structures; minerals, rocks and fossils. Three one-day field excursions.

DEPARTMENT OF APPLIED CHEMISTRY

62411 Chemistry 1 F/T
62412 Chemistry 1 P/T (2 semesters)
Six semester hours (3 s/hrs/week over 2 semesters for part-time)

Text: Sleet - 'Chemical Calculations - A Programmed Approach' (Science Press)

Revision of basic concepts; atomic structure, periodic table, bonding, stoichiometry, heat changes in chemical reactions, structure of matter, changes of state, Redox reactions.

62414 Chemistry 1M
Six semester hours (2 s/hrs lectures, 1 s/hr tutorial, 3 s/hrs practical)

Assumed knowledge: Core of HSC Chemistry 2U course, or equivalent.

Preparation for practical work, atomic structure, periodic table, chemical bonding, Redox reactions, chemical energetics, properties of matter.

62421 Chemistry 2 F/T
62422 Chemistry 2 P/T (2 semesters)
Six semester hours (3 s/hrs/week over 2 semesters for part-time)

Pre-requisite: Chemistry 1 or Chemistry Certificate (Sydney Technical College)

Texts: Aylward and Findlay - 'SI Chemical Data'(Wiley)
Petrucci - 'General Chemistry', 2nd Edition (Collier MacMillan)

A continuation of basic principles; reaction kinetics; chemical equilibrium; electrochemistry; manufacture of chemicals; introduction to organic chemistry.

62424 Chemistry 2M
Six semester hours (2 s/hrs lectures, 1 s/hrs tutorial, 2 s/hrs practical)

Pre-requisites: Chemistry 1M or equivalent

Chemical Kinetics, chemical equilibrium, enthalpy and entropy, acid base theory, complex ions, electrochemistry, manufacture of chemicals.

FACULTY OF LIFE SCIENCES

91388 Concepts in Biology F/T
91378 Concepts in Biology P/T (2 semesters)
Six semester hours (3 s/hrs/week over 2 semesters for part-time)

The subject is designed primarily as a terminating one-semester course in Biology for students in Physical Sciences. It provides an introduction to the major principles of biological science, and the importance of this branch of sciences in a world of advanced technology.

Life exists in general on three planes of organisation; cell, organism and population. Life is self-perpetuating, diverse and evolving. The biosphere represents a complexly balanced system involving a cycling of materials and a continuous flow of energy.

The course is presented in two 3 semester-hour units, with the characteristics of living things and life-activities; with the diversity of living things, and the dynamics of population with environment.

FACULTY OF MATHEMATICAL AND COMPUTING SCIENCES

31799 Computing 1
Four semester hours (2 s/hrs lectures, 2 s/hrs practical)

Pre-requisite: Science Mathematics 2 or equivalent

Elements of FORTRAN programming; the use of a digital computer; introduction to numerical solutions of problems in sciences and engineering using digital computers; solution of linear and non-linear equations; numerical integration; linear algebra and matrices; solutions of ordinary differential equations.

33160 Science Mathematics 1 F/T
33159 Science Mathematics 1 P/T (2 semesters)
Six semester hours (3 s/hrs lectures. 3 s/hrs tutorial)

Pre-requisite: HSC 2U Mathematics or equivalent

Introduction to the derivative, local and global extreme values; instantaneous rates of change; non-time rates; continuity; introduction to the integral; area-predicting formulas; volumes of geometric solids; arc length, surface area; calculation of work; improper integrals; first and second derivative test; mean value principle; composite functions and the chain rule; related rates; differentials and implicit differentiations; change of variables technique in integration; the indefinite integral.

33163 Science Mathematics 2
Three semester hours ($1\frac{1}{2}$ s/hrs lectures, $1\frac{1}{2}$ s/hrs tutorial)

Pre-requisite: Sciences Mathematics 1

More antiderivatives; logarithmic laws and their applications; integrations using the natural logarithmic function; the number e; the concept of inverse functions; the exponential function and its properties; integration by parts; method of partial fractions; introduction to differential equations; separation of variables technique.

33164 Science Mathematics 3
Three semester hours ($1\frac{1}{2}$ s/hrs lectures, $1\frac{1}{2}$ s/hrs tutorial)

Pre-requisite: Science Mathematics 1

Co-requisite: Science Mathematics 2

Solution of linear equations by determinants. Matrix algebra, Inverse matrix. Application to linear equations. Gauss and Gauss-Jordan reduction. Inconsistent and redundant equations. Calculation of inverse matrix by reduction. Eigenvalues and eigenvectors of a matrix and simple examples of their application to diagonalisation. Algebra of 3-D vectors. Scalar and vector product. Products of three vectors. Equations of lines and planes. Angles and distances between points, lines and planes. Sequences, series and convergence. Ratio test. Power series and radius of convergence. Maclaurin series. Complex numbers. Polar form. De Moivre's theorem. Complex series. Complex exponential function. Euler's formula. L'Hopital's rule for the calculation of limits. Inverse hyperbolic functions. Application to the calculation of integrals.

33221 Engineering Mathematics 2A
Three semester hours ($1\frac{1}{2}$ s/hrs lecture, $1\frac{1}{2}$ s/hrs tutorial)

Pre-requisites: Science Mathematics 2 and Science Mathematics 3

Functions of several variables. Limits and continuity. Partial derivatives. Chain rule. Gradient. Differentials. Maxima and Minima. Lagrange multipliers. Least squares. Double integrals in Cartesian co-ordinates. Repeated integrals. Application to areas and volumes. Jacobians. Use of polar co-ordinates. Centre of mass and moment of inertia of plates. Triple integrals in Cartesian co-ordinates. Repeated integrals. Spherical and cylindrical co-ordinates. Quadric surfaces. Applications to volume, centre of mass. Moment of inertia, surface area. Differential equations. First order variables separate and linear equations. Higher order linear equations. Homogenous constant coefficient linear equations. Methods of undetermined coefficients.

33330 Physical Mathematics
Three semester hours

Pre-requisite: Engineering Mathematics 2A

Vector Calculus: Vector fields. Line and surface integrals. Conservative fields. Green's theorem. Divergence and curl. Gauss's theorem and the equation of continuity. Strokes' theorem and circulation.
ODE's: Series solutions of linear equations with non-constant Coefficients. Legendre's and Bessel's equations and functions.
Boundary Value Problems: One dimensional heat and Wave equations. Seperation of variables. Fourier sine and cosine series. Vibrating circular membrane.
Fourier Analysis: Introduction to Fourier interal. The triangle, sign step, delta and sinc functions.

FACULTY OF ENGINEERING

42549 Numerical Analysis
Three semester hours

Pre-requisites: Computing 1; Engineering Mathematics 2A or both Multivariable Calculus and Ordinary Differential Equations

This subject introduces the application of numerical methods to the solution of engineering problems. It makes extensive use of the computer.

Topics include: numerical precision and errors, integration, solution of equations (linear, non-linear, simultaneous), curve fitting, differential equations (ordinary, simultaneous, partial).

FACULTY OF HUMANITIES AND SOCIAL SCIENCES

51368 Written and Oral Reporting
Two semester hours

A course in the principles and practice of effective written and oral reporting, designed to help students in research, organising, writing and presenting material appropriate to technical and commercial contexts. Adaptation of material and communication techniques to selected channels of communication. Letters, memoranda, reports, articles, graphs, tables, diagrams. Short talks on technical subjects and introduction to visual aids.

5.... Social Science Electives
A number of social science elective subjects are made available each semester. Details of these subjects, together with timetable information, are displayed on the noticeboards at enrolment sessions.

APPLIED PHYSICS DEGREE COURSE
TIMETABLE 1989
AUTUMN SEMESTER

DEPARTMENT OF PHYSICS

63152 01 Materials Physics	Thu 1.30-2.30	L
	2.30-4.30	T/P
63196 01 Electrotechnology	Wed 5.30-6.30/8.30	L/P
63211 01 Physics 1	Tue 3.00-4.15	L
	4.15-5.00	T*
	Wed 12.15-1.15	L
	Thu 9.30-10.45	L
	Fri 10.00-12.30	P
63212 01 Physics 1 P/T (2 sem)	Thu 5.15-6.30	L
	6.30-7.30/9	T/P
63212 01 Physics 2	Mon 2.00-4.30	P
	5.15-6.30	L
	Tue 2.00-3.15	L
	3.15-4.15	T
63222 01 Physics 2 P/T (2 sem)	Mon 5.15-6.30	L
	6.30-7.30/9	T/P

*Optional Tutorial

63331 01 Physics 3	Wed 1-3	L/T
	3-5	L/P

63332 01 Electronics	Tue 2-3	L
	3-5	P
	Thu 1.30-2.30	L
	2.30-4.30	P
63343 01Applied Physics1P/T(2sem) (Vacuum)	Tue 5.30-6.30	L
	6.30-8.30	P
63335 01 Experimental Methods 1	Mon 5.30-8.30	L/P
63354 01Solid State Physics	Wed 1-3	L
	3-5	P
63355 01Experimental Methods 2	Thu 5.30-6.30	L
	6.30-8.30	P
63357 01Applied Techniques	Mon 1.30-4.30	L/P
	5.30-8.30	L/P
63358 01Field Theory	Wed 5.30-8.30	L/T
63361 01 Microprocessors in Instrumentation	Wed 5.30-6.30	L
	6.30-8.30	P
63366 01Nuclear Physics	Mon 10-12	L/P
63381 01Computational Analysis of Physical Data	Fri 1.30-4.30	L/P
63849 01Project		
63859 01Project P/T (2 sem)		

* Optional Tutorial

DEPARTMENT OF MATERIALS SCIENCE

63522 01Materials Science1(2 sem)	Wed 1-3	L
	3-5	P

DEPARTMENT OF APPLIED GEOLOGY

62311 01Geology 1 F/T	Mon 2-3	L
	3-5	P
	Tue 1.45-2.45	T
	Thu 2-3	L
	3-5	P
62312 01 Geology 1 P/T (2 sem)	Mon 5.30-6.30	L
	6.30-8.30	P

DEPARTMENT OF CHEMISTRY

62411 01Chemistry 1	Mon 9-12	P
	12.15-1.15	L
	Thu 11-12	L
	12-1	T
62411 02Chemistry 1	Mon 12.15-1.15	L
	Wed 9-12	P
	Thu 11-12	L
	12-1	T
62412 01Chemistry 1 P/T (2 sem)	Tue 1-2	L
	2-3/5	T/P
62414 01Chemistry 1M	Mon 2-5	P
	Wed 11-12	L
	Thu 11-12	L
	12-1	T

62414 01	Chemistry 1M	Wed 11-12	L
		2-5	P
		Thu 11-12	L
		12-1	T
62422 01	Chemistry 2 P/T (2 sem)	Thu 5.30-6.30	L
		6.30-7.30/9.30	T/P

SCHOOL OF MATHEMATICAL SCIENCES

33159 01	Science Maths 1 P/T (2 sem)	Tue 5.30-30
33160 01	Science Maths 1 F/T	Tue 9.30-12.30 Fri 2-5
33160 02	Science Maths 1 F/T	Tue 9.30-12.30 Thu 2-5
33161 01	Science Maths 2	Wed 9-12
33163 02	Science Maths 2	Fri 5.30-8.30
33221	Engineering Maths 2A	Mon 1.30-4.30
33221	Engineering Maths 2A	Thu 5.30-8.30

SCHOOL OF COMPUTING SCIENCES

31799 01	Computing 1 (Science)	Tue 9-12 Fri 9-12
31799 02	Computing 1 (Science)	Thu 5-9

FACULTY OF ENGINEERING

45249	01 Numerical Analysis	Tue 1.30-4.30	

FACULTY OF HUMANITIES AND SOCIAL SCIENCES

51368	01 Written & Oral Reporting	Tue 11-1	
51368	02 Written & Oral Reporting	Thu 2-4	
51368	03 Written & Oral Reporting	Thu 5.30-7.30	

FACULTY OF LIFE SCIENCES

91378	01 Concepts in Biology P/T (2 sem)	Wed 5.30-6.30	L
		6.30-7.30	T
		7.30-9.30	P
91388	01 Concepts in Biology	Fri 10-11	L
		11-12	T
		12-1	L
		2-5	P

APPLIED PHYSICS DEGREE COURSE

TIMETABLE 1989

SPRING SEMESTER

DEPARTMENT OF PHYSICS

63152 01Materials Physics	Wed 5.30-6.30	L
	6.30-8.30	T/P
63152 02Materials Physics	Thu 1.30-2.30	L
	2.30-4.30	T/P
63153 01Energy Technology	Tue 1.30-2.30	L
	2.30-4.30	T/P
63211 01Physics 1	Mon 2.00-4.30	P
	Thu 5.15-6.30	L
	6.30-7.30	T*
	Fri 9.00-10.15	L
	10.15-10.45	T
63212 01Physics 1 P/T (2 sem)	Thu 5.15-6.30	L
	6.30-7.30/9	T/P
63221 01Physics 2	Mon 11.15-12.30	L
	2.00-4.30	P
	Wed 9.00-10.00	L
	Fri 12.00-1.15	L
63221 01Physics 2	Mon 11.15-12.30	L
	Tue 2.00-4.30	P
	Wed 9.00-10.00	L
	Fri 12.00-1.15	L

63332 01 Electronics	Mon 5.30-6.30	L
	6.30-8.30	P
	Thu 5.30-6.30	L
	6.30-8.30	P

* Every second week.

63333 01Applied Physics 1	Mon 10.00-12.00	P
	1-00-2.00	L
	2.00-4.00	P
	5.00-6.00	L
63333 02Applied Physics 1	Mon 1.00-2.00	L
	2.00-4.00	T/P
	5.00-6.00	L
	6.00-8.00	P
63343 01Applied Physics 1 P/T	Mon 5.00-6.00	L
	6.00-8.00	P
63343 02Applied Physics 1 P/T	Mon 1.00-2.00	L
(2 sem)	2.00-4.00	T/P
63341 01Quantum Physics 1	Tue 5.30-8.30	L/T
63342 01Principles of Instrument	Tue 5.30-6.30	L
	6.30-8.30	P
63348 01Applied Mechanics	Wed 1.30-4.30	L/T
63351 01Quantum Physics 2	Fri 1.30-4.30	L/T
63352 01Digital Electronics	Thu 1.30-4.30	L/T/P

63365 01 Physics Optics	Wed 1.30-4.30	L/P
63382 01 Computer Modelling of Physical Systems	Thu 1.30-4.30	L/P
63849 01 Project		
63859 01 Project P/T (2 sems)		

DEPARTMENT OF MATERIALS SCIENCE

63521 01 Materials Science 1	Wed 1-3	L
	3-5	P
	5.30-7.30	L/T
63521 02 Materials Science 1	Wed 1-3	L
	5.30-7.30	L/T
	Fri 10-12	P
63522 01 Materials Science 1 P/T	Wed 5.30-7.30	L/T

DEPARTMENT OF APPLIED GEOLOGY

62312 01 Geology 1 P/T	Mon 5.30-6.30	L
	6.30-8.30	P

DEPARTMENT OF CHEMISTRY

62411 01 Chemistry 1	Thu 10-11	L
	11-12	T
	Fri 1.15-2.15	L
	2.15-5.15	P
62412 01 Chemistry 1 P/T	Tue 1-2	L
	2-3/5	T/P

62421 01Chemistry 2	Mon 9-10	L
	10-11	T
	2-5	P
	Wed 10-11	L
62421 02Chemistry 2	Mon 9-10	L
	10-11	T
	Wed 10-11	L
	Thu 9.30-12.30	P
62422 01Chemistry 2 P/T	Thu 5.30-6.30	L
	6.30-7.30/9.30	T/P
62424 01Chemistry 2M	Mon 9-10	L
	10-11	T
	Tue 9.30-12.30	P
	Wed 10-11	L
62424 02Chemistry 2M	Mon 9-10	L
	10-11	T
	Wed 10-11	L
	2-5	P

SCHOOL OF MATHEMATICAL SCIENCES

33159 01Science Mathematics 1 P/T	Tue 5.30-8.30
33160 01Science Mathematics 1 F/T	Tue 10-1
	Thu 2-5
33163 01Science Mathematics 2	Fri 2-5
33163 02Science Mathematics 2	Thu 10-1

33163	03Science Mathematics 2	Fri 5.30-8.30	
33164	01Science Mathematics 3	Thu 1.30-4.30	
33221	Engineering Maths 2A	Mon 1.30-4.30	
33221	Engineering Maths 2A	Wed 5.30-8.30	
33330	Physical Mathematics	Thu 5.30-8.30	

SCHOOL OF COMPUTING SCIENCES

31799	01Computing 1 (Science)	Thu 1-5
31799	02Computing 1 (Science)	Fri 5-9

FACULTY OF ENGINEERING

42549	01 Numerical Analysis	Mon 5.30-8.30	L/P
42549	02Numerical Analysis	Wed 9.30-12.30	L/P

FACULTY OF HUMANITIES AND SOCIAL SCIENCES

51368	01Written & Oral Reporting	Tue 2.30-4.30	
51368	02Written & Oral Reporting	Thu 2-4	
51368	03Written & Oral Reporting	Thu 5.30-7.30	

FACULTY OF LIFE SCIENCES

91378	01Concepts of Biology P/T	Wed 5.30-6.30	L
		6.30-7.30	T
		7.30-9.30	P

PRINCIPAL DATES FOR 1989

AUTUMN SEMESTER

February 3	Enrolment of new students
February 10	Re-enrolment of continuing students
February 13 (week 1)	Stage 2-6 classes commence
February 13	Orientation Day for new students
February 20	Stage 1 classes commence
March 10	Last day for addition of subjects to approved program
March 20	Tutorial Week commences
March 23	Last day to pay HECS tax
March 24-27	EASTER
March 30	Last day for withdrawal from subjects or course without penalty
April 25	ANZAC DAY
April 26	Physical Sciences Graduation and Prize Giving Ceremonies
May 1	Tutorial Week commences
June 12	QUEEN'S BIRTHDAY HOLIDAY
June 13	Formal Examinations commence
June 23	Formal Examinations end for Physical Sciences

SPRING SEMESTER

July 21	Re-enrolment of continuing students
July 24 (Week 1)	Classes commence
August 3	New students commence
August 11	Last day for addition of subjects to approved program
August 23	Last day to pay HECS tax
August 28	Tutorial Week commences
August 30	Last day for withdrawal from subjects without penalty.
October 2	EIGHT-HOUR DAY HOLIDAY
October 9	Tutorial Week commences
November 20	Formal examinations commence
December 1	Formal examinations end for Physical Sciences