Faculty of Engineering

Volume 8

1994
The University of Newcastle Campus Layout

The University of Newcastle

Faculty of Engineering

The Physical Planning & Stores Building

Physics Building

Radio 2MUR FM

Richmond Wing

Security

Science Building

Sculpture Workshop

School Sciences Building

Special Education Centre

Sports Centre - Auchmuty

Sports Gymnasium - Hunter

Sports Pavilion

Staff House

Temporary Office Buildings

TUNRA

TUNRA Annexa

University Union - Hunter

University Union - Shortland

Visual Arts/Media Studies

Wetlands Pavilion

The University of Newcastle
The University of Newcastle Calendar consists of the following volumes:

- Volume 1: Legislation
- Volume 2: University Bodies and Staff
- Volume 3: Faculty of Architecture Handbook
- Volume 4: Faculty of Art, Design and Communication Handbook
- Volume 5: Faculty of Arts Handbook
- Volume 6: Faculty of Economics and Commerce Handbook
- Volume 7: Faculty of Education Handbook
- Volume 8: Faculty of Engineering Handbook
- Volume 9: Faculty of Health Sciences Handbook
- Volume 10: Faculty of Law Handbook
- Volume 11: Faculty of Medicine Handbook
- Volume 12: Faculty of Music Handbook
- Volume 13: Faculty of Nursing Handbook
- Volume 14: Faculty of Science and Mathematics Handbook
- Volume 15: Faculty of Social Science Handbook

Also available are the Undergraduate Guides.

This Volume is intended as a reference handbook for students enrolling in courses conducted by the Faculty of Engineering.

© The University of Newcastle 1993

ISSN 0159 - 3455

The colour band Lapis Lazuli BCC150 on the cover is the lining colour of the hood of Bachelor's of Engineering of this University.

The information in this Handbook is correct as at 16 September 1993.

Recommended Price: Five dollars and fifty cents plus postage.

Section One: Faculty Staff

Section Two: Faculty Information

Section Three: Award Rules

Rules Governing Academic Awards

Award Schedules

- Bachelor of Engineering
- Bachelor of Surveying
- Bachelor of Computer Science
- Bachelor of Computer Science (Honours)
- Graduate Diploma in Computer Science
- Graduate Diploma in Computing
- Graduate Diploma in Surveying

Section Four: Faculty Policies

- General Course Rules and Information
- Progress and Performance
- Other Faculty Policies

Section Five: Bachelor Degree Course Programs

Guide to Attendance Patterns
- Chemical Engineering
- Civil Engineering
- Computer Engineering
- Computer Science
- Computer Science Honours

Design by: Marie-T Wintowski, Medical Communication Unit

Typeset by: Jan Spurr, Office of the University Secretary

Printed by: The Pot Still Press Pty Ltd, Artarmon, Sydney
Electrical Engineering 48
Environmental Engineering 51
Industrial Engineering 54
Mechanical Engineering 57
Surveying 60

section six

Master & Doctoral Degree Regulations 63

section seven

Graduate Coursework Programs 73

Graduate Diploma in Computer Science 73
Graduate Diploma in Computing 76
Graduate Diploma in Surveying 77
Master of Computing 78
Master of Engineering Science - Industrial Systems 78

section eight

Subject Descriptions 80

Biology Subjects (BIOL) 82
Chemical Engineering Subjects (CHEE) 84
Chemistry Subjects (CHEM) 90
Civil Engineering Subjects (CIVL) 92
Commerce Subjects (COMM) 96
Computer Science Subjects (COMP) 98
Economics Subjects (ECON) 105
Electrical and Computer Engineering Subjects (ELEC) 105
Geography Subjects (GEOG) 112
Geology Subjects (GEOL) 112
Information Science Subjects (INFO) 112
Law Subjects (LAW) 114
Management Subjects (MNGT) 115
Mathematics Subjects (MATH) 115
Mechanical Engineering Subjects (MECH) 118
Philosophy Subjects (PHIL) 127
Physics Subjects (PHYS) 128

section nine

Psychology Subjects (PSYC) 131
Statistics Subjects (STAT) 132
Surveying Subjects (SURV) 133

section ten

Schedule of Subjects 136

Department of Chemical Engineering (CHEE) 138
Department of Civil Engineering and Surveying (CIVL and SURV) 140
Department of Computer Science (COMP) 142
Department of Electrical and Computer Engineering (ELEC) 144
Department of Mechanical Engineering (MECH) 146
Other Departments of the University (Various codes) 148

General Information Centre

Principal Dates 1994
Advice and Information
Enrolment and Re-enrolment
Leave of Absence
Attendance at Classes
General Conduct
Examinations
Statements of Academic Record
Unsatisfactory Progress — Rules
Charges
Higher Education Contribution Scheme (HECS)
Loans
Refund of Charges
Campus Traffic and Parking
Miscellaneous Services
Banking
Cashier
Chaplaincy Service
Community Programs
Convocation
On behalf of the staff of the Faculty of Engineering, I wish to extend a welcome to all students, those who are entering the University and the Faculty for the first time and those who are returning to commence another year of studies. Having chosen to study in one of the fields of Engineering, Computer Science or Surveying, you are embarking on a professional career which is both challenging and stimulating. We are living in an age which is witnessing a tremendous growth in scientific and technological development and which is having a marked effect on the modes and characteristics of our society. The future of our society is very much dependent on the solution of a number of very complex technological problems. While these problems will be many and varied, none will be more important than those associated with food production, the development of alternative forms of energy and the preservation of our living environment. Graduates in the various disciplines of Engineering and of Computer Science and Surveying, will, in their own way, contribute to the solution of these and other important problems.

The role of universities in modern society has broadened. Not only is it necessary to preserve the ideals of learning and associated fundamental research, it has become of equal importance for universities to become directly involved in the application of research to the solution of problems associated with industry and the community. For this reason, the role of a university engineering faculty in applied and industrially orientated research is an important one. In this respect it is noteworthy that this Faculty of Engineering, through its research and associated projects undertaken on behalf of Australian industry, is making a major contribution and has attained national and international prominence. The interaction between the research and teaching functions is invaluable to the maintenance of standards and the professional relevance of course curricula.

The opportunity to obtain a well-rounded tertiary educational experience is embodied in the very concept of the university system. The University environment, with its excellent campus and facilities, together with the many extra-curricular activities, creates an opportunity for obtaining a broad experience, indeed a unique experience in one’s lifetime. For this reason I would encourage you to take full advantage of the opportunities available to you and, where time...
permits, take an active interest in the various facets of University life. I would also encourage you to take part in the decision-making processes of the Faculty, either through membership of the Faculty and Departmental Boards, or by supporting the students elected to those positions.

The staff of the Faculty will do everything possible to make your work both interesting and enjoyable; they are anxious to help you with any problems you may have. We would be most grateful for any feedback of a constructive nature that you may wish to offer.

In conclusion, I wish you well in your studies at this University. There is no doubt that a course leading to a degree in Engineering, Computer Science or Surveying, requires a great deal of dedication and perseverance, but the task is certainly a rewarding one.

Alan W. Roberts
Dean
Faculty Office Staff: I. Sherwood

DEPARTMENT OF CHEMICAL ENGINEERING

Professors
G.J. Jameson, BSc(NSW), PhD(Camb), ASTC, CEng, FICChemE, FIEAust, FRACI, FAusIMM, FTS (Professor of Chemical Engineering) (Head of Department)
T.F. Wall, PhD, FRMIT(ChemEng), CEng, CChem, FIEAust, FAE, MCombl, FICChemE, MRACI (Professor of Fuels and Combustion Engineering)

Associate Professor R.H. Weiland, MSc, PhD(Toronto), MAICHE, MFPSoc, MFSoC

Senior Lecturers
N. Ahmed, BSc(B'desh Engin), PhD, MSME-AlME, MRACI, CChem
J. Roberts, BSc(NSW), ME, ASTC, ARACI, MAWWA

Lecturers
G.E. Evans, BE, PhD, GradlChemE
K.P. Galvin, BE, PhD, DIC, GradlEAust
A.G. Tate, BE, MCombl, GradlChemE

Professional Officer
J.B. Waanders, BE, MEngSc, MIEAust, GradlChemE, CPEng

Technical Officers
R.B. D’Ombrain
T.R. Farrugia, BSc, PhD
N. Gardner

Senior Laboratory Craftsmen: J.L. Richards

Laboratory Craftsmen: C. Croese

Departmental Office Staff
G.B. Hensman
M. Hughes

Honorary Professor: I. McC. Stewart, AM, ME(Qld), SM(MIT), CEng, MICChemE, FinstF, MAusIMM, MCombl, FIEAust

DEPARTMENT OF CIVIL ENGINEERING AND SURVEYING

Professors
J.C. Fryer, BSurv, PhD(NSW), FISAA (Adam-Kawaso Professor of Photogrammetry)
R.E. Melchers, BE, MEngSc(Monash), PhD(Camb), DipEd(Monash), MICE, FIEAust (Professor of Civil Engineering)
A.W. Page, BE(NSW), PhD, ASTC, FIE Aust (CSIRO Professor in Structural Clay Brickwork) (Head of Department)

Associate Professor: S.W. Sloan, BE, MEngSc(Monash), MPhil, PhD(Camb)

Senior Lecturers
M.H. Elliffe, BSurvSc, Dip&TCP(Syd), LS, FISAAust
W.G. Field, BE(NSW), PhD, ASTC, FIEAust
B.S. Heaton, BE(NSW), ME, ASTC, MIEAust
G.A. Kucera, BE, MEngSc(Melb), PhD(Harv), MIEAust
H.L. Mitchell, BSurv, PhD(NSW), MSAust
D.J. Williams, BE(Adel), MEngSc(NSW), PhD(Melb)

Lecturers
P. Binding, BSc(Hons) (ANU), MArts (Princeton)

DEPARTMENT OF COMPUTER SCIENCE

Professor P.D. Eades, BA, PhD(ANU) (Professor of Computer Science) (Head of Department)

Associate Professor G. Wrightson, BE, MCompSc, PhD (Karlshruhe), MACM, MGI, MIEE

Senior Lecturers
B. Beresford-Smith, BSc, Phd(ANU)
H. Elgindy, BE, BSc, MSc(McGill), PhD(McGill)
M.R. Hanaford, BA, BE, DipCompSc, PhD
M. Miller, BA(Sydney), MLitt(UNE), MA(UNE), PhD(NSW)

Lecturers
R.F. Cohen, BAI(Brandeis), MCompSc(Boston), MCompSc(Brown), PhD(Brown)
M. Houle, BSc, PhD(McGill)
Simon, BSc, BAI(James Cook), DipCompSc, MMath

Senior Tutor: K. Wallace, BMath

Professional Officer: D.M. Koch, BTech(EE) (SAIT)

Technical Officer: G. Martin

Computer Systems Officers
C. Lane, BA, BSc(London), Phd(ANU)
D. Montgomery, BCompSc

Departmental Office Staff
D.C. Edwards
D.A. Hatherell
### DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

**Professors**
- G.C. Goodwin, BSc, BE, PhD(NSW), FIEE, FTS, FIEAust (Professor of Electrical Engineering)
- Pacific Power Professor of Power Engineering - position vacant
- H. Schröder, DipMath, PhD(CAU) Kell (AWA Professor of Microelectronics)

**Associate Professors**
- R.H. Middleton, BE, SSe, PhD, MIEEE
- P.J. Moylan, BE(Melb), ME, PhD, MIEEE, MACS

**Senior Lecturers**
- R.E. Betz, BE, ME, PhD, MIEEE (Head of Department)
- B.J. Cook, HND(Elect)(Plymouth Polytechnic), PhD(Bristol), CEng
- C.E. de Souza, BE(Pernambuco, Brazil), Dr-Ing(Ferre & Marie Curie), MIEEE
- M. Fu, BAI(Chem), MA, PhD(Wisconsin)
- B. Penfold, BSc(ElecEng), PhD, MIEEE

**Lecturers**
- S.W. Chan, BE, PhD, MIEEE
- B. Ninnis, BE, ME,
- M.J. Sculley, BAppSci, MAppSci(Melb), PhD(IISc)
- A. Spray, BSc, PhD(Wales), MIEEE, AMIEEE
- H. Villanueva, DipElecEng(Uruguay), MSc, PhD(Manch. UK)
- I. Webster, BE, ME, PhD

**Professional Officers**
- F. Martinez, BE

**Senior Technical Officers**
- A.M. Arma
- P. Hardy
- P.C. McLaughlan
- I. Powell

**Technical Officers**
- R.R. Hicks
- W. Lis
- D.J. Murray

**Administrative Assistants**
- V. Lucky
- A. Spear, BSc(Hons)(Edinburgh)

**Departmental Office Staff**
- M.J. Conn
- D. Taft
- R.K. Thrift, BSc

### DEPARTMENT OF MECHANICAL ENGINEERING

**Professors**
- R.A. Antonia, BE, MEngSc, PhD(Syd), FIEAust, FIRMS (Professor of Mechanical Engineering)
- Professor of Industrial Engineering - position vacant
- A.W. Roberts, AM, BE, PhD(NSW), ASTC, MIMechE, FIEAust, FTS (Mertz/TUNRA Professor of Bulk Solids Handling and Conveying)

**Associate Professors**
- L.W.B. Browne, BE(Syd), PhD
- A.J. Chambers, BE(NSW), ME, PhD(Stan), FIEAust
- G.E. Murch, BSc, PhD, DSc(Finn), DEng, MACS, MASM, FIEAust
- D.H. Wood, BE, MEngSc(Syd), PhD, DIC(Lond)

**Senior Lecturers**
- G.D. Butler, BE(NSW), MSc(CranInt), ASTC, MIEAust, MBRS, MASOR
- J.W. Hayes, BE, MEngSc(Syd), MIEAust, MIEE, MORS (Head of Department)
- K.I. Hitz, BE(NSW), PhD
- R. D. Parbery, BSc, BE, ME, PhD, FIEAust
- S. Rajagopalan, BE(Madras), ME, PhD(IISc), MIEAust
- O.J. Scott, ME

**Lecturers**
- P.D. Clausen, BE, PhD, GradIEAust
- B.J. Hill, BSc(Eng), MEngSc, PhD, GradIEAust
- H.S. Kim, BSc, MScEng(INha), PhD(Syd)
- E. Kiat, BMet, PhD

**Professional Officers**
- S. Keys, BE
- J.A. Lewis, BSc(NSW), ME, PhD, ASTC
- R.J. Scobie, ASTC

**Senior Technical Officers**
- B. Cooper
- D.K. Marsden
- I.S. Miller
- J.D. Walton

**Technical Officers**
- P.J. Garfoot
- J. Lewis
- K.M. McLelean
- R.J. Reece

**Senior Laboratory Craftsmen**
- N.J. Allwood
- R.K. Hicks
- Laboratoy Craftsmen
- D.W. Ferry
- P. Peady

**Departmental Office Staff**
- P. Falkiner, ATCL
- C.A. Watkins

**Honorary Professors**
- G.R. Belton, BSc(Eng), PhD, DIC(Lond)
- A. Harrison, BA(Macq), BE(NSWIT), PhD

**Honorary Associates**
- E. Betz, ME, PhD(NSW), ASTC, FIEAust, MASME
- J.D. Browne, BE(Lond), MSc(NSW), PhD(Monash), MAIP
- J.A. Grahame, ASTC
- N.A. Molloy, BE(Qld), MIEAust
- M. Ooms, BE
CENTRE FOR INDUSTRIAL CONTROL SCIENCE

Director G.C. Goodwin, BSc, BE, PhD(NSW), FIEEE, FTS, FIEAust
Associate Director R.H. Middleton, BE, BSc, PhD, MIEEE

Assistant Directors
R.E. Betz, BE, ME, PhD, MIEEE
R.J. Cook, HDI(Elect)(Plymouth Polytechnic), PhD(Activ), CEng
M. Fu, BA(Phil), MA, PhD(Wisconsin)
S.F. Graebe, BSc, MSc(San Diego), PhD(Stockholm)
B.M. Ninness, BE(Hons), ME
P. Stepen, BE

Administrative Assistant D.E. Piefke

Professional Officers
A. Bastiani, BE(Hons)
A. Pemberton, BE(Hons)
M. West, BE

Research Fellows
Y. Shirvashala, BTech(Kanpur), PhD(Iowa City)
S.R. Weller, BE(Hons), ME

section two

Faculty Information

About This Section
This section contains general information about the Faculty of Engineering and the courses which are offered within that faculty. Relevant University Rules and Course Programs are given in separate sections of this Handbook.

Advice and Information
Students are assumed to be familiar with the information contained in this Handbook which relates to their own course of study and to general University and Faculty requirements.

Additional information will be posted on Notice Boards throughout the academic year. It is each student's responsibility to ensure that they keep themselves aware of the contents of relevant Notice Boards.

As course and University requirements do not remain static, students are advised to purchase a copy of the Faculty Handbook annually in order to become aware of changes and to retain those Handbooks so as to provide a record of the content studied.

COURSE AND ENROLMENT ENQUIRIES
Enquiries regarding course requirements and general matters such as University Rules and procedures, Faculty policies, admission, enrolment and re-enrolment, variations of program and course transfer may be directed to the Faculty Office - call at Room EA206 or telephone (049) 21 6065.

ACADEMIC ADVICE
Academic advice and general enquiries regarding the content of particular courses may be obtained from the relevant Head of Department or from the Course Coordinator of the relevant course.

PERSONAL COUNSELLING
Students may wish to discuss matters relating to course difficulties or options with the Faculty Secretary, other Faculty Office staff or the relevant Course Coordinator.
Members of the University Counselling Service are also available for entirely confidential personal consultation on any matter, particularly matters of academic skills and personal growth. The Counselling Service is situated on the courtyard level of the Library Building. An appointment is usually required.

**STUDENTS WITH SPECIAL NEEDS**

Students with disabilities may wish to consult the Faculty's Adviser for Students with Special Needs, Dr. D.H. Wood of the Department of Mechanical Engineering, top Floor, D.W. George Building. Telephone 21 6200 for an appointment.

**The Faculty**

The Faculty of Engineering is constituted by the Council of the University and consists of the Department of Chemical Engineering, the Department of Civil Engineering and Surveying, the Department of Electrical and Computer Engineering and the Department of Mechanical Engineering.

The Faculty Board, Faculty of Engineering, is charged with conducting the academic affairs of the Faculty. Membership of the Faculty Board includes the Vice-Chancellor (ex officio), the Director of the School of Engineering, the Dean of the Faculty, the members of the full-time academic staff of the departments comprising the Faculty, representatives of the University's students and members of the full-time and part-time academic staff of other faculties of the University. The Dean is Chairman and executive officer of the Faculty Board.

**DEGREES AND DIPLOMAS**

The awards which may be currently made by the University to persons presented by the Faculty of Engineering are listed below.

<table>
<thead>
<tr>
<th>Degree/Diploma</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor of Computer Science (BCompSc)</td>
<td>Honours (BCompScHon)</td>
</tr>
<tr>
<td>Bachelor of Engineering (BE)</td>
<td>Honours (BEngHon)</td>
</tr>
<tr>
<td>Bachelor of Industrial Engineering (BIndEng)</td>
<td>Honours (BIndEngHon)</td>
</tr>
</tbody>
</table>

**Industrial Engineering**

(no new admissions will be accepted from 1995)

**Mechanical Engineering**

Bachelor of Surveying (BSurv), which may be awarded as a pass or honours degree.

**Graduate Diplomas**

Graduate Diploma in Computer Science
Graduate Diploma in Computing (GradDipComp)

**Higher Degrees by Coursework**

Master of Computing (MComp)
Master of Engineering Science (MEngSc)

**Higher Degrees by Research**

Master of Computer Science (MCompSc)
Master of Science (MSc)
Doctor of Engineering (DEng)
Doctor of Philosophy (PhD)
Doctor of Science (DSc)

**Bachelor Degree Courses**

General information regarding the bachelor degree programs offered in the Faculty is provided below. The detailed Course Programs appear in Section 5 of the Handbook.

**COMPUTER SCIENCE**

The Bachelor of Computer Science (BCompSc) degree course has been designed to equip students with an excellent background for a successful career in the computer industry or as a programmer or systems analyst in industry or commerce.

The course program is accredited by the Australian Computer Society (ACS) and meets the Australian Computer Science full academic requirements for membership of the Society.

The BCompSc program may be completed by three years of full-time study or part-time equivalent. Combined degree programs are also available (see below).

**Honours in Computer Science**

The Bachelor of Computer Science (Honours) degree is a separate degree program which may be taken full-time over one year or part-time over two years. Candidates for this degree have normally completed the BCompSc program with a creditable performance, however, graduates in other disciplines with a substantial background and a creditable performance in computer science may be considered for admission.

**ENGINEERING**

Bachelor of Engineering (BE) degree courses are offered in the following specialisations:

- Chemical Engineering
- Civil Engineering
- Computer Engineering
- Electrical Engineering
- Environmental Engineering
- Industrial Engineering
- Mechanical Engineering

Each engineering degree program may be completed by four years of full-time study or equivalent. Part-time attendance is permitted, however, students intending to undertake part-time study should note that many classes are held during the day. Students may choose to combine years of full-time study with years of part-time study as their commitments permit. It is also possible to follow a 'thick sandwich' pattern of attendance by which full-time study and full-time industrial experience are undertaken in alternate years. It is recommended that at least the final year of study be taken on a full-time basis.

Engineering courses are highly structured and, although each follows a similar pattern, the content of the courses naturally differs according to the needs of the specialty concerned.

In Year I students study mathematics and the basic sciences as well as commencing studies in the engineering sciences. Year II programs continue studies in mathematics and, where applicable, basic sciences. The scope of engineering studies is also widened. Year III consists of major engineering subjects and is generally regarded as the core of the program. In the final year these studies are extended by the inclusion of more highly specialised topics. The programs also make provision for non-engineering elective subject to be included in the degree program. The final year project, in which students may undertake extensive studies in an area of special interest, is a particular feature of engineering programs at Newcastle.

Engineering programs are regularly reviewed in order to incorporate the latest technological and professional developments relevant to each specialisation. The current Curriculum Programs are set out in Section 5 of this Handbook.

In addition to the full degree programs offered in the Faculty, students may commence studies in Mining Engineering and Naval Architecture by completing the first two years of the full time programs in Civil Engineering or Mechanical Engineering respectively. Students choosing to follow these programs may complete their studies at the University of New South Wales.

**Honours**

Awards of honours are made on the basis of performance during the entire course program (see Faculty Policies in Section 4). There is no separate 'honours year'.

**Accreditation**

Each engineering program (other than the new Environmental Engineering program) is accredited as meeting the full academic requirements for corporate membership of the Institution of Engineers, Australia (IEAust) and recognised by a number of overseas professional bodies. The Environmental Engineering program has received preliminary accreditation and is confidently expected to be fully accredited in accordance with the normal accreditation process.

The Computer Engineering Program is also accredited by the Australian Computer Society (ACS) as satisfying that organisation's highest level of academic requirements.

The Chemical Engineering program also meets requirements for membership of the Institution of Chemical Engineers (Great Britain) and is recognised by the Royal Australian Chemical Institute and the Australian Institute of Energy.

**SURVEYING**

The Bachelor of Surveying (BSurv) program is offered as a four year full-time or equivalent study course on a similar basis to that of engineering programs. In addition to Mathematics and Physics, the course also deals with aspects of Civil Engineering, Economics and Law as well as the technical aspects which include: cadastral surveying, engineering surveying, topographical surveying, geodetic surveying and hydrographic surveying.
Faculty of Engineering

Section Two

Faculty Information

The course meets the academic prerequisites for an application for registration under the Surveyors Act, 1929 (as amended). In order to become a Registered Surveyor in NSW it is necessary for a graduate to meet other requirements of the Board of Surveyors of NSW. Enquiries on this aspect should be directed to the Registrar of the Board of Surveyors of NSW. Registration is required only if practice as a land surveyor is intended; many surveying careers do not require registration.

The combined BE (Civil Engineering) / BSurv degree program, which is understood to be unique to the University of Newcastle, allows completion of the two professional qualifications by 5 years of full-time study. The program is entered after completion of the first year of either course with a WAM of 55 or more.

COMBINED DEGREE PROGRAMS

A number of combined degree programs are available which lead to the award of a two degrees by a total of five years of full-time study for programs which lead to the award of a two degrees by a total of five years of full-time study for programs which have Important applications in modern developments in surveying.

The first year of either of the associated programs is sufficient for admission to the program. Students intending to transfer to a combined program must contact the Faculty Office to obtain application forms and lodgment by the date required for lodgment of re-enrolment applications.

UNDERGRADUATE SCHOLARSHIPS

The scholarships listed below are expected to be offered in 1994. Information regarding the scholarships available to students entering the Faculty of Engineering and the relevant application details and closing dates may be obtained from the Scholarships Office from November, telephone 049 21 6537.

The Combined Degree Scholarship

A number of scholarships are awarded annually to students enrolled in the Computer Engineering program. The scholarships provide a living allowance of approximately $7,000 per annum and a book allowance.

Frank Henderson Scholarships in Civil Engineering

Four scholarships are awarded annually to first year students enrolled in the Civil Engineering program. The awards are based on ISCE performance and are continued for normal duration of the course subject to satisfactory academic performance.

Graduate Coursework Programs

Faculty of Engineering

Section Two

Faculty Information

Department of Mechanical Engineering Scholarships

Four scholarships are awarded annually to first year students enrolled in the Mechanical Engineering program. The value of each scholarship is $500 for one year only. Selection is based on academic merit. No application is necessary.

Shortland Electricity Scholarships in Electrical Engineering

Two scholarships are awarded annually to students enrolled in the Electrical Engineering or combined degree program.

Selection is based on the ISCE performance of applicants offered a place through UAC and interview. Each scholarship provides a living allowance of approximately $5,000 and the opportunity to undertake vacation employment with the sponsoring organisation.

University HECS Scholarships

Ten undergraduate scholarships are awarded annually to students enrolling in any undergraduate program in the University after completing their ISCE in the previous year. Selection is on the basis of ISCE performance. A substantial number of these scholarships are usually awarded to students enrolling in the Faculty of Engineering. The scholarships provide coverage of the HECS charge to the value of $2,000 per annum and are continued for one year only. No application is necessary.

The Diploma in Surveying

The Graduate Diploma in Surveying is a postgraduate course designed to broaden and further the education of the practical surveyor. It may also be suitable for those persons holding overseas qualifications in surveying not presently recognised as sufficient to meet the academic requirements for professional recognition in Australia to meet those requirements.

Recent technological changes have significantly altered the role and operational techniques of surveyors. Many items of equipment and computational methods now in use were unknown or new to those surveyors who have had this training in the modern developments in surveying, the course has a secondary objective. In this case, the aim is to broaden the candidate's basic training with the offer of study in a wider range of disciplines which have important applications in some fields of surveying.

The Diploma program is normally completed by at least two years of part-time study, although in special cases approved by the Faculty Board, the program may be completed in one year on a full-time basis.

MASTER OF COMPUTING

This postgraduate coursework masters degree program requires up to two years of full-time study (or the equivalent part-time study). In addition to coursework at 400 level, candidates complete a very substantial one-year research related project which is usually associated with one of the research projects being carried out in the Department of Computer Science.

Applications will be considered from graduates who have completed the Bachelor of Computer Science or its equivalent (including the Graduate Diploma in Computer Science).
Higher Degrees by Research

**MASTER OF COMPUTER SCIENCE**

The Master of Computer Science is a research degree by thesis, requiring an original contribution to knowledge in the area of computer science. Applicants for admission are expected to hold a BCompSc(Hons) degree or an equivalent honours degree with at least second class honours. Candidates who enrol initially in the MCompSc may later transfer into the PhD program if their work is of an exceptional quality. The area of research is usually associated with one of the research projects being carried out in the Department of Computer Science.

**MASTER OF ENGINEERING**

The Master of Engineering is a research degree by thesis. Relevant coursework may be undertaken in association with the research program. The quality and standard of work required in the thesis is substantially higher level than that expected of an Bachelor of Engineering honours graduate. Candidates who enrol initially in the MEng program may later transfer into the PhD program if their work is of an exceptional quality.

**MASTER OF SCIENCE**

This degree is similar to the Master of Engineering degree but is usually taken by students with a non-engineering background or students who are carrying out research in science areas related to engineering.

**MASTER OF SURVEYING**

The Master of Surveying is a research degree by thesis. Coursework will normally be included in the program. The quality and standard of work required in the thesis will be at a substantially higher level than that expected of an Bachelor of Surveying honours graduate. Candidates who enrol initially in the MSurv program may later transfer into the PhD program if their work is of an exceptional quality.

**DOCTOR OF PHILOSOPHY**

Doctoral research programs are available within each of the Departments of the Faculty. Initial enquiries regarding these programs and areas of specialised research activity currently undertaken within Departments may be addressed to the Head of the relevant department. Enquiries regarding scholarships, the formal requirements for the degree and admission procedures should be addressed to:

The Academic Registrar,
University of Newcastle,
Callaghan, NSW
AUSTRALIA 2308

**Centre for Industrial Control Science**

The Centre for Industrial Control Science (CICS) was established in 1988 under the Special Research Centre scheme of the Australian Government and is closely linked to the Department of Electrical and Computer Engineering. Additional support is provided by the University and Industry. The work of the Centre is conducted on two parallel streams. One dealing with theoretical issues in systems science and the other with the design of industrial control and signal processing systems. The aims of the Centre is to establish a true synergism between theoretical work and practical applications of control science, particularly in the areas of process control and automation. The area of control systems design brings basic theoretical ideas in the understanding of nonlinear systems, estimation and information theory together with the associated technologies of computing, communications and industrial electronics.

In addition to the staff of the Centre, a number of the members of the academic staff of the Department of Electrical and Computer Engineering are involved with the work of the Centre, as are some 30 postgraduate students. Visiting academists and postdoctoral fellows also contribute to the work of the Centre.

Further information regarding the work of the Centre may be obtained from:

The Director,
Centre for Industrial Control Science,
Department of Electrical and Computer Engineering,
University of Newcastle,
Callaghan, NSW
AUSTRALIA 2308

**Rules Governing Academic Awards**

**Application of Rules**

1. These Rules shall apply to all the academic awards of the University other than the degrees of Doctor and Master.

2. (i) In these Rules, unless the context or subject matter otherwise indicates or requires:

- "award" means the degree, diploma (including graduate diploma and associate diploma) or graduate certificate for which a candidate is enrolled;

- "course" means the total requirements of the program of study approved by the Academic Senate to qualify a candidate for the award as set out in the schedule.

- "Dean" means the Dean of a Faculty;

- "department" means the department offering a particular subject and includes any other body so doing;

- "Faculty" means the Faculty responsible for the course;

- "Faculty Board" means the Faculty Board of the Faculty;

- "schedule" means the schedule to these Rules relevant to the award listed under the name of the Faculty;

- "subject" means any part of a course for which a result may be recorded.

---

**About This Section**

This section contains the University Rules regarding the Bachelor Degrees and Graduate Diplomas offered in the Faculty of Engineering. The approved Course Programs referred to in the Degree schedules appear in Sections 5 and 7 of this handbook.
Enrolment

(2) A reference in these Rules to a Head of Department shall be read not only as a reference to the person appointed to that office but also, where a subject is not offered by a department as such, to the person approved by the Academic Senate to undertake the responsibilities of a Head of Department for the purpose of these Rules.

Admission

3. An applicant for admission to candidature for an award shall satisfy the requirements of the University governing admission to and enrolment in a course and any other additional requirements as may be prescribed in the schedule for that award.

Subjects

4. (1) For the purposes of a course, a subject may be classified at a level determined by the Faculty Board.

(2) Each subject shall be allotted a credit point value by the Academic Senate after considering the advice of the Faculty Board of the Faculty in which the department is located.

(3) The Academic Senate, after considering a request from a Faculty Board, may determine that a subject be not offered during a particular academic year.

(4) The Faculty Board shall approve the subjects for the award. Any change in the list of approved subjects which will have effect in the following year shall be approved by a date determined by the Academic Senate.

(5) Where there is any change in the list of approved subjects, the Faculty Board shall make all reasonable provision to permit students already enrolled in the course to progress normally.

Enrolment

5. (1) A candidate may not enrol in any year in a combination of subjects which is incompatible with the requirements of the timetable for that year.

(2) Except with the permission of the Dean and subject to any contrary provision in the schedule:

(a) a candidate may not enrol in subjects totalling more than the equivalent of 40 credit points in any semester;

(b) a candidate shall not enrol in a subject which does not count towards the award; and

(c) a candidate shall not be permitted to enrol in any subject which is substantially equivalent to one which the candidate has previously counted towards a degree or diploma.

(3) A candidate for an award shall not enrol in a course or part of a course for another award in this University unless consent has first been obtained from the Dean and, if another Faculty is responsible for the course leading to that other award, the Dean of that Faculty, provided that a student may enrol in a combined course approved by the Academic Senate leading to two awards.

Prerequisites and Corequisites

6. (1) The Faculty Board on the recommendation of the Head of the Department may prescribe prerequisites and/or corequisites for any subject offered by that Department.

(2) Except with the permission of the Dean granted after considering any recommendation made by the Head of the Department, no candidate may enrol in a subject unless that candidate has passed any subjects prescribed as its prerequisites at any grade which may be specified and has already passed or concurrently enrols in or is already enrolled in any subjects prescribed as its co-requisites.

(3) Except with the permission of the Dean, a candidate will not have satisfied a prerequisite if the prerequisite subject has not been completed in the preceding eight calendar years.

(4) A candidate attaining a Terminating Pass in a subject shall be deemed not to have passed that subject for pre-requisite purposes.

Credit

7. (1) A Faculty Board may grant credit to a candidate in specified and unspecified subjects, on such conditions as it may determine, in recognition of work completed in the University or another institution approved by the Faculty Board for this purpose or additionally as may be provided in the schedule.

(2) Except as may be otherwise provided in the schedule, a candidate shall not be given credit for more than sixty-five percent of the total number of credit points required to complete the course.

Subject Requirements

8. (1) The subjects which may be completed in the course for the Award shall be those approved by the Faculty Board and published annually as the Approved Subjects section of the schedule.

(2) A candidate enrolled in a subject shall comply with such academic and practical requirements and submit such written or other work as the Department shall specify.

(3) Except as otherwise permitted by the Head of Department, any material presented by a candidate for assessment must be the work of the candidate and not have been previously submitted for assessment.

(4) To complete a subject a candidate shall satisfy published departmental requirements and gain a satisfactory result in such assessments and examinations as the Faculty Board shall require.

Withdrawal

9. (1) A candidate may withdraw from a subject or the course only by informing the Academic Registrar in writing and the withdrawal shall take effect from the date of receipt of such notification.

(2) A student shall be deemed not to have enrolled in a subject if that student withdraws from the subject:

(a) in the case of a semester length subject, before the Higher Education Contribution Scheme census date for that semester; or

(b) in the case of a full year subject, before the first Higher Education Contribution Scheme census date for that academic year.

(3) Except with the permission of the Dean:

(a) a candidate shall not be permitted to withdraw from a subject after the relevant date which shall be:

(i) in the case of a semester length subject, the last day of that semester; or

(ii) in the case of a full year subject, the last day of second semester; and

(b) a candidate shall not be permitted to withdraw from a subject on more than two occasions.

Leave of Absence

10. (1) Subject to any provision in the schedule, a candidate in good academic standing in the course:

(a) may take leave of absence of one year from the course; or

(b) with the permission of the Dean, may take leave of absence of two consecutive years from the course without prejudice to any right of the candidate to re-enrol in the course following such absence and with full credit in all subjects successfully completed prior to the period of leave.

(2) For the purposes of sub-rule (1), unless otherwise specified in the schedule, a candidate eligible to re-enrol shall be deemed to be in good academic standing.

Qualification for the Award

11. (1) To qualify for the award a candidate shall satisfactorily complete the requirements governing the course prescribed in the schedule.

(2) A subject which has been counted towards a completed award may not be counted towards another award, except to such extent as the Faculty Board may approve.

Combined Degree Programs

12. (1) Where so prescribed for a particular course, a candidate may complete the requirements for one Bachelor degree in conjunction with another Bachelor degree by completing a combined degree program approved by the Academic Senate in the advice of the Faculty.
Board and, where the other Bachelor degree is offered in another Faculty, the Faculty Board of that Faculty.

(2) Admission to a combined degree program shall be restricted to candidates who have achieved a standard of performance deemed satisfactory for the purposes of admission to the specific combined degree course by the Faculty Board(a).

(3) The work undertaken by a candidate in a combined degree program shall be no less in quantity and quality than if the two courses were taken separately.

(4) To qualify for admission to the two degrees a candidate shall satisfy the requirements for both degrees, except as may be otherwise provided.

Relaxing Provision

13. In order to provide for exceptional circumstances arising in a particular case, the Academic Senate on the recommendation of the Faculty Board may relax any provision of these Rules.

SCHEDULE I — BACHELOR OF ENGINEERING

Specialisations

1. The Degree may be offered in one of the following specialisations:
   - Chemical Engineering
   - Civil Engineering
   - Computer Engineering
   - Electrical Engineering
   - Environmental Engineering
   - Industrial Engineering
   - Mechanical Engineering

2. For the purposes of this Schedule, the designated Department with respect to each specialisation shall be:
   - Department of Chemical Engineering
   - Chemical Engineering:
   - Department of Civil Engineering and Surveying
   - Civil Engineering and Environmental Engineering:
   - Department of Electrical and Computer Engineering

3. The Degree may be offered Department with respect to each specialisation:
   - Electrical Engineering:
   - Department of Mechanical Engineering
   - Industrial Engineering and Mechanical Engineering.

Qualification for the Award

3. (1) To qualify for admission to the degree a candidate shall:
   (a) complete the requirements of the course program for that specialisation; and
   (b) complete the industrial experience requirements as determined by the Faculty Board; to the satisfaction of the Faculty Board.

4. The course program for each specialisation shall consist of subjects totalling not less than 320 credit points approved by the Faculty Board on the recommendation of the Head of the designated department and include:
   (a) at least 80 credit points from 100 level subjects;
   (b) at least 60 credit points from 200 level subjects;
   (c) at least 100 credit points from 300 or 400 level subjects of which at least 40 credit points must be from 400 level subjects.

Grading of the Degree

3. (1) The degree shall be conferred as an ordinary degree except that, where the performance of a candidate has reached a standard determined by the Faculty Board to be of sufficient merit, the degree may be conferred with Honours.

(2) There shall be two classes of Honours, namely Class I and Class II. Class II shall have two divisions, namely Division 1 and Division 2.

Enrolment

3. A candidate may not enrol in any year in a combination of subjects which is incompatible with the requirements of the Faculty Board.

Prerequisites and Corequisites

4. Where the result for a subject is expressed as a mark, a candidate shall have met the requirements of Rule 6(2) of the Rules Governing Academic Awards by achieving a mark of 45 or more in all subjects specified as pre-requisites or co-requisites.

Credit

6. Credit may be granted for up to 160 credit points except that a candidate may be granted such credit as the Faculty Board determines for subjects completed in the University which have not already been counted towards an award.

Transfer Between Specialisations

7. The Faculty Board may make conditions with respect to the transfer of candidature from one specialisation in the degree to another.

Additional Specialisations

8. A person who has satisfied the requirements for admission to the degree in one specialisation is admitted to candidature in any other specialisation on such conditions as the Faculty Board may prescribe. Upon completing the requirements for admission to the degree in that other specialisation the candidate shall be issued with a statement to that effect by the Academic Registrar.

Leave of Absence

9. (1) For the purposes of Rule 10 of the Rules Governing Academic Awards, candidates shall be deemed to be in good academic standing if at the conclusion of the year of last enrolment in the course they:
   (a) had achieved a passing grade or a result of 45 or more in at least one subject; and
   (b) were eligible to re-enrol.

(2) Leave of Absence of one year from the course may be taken on more than one occasion but not in consecutive years.

SCHEDULE 2 — BACHELOR OF SURVEYING

Qualification for the Award

1. To qualify for admission for the degree a candidate shall complete, to the satisfaction of the Faculty Board, a course program consisting of subjects totalling not less than 320 credit points approved by the Faculty Board on the recommendation of the Head of the Department of Civil Engineering and Surveying, including:

(a) at least 80 credit points from 100 level subjects;
(b) at least 60 credit points from 200 level subjects;
(c) at least 100 credit points from 300 or 400 level subjects of which at least 40 credit points must be from 400 level subjects.

Grading of the Degree

2. (1) The degree shall be conferred as an ordinary degree except that, where the performance of a candidate has reached a standard determined by the Faculty Board to be of sufficient merit, the degree may be conferred with Honours.

(2) There shall be two classes of Honours, namely Class I and Class II. Class II shall have two divisions, namely Division 1 and Division 2.

Enrolment

3. A candidate may not enrol in any year in a combination of subjects which is incompatible with the requirements of the Faculty Board.

Pre-requisites and Co-requisites

5. Where the result for a subject is expressed as a mark, a candidate shall have met the
(2) Leave of Absence of one year from the course may be taken on more than one occasion but not in consecutive years.

SCHEDULE 3 — BACHELOR OF COMPUTER SCIENCE

Qualification for the Award

1. To qualify for admission for the degree a candidate shall complete, to the satisfaction of the Faculty Board, a course program consisting of subjects totalling not less than 240 credit points approved by the Faculty Board on the recommendation of the Head of the Department of Computer Science, including:

(a) at least 80 credit points from 100 level subjects;
(b) at least 60 credit points from 200 level subjects; and
(c) at least 40 credit points from 300 level subjects.

Enrolment

2. A candidate may not enrol in any year in a combination of subjects which is incompatible with the requirements of the Faculty Board.

Pre-requisites and Co-requisites

3. Where the result for a subject is expressed as a mark, a candidate shall have met the requirements of Rule 6(2) of the Rules Governing Academic Awards by achieving a mark of 45 or more in all subjects specified as pre-requisites or co-requisites.

Credit

4. Credit may be granted for up to 160 credit points except that a candidate may be granted such credit as the Faculty Board determines for subjects completed in the University which have not already been counted towards an award.

Leave of Absence

5. (1) For the purposes of Rule 10 of the Rules Governing Academic Awards, candidates shall be deemed to be in good academic standing if at the conclusion of the year of last enrolment in the course they:

(a) had achieved a passing grade or a result of 45 or more in at least one subject; and

(b) were eligible to re-enrol.

Leave of Absence of one year from the course may be taken on more than one occasion but not in consecutive years.

SCHEDULE 4 — BACHELOR OF COMPUTER SCIENCE (HONOURS)

Admission to Candidature

1. (1) An applicant for admission to candidature shall have satisfied the requirements for admission to:

(a) the degree of Bachelor of Computer Science; or
(b) the degree of Bachelor in the University, or another university approved for this purpose by the Faculty Board.

(2) The Head of the Department of Computer Science shall, after considering an applicant's previous academic performance in relevant studies, make recommendations to the Faculty Board as to the applicant's suitability for admission to candidature.

(3) The Faculty Board after taking into account the recommendation of the Head of the Department of Computer Science shall either:

(a) approve admission to candidature; or
(b) approve admission to candidature subject to the applicant completing, to the satisfaction of the Faculty Board, such prerequisite and/or corequisite studies as it may prescribe; or
(c) reject the application.

Grading of the Degree

2. (1) The Faculty Board shall, on the recommendation of the Head of the Department of Computer Science, determine the grade of Honours to be awarded to a candidate upon qualifying for admission to the degree.

(2) There shall be three classes of Honours, namely Class I, Class II and Class III. Class II shall have two divisions, namely Division 1 and Division 2.

Qualification for the Award

3. To qualify for admission to the degree a candidate shall pass the program of subjects approved by the Faculty Board on the recommendation of the Head of the Department of Computer Science totaling not less than 80 credit points.

Credit

4. (1) Credit shall not be granted for studies which have been counted towards a completed award.

(2) Credit granted for studies completed at another institution which did not qualify a candidate for an award shall be limited to 40 credit points.

(3) Credit may be granted for all subjects completed in this University which have not already been counted towards a completed award.

Leave of Absence

5. Candidates shall not be entitled to take Leave of Absence from the course.

Time Requirement

6. Except with the permission of the Faculty Board, a candidate shall complete the requirements for the award of the Diploma in not less than one and not more than five calendar years from the date of first enrolment in the course.

SCHEDULE 5 — GRADUATE DIPLOMA IN COMPUTER SCIENCE

Admission to Candidature

1. In order to be admitted to candidature for the award, the applicant shall:

(a) have completed the requirements for admission to a degree in the University of Newcastle; or
(b) have completed the requirements for admission to a degree at any other institution recognised by the Faculty Board; and hold such other qualifications approved by the Faculty Board for the purpose of admission to candidature.

Qualification for the Diploma

2. To qualify for admission to the degree a candidate shall pass the program of subjects approved by the Faculty Board on the recommendation of the Head of the Department of Computer Science totaling not less than 80 credit points.

Credit

4. (1) Credit shall not be granted for studies which have been counted towards a completed award.
To qualify for the Diploma of Engineering, a candidate shall complete the requirements of the course program to the satisfaction of the Faculty Board.

Credit

4. The Diploma shall be awarded as an ordinary diploma except that, where the performance of a candidate has reached a standard determined by the Faculty Board to be sufficient, the diploma may be conferred with Merit.

Graduation

Section Four

Faculty Policies

About This Section

This section contains Faculty Policies which are relevant to all students enrolled in coursework programs within the Faculty and are to be read in conjunction with the relevant Course Programs and Award Rules.

Students should note that Faculty Policies do not remain static. Students are expected to consult Faculty and Departmental notice boards regularly in order to make themselves aware of any proposals or decisions which may affect them. Enquiries regarding Faculty Policy may be directed to the Faculty Office.

General Course Policies and Information

The information given below should be read in conjunction with the Rules Governing Academic Awards and the relevant Schedule to those Rules together with other University requirements and Faculty policies.

It is the responsibility of students to ensure that they enrol in a program which meets currently applicable course requirements. Where approval of a Head of Department or Course Coordinator is required, this should be gained prior to submitting a Variation of Program Form and be attached to that form.

Advice on course requirements and procedures is available from the staff of the Faculty Office - Enquiries to Room EA206, or from the relevant Course Coordinator.

Credit Points

1. The credit point value of a subject is intended to give a general indication of the total time required of a student undertaking that subject. The normal annual workload of 80 credit points may be taken to indicate that the total workload of an average student working at pass level is approximately 48 hours per week. Thus a 5 credit point subject offered over one semester may be taken to indicate a minimum average workload requirement of 8 hours per week which includes course contact hours plus time spent by the student on assignments and other set work as well as general study of subject content. The ratio between contact hours and private study will vary between subjects according to the nature of the content studied.
2. The number of hours per week required by individual students will vary according to many factors including: academic background, personal ability, work/study techniques and the level of performance the student wishes to attain in a particular subject. The general indication of 6 hours per week for each 5 credit points in a semester subject is a guide to the minimum expectations of the Faculty - students will need to monitor and evaluate their own performance in the light of this expectation and the results they obtain in particular subjects.

Timetable
3. Course programs are specified and timetabled by year.
4. Every effort will be made to provide for single day release attendance patterns in the first two part-time stages of each course. Timetable requirements may restrict selection of subjects in non-standard programs.
5. Students are not to enrol in subjects which clash in the timetable.

Prerequisites and Corequisites
6. In addition to the subject prerequisite and corequisite requirements of individual subjects, a general understanding of the material in previous years of the course is assumed.
7. Students must satisfy the relevant prerequisite and corequisite requirements of each subject unless granted a written waiver of these requirements by the Head of the Department responsible for offering the subject. Students wishing to obtain such a waiver should make application at the scheduled Re-enrollment Approval Sessions in February. If requesting a variation of enrolment at another time, the relevant form should be obtained from the Faculty Office before making an appointment to see the Head of Department to discuss the proposed waiver.
8. Only in exceptional circumstances will prerequisite and corequisite requirements be waived for students who have a WAM of 55 or less.

Adjusting Second Semester Enrolment
9. Enrolment in second semester subjects which require completion of first semester subjects to meet prerequisite, corequisite or assumed knowledge requirements is contingent upon successful completion of the relevant first semester subjects.
10. It is the responsibility of students to apply to withdraw from any second semester subject for which they do not meet prerequisite or corequisite requirements unless a formal waiver of such requirements is received from the Head of Department offering the subject concerned within the first 2 weeks of second semester.
11. A student who remains officially enrolled in a subject will receive a result in that subject. If the student ceases to attend classes but does not officially withdraw, the result will be Fail (FR).
12. Students wishing to add a second semester subject in place of a withdrawn subject should do so by 5 p.m. on Monday of the third week of second semester otherwise the Head of Department may refuse to permit the addition.

Late Addition or Substitution of Subjects
13. Applications to add subjects after the 5 p.m. on Monday of the third week of the semester in which the subject commenced will be approved by the Dean only when submitted with the written permission of the Head of the Department offering the subject. When considering a request for late addition of a subject, the Head of Department will take into account:
   • the ability of the student to catch up with work already completed in the subject;
   • the effect that a late addition to the class may have on the work of students already enrolled in the subject; and
   • where a student has been attending the subject without being enrolled, the reasons why the student did not enrol in the subject within the first two weeks of the semester.
14. Note that dates are prescribed after which total semester workload may not be increased. The requirement prevents approval of the addition of a subject after those dates where total semester workload would be increased, even if the permission of the Head of Department to enrol in the subject is obtained. Students in doubt as to the requirements should consult the staff of the Faculty Office before approaching the Head of Department.

Addition or substitution of first semester and full year subjects after 31 March and second semester subjects after 31 August will only be permitted by the Dean in exceptional circumstances and where the total semester workload of the student is not increased.

Non-Standard Programs
15. A non-standard program is one which includes subjects from the course other than the Year 1 program. While progression in each course offered in the Faculty of Engineering is by subject, the following rules apply to students wishing to enrol in a non-standard program.
16. Students are expected to complete subjects in the order given in the course program. A student undertaking a non-standard program should therefore include all subjects yet to be completed from the lower year of the course. If a student withdraws from a subject, that subject is expected to be chosen from the higher year. The approval of the Course Coordinator or the Department concerned for any departure from these expectations.
17. Applications for enrolment in the following non-standard programs will be approved without special permission being required.
   • An annual program of subjects prescribed for a combined degree program in which a subject is included;
   • Inclusion of Industrial Experience subjects by part-time students;
   • An annual program which follows prescribed Year by Year transition arrangements;
   • An annual program of subjects for which all of the following apply:
     • all prerequisite and corequisite requirements are met or written relaxation of the relevant requirements is submitted;
     • all subjects extend over only two Years of the course;
     • all subjects yet to be completed in the lower Year of the course are included;
     • when undertaken by a student with a WAM of 55 or more, has a total credit point value not exceeding 85 with no more than 50 credit points in a semester; and
   • when undertaken by a student with a WAM of 54 or less, has a total credit point value not exceeding 60 with no more than 40 credit points in a semester.

All other applications for enrolment in a non-standard program must be approved by the Course Coordinator responsible for the course in which the student is enrolled.

Substitution of Subjects
21. The Head of Department responsible for the course program or the Course Coordinator may approve limited substitution of another subject for a subject listed in the course program where such a substitution is considered to be to the academic benefit of the student concerned. Approval will only be given where:
   • the replacement subject is of the same credit point value as the subject(s) it replaces;
   • the requirements of the Regulations governing the degree program continue to be met; and
   • the overall program of study to be taken by the student is suited to the award of the degree involved.

Enrolment in Extraneous Subjects
22. Enrolment in subjects extraneous to the requirements of the course in which the student is enrolled will normally be approved where the student is otherwise enrolled in all subjects required to complete degree requirements and has a WAM of at least 55. The total annual program attempted by such a student, including extraneous subjects, shall not exceed 80 credit points. The approval of the Dean is required for any application to undertake extraneous subjects while a student is enrolled in any course offered in the Faculty of Engineering. The Dean may decline to approve any such application.
23. Note that the University charges a fee for enrolment in subjects which do not count towards degree requirements.

Appeals
24. A written appeal regarding any decision made under these rules may be made to the Dean who shall decide the matter.

Course Coordinators

Undergraduate Programs

Chemical Engineering - Associate Professor R.H. Wetland
Civil Engineering - Dr W.G. Field
Combined Degree Programs - Dr W.G. Field
Computer Engineering - Associate Professor P.J. Moylan
Computer Science - Dr M. Houle
Electrical Engineering - Dr I. Webster
Environmental Engineering - Dr H.J. Williams
Industrial Engineering - Dr J.W. Haynes
Mechanical Engineering - Mr J.W. Haynes
Surveying - Professor J.G. Fryer

Postgraduate Coursework Programs

BCompSc(Hons) - Dr H. Elglndy
GradDipCompSc - Dr H. Elglndy
GradDipSurv - Professor J.G. Fryer
MCmp - Dr H. Elglndy
MEMSc - Associate Professor A.J. Chambers

Undergraduate Performance and Progress

These policies apply to students enrolled in the Bachelor of Computer Science, Bachelor of Engineering and Bachelor of Surveying programs.

1. General

(1) The following policies are made under the powers vested in the Faculty Board, Faculty of Engineering, by the Rules of the University.

(2) In these Policies, unless the context or subject matter otherwise indicates or requires:

"annual WAM" means the weighted average mark of the results of subjects taken in a particular calendar year.
"course" means the total requirements as prescribed in these Policies and the Regulations, Governing Bachelor Degrees offered in the Faculty of Engineering which, when completed, qualify a candidate for the award of the degree of Bachelor of Computer Science, Bachelor of Engineering or Bachelor of Surveying.
"Course Coordinator" means Head of the designated Department or the Head of Department's nominee;
"Dean" means the Dean of the Faculty of Engineering;
"Degree Regulations" means the Regulations Governing Bachelor Degrees in the Faculty of Engineering;
"Department" means a department of the Faculty of Engineering;
"Faculty Board" means the Faculty Board of the Faculty of Engineering;
"Degree Regulation" means a Sub-dean of the Faculty of Engineering;
"Faculty of Science and Mathematics at a Tenure of Science" means a person enrolled in an undergraduate course offered in the Faculty by Departments of the Faculty (and any department of another faculty willing to take part in this procedure), the result in each subject will be reported as follows:

Result Reported as
Marks in the range of 45% to 100% inclusive - Percentage Mark
Marks less than 45% - FF (Fail)
Other non-passing grades for specific purposes - Grades approved by Senate

A mark of 50% is considered to be the notional pass/fail level of performance, however it is recognised that no matter how careful the assessment, an area of doubt may exist within 5% of that mark. Therefore, while a mark below 45% is a clear fail and a mark of 55% is a clear pass, percentage marks in the range of 45 to 54 are regarded as indicating that a student, whilst not performing clearly at a satisfactory level in the subject concerned, had nevertheless demonstrated sufficient understanding of the subject to proceed, provided other progress requirements are met, without repeating the material contained in that subject (see Policy 5 below).

2. Reservation

Faculty Board reserves its right to consider each case on its merits and to amend its policies without notice as it judges to be proper to maintain appropriate standards of attainment.

3. Assessment

(1) Assessment within each subject offered by the Department may take into account work in assignments, reports, laboratory exercises, tutorials, class tests and formal examinations.

(2) Students will be informed of the method of assessment to be adopted in each subject before the end of the second week of lectures in the subject. This information will include an indication of the type of tasks comprising the assessment and the proportion each task will contribute to the final result in the subject concerned.

It should be noted that the final result in a subject is not necessarily determined simply by the addition of marks awarded for assessment tasks although the weighting of each task and class marking will be maintained except where an application for special consideration is granted.

In the case of students offered to students enrolled in any undergraduate course in the Faculty by Departments of the Faculty (and any department of another faculty willing to take part in this procedure), the result in each subject will be reported as follows:

Result Reported as
Marks in the range of 45% to 100% inclusive - Percentage Mark
Marks less than 45% - FF (Fail)
Other non-passing grades for specific purposes - Grades approved by Senate

A mark of 50% is considered to be the notional pass/fail level of performance, however it is recognised that no matter how careful the assessment, an area of doubt may exist within 5% of that mark. Therefore, while a mark below 45% is a clear fail and a mark of 55% is a clear pass, percentage marks in the range of 45 to 54 are regarded as indicating that a student, whilst not performing clearly at a satisfactory level in the subject concerned, had nevertheless demonstrated sufficient understanding of the subject to proceed, provided other progress requirements are met, without repeating the material contained in that subject (see Policy 5 below).

3. Assessment

(1) Assessment within each subject offered by the Department may take into account work in assignments, reports, laboratory exercises, tutorials, class tests and formal examinations.

(2) Students will be informed of the method of assessment to be adopted in each subject before the end of the second week of lectures in the subject. This information will include an indication of the type of tasks comprising the assessment and the proportion each task will contribute to the final result in the subject concerned.

It should be noted that the final result in a subject is not necessarily determined simply by the addition of marks awarded for assessment tasks although the weighting of each task and class marking will be maintained except where an application for special consideration is granted.

In the case of students offered to students enrolled in any undergraduate course in the Faculty by Departments of the Faculty (and any department of another faculty willing to take part in this procedure), the result in each subject will be reported as follows:

Result Reported as
Marks in the range of 45% to 100% inclusive - Percentage Mark
Marks less than 45% - FF (Fail)
Other non-passing grades for specific purposes - Grades approved by Senate

A mark of 50% is considered to be the notional pass/fail level of performance, however it is recognised that no matter how careful the assessment, an area of doubt may exist within 5% of that mark. Therefore, while a mark below 45% is a clear fail and a mark of 55% is a clear pass, percentage marks in the range of 45 to 54 are regarded as indicating that a student, whilst not performing clearly at a satisfactory level in the subject concerned, had nevertheless demonstrated sufficient understanding of the subject to proceed, provided other progress requirements are met, without repeating the material contained in that subject (see Policy 5 below).

4. Academic Performance

(1) The academic performance of each student enrolled in an undergraduate course offered in the Faculty shall be measured by a cumulative Weighted Average Mark (WAM).

(2) The WAM is calculated from the results of all subjects taken towards the satisfaction of Degree Requirements, except as provided in Policy 4(3) below, in the following manner:

\[ WAM = \frac{\Sigma (m \times v \times w)}{\Sigma w} \]

Where:

m = The Mark as defined in Policy 4(3) below.
v = The credit point value of the subject concerned.
w = The Weighting of the subject concerned as determined under Policy 4(4) below.

(3) The Mark [m] will be calculated as follows:

- Where the result in a subject is given in the range of 45 to 54 inclusive, 'm' is equal to the percentage mark.
- Where the result in a subject is a Failure grade, 'm' is equal to 44.
- Where the result in a subject is a Passing grade (rather than a percentage mark), the Mark [m] will be deemed to be the relevant number listed below:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>HD</td>
<td>93</td>
</tr>
<tr>
<td>D</td>
<td>80</td>
</tr>
<tr>
<td>C</td>
<td>70</td>
</tr>
<tr>
<td>P</td>
<td>58</td>
</tr>
<tr>
<td>UP</td>
<td>58</td>
</tr>
<tr>
<td>TP</td>
<td>49</td>
</tr>
</tbody>
</table>

- Where grades of 'T' are awarded the WAM will not be calculated until a mark or a final grade shall be awarded in that subject.
(4) Each subject shall have a weighting of 1, 2, 3 or 4 as set out below.

<table>
<thead>
<tr>
<th>Level at which the subject is offered</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>1</td>
</tr>
<tr>
<td>200</td>
<td>2</td>
</tr>
<tr>
<td>300</td>
<td>3</td>
</tr>
<tr>
<td>400 and over</td>
<td>4</td>
</tr>
</tbody>
</table>

Note: The level at which a subject is offered is indicated by the first number in the subject code; for example, MECH101 is offered at 100 level and MECH342 is offered at 300 level.

(5) The following will be taken into account when calculating the WAM:

- Subjects taken in satisfaction of course requirements will be considered to satisfy those requirements in the order in which they are taken during the course.
- Subjects taken extraneous to degree requirements will not be included in the calculation of a student’s WAM.
- Students re-admitted to a course after an absence for the previous academic year will retain their previous WAM as the basis of future calculations.
- Students permitted to transfer from one course offered in the Faculty to another shall, provided the credit point value of the credit granted in the new course equals the credit point value of all subjects previously completed in the original course, retain the WAM achieved in the original course as the basis for future WAM calculations in the new course.
- In all other cases, students admitted to a course shall commence calculation of the WAM from the year of their admission or re-admission, whether they be granted credit or not.
- At the conclusion of second semester, each student’s WAM shall be calculated in the schedule of recommended results presented to Faculty Board. Included on each student’s notification of results and placed on the student’s academic record.

(7) Students may elect to repeat any subject in which they were awarded a result in the range of 45 to 54 or a grade of TP, or to enrol in a subject which replaced a subject in that category in the course program of the course in which they are enrolled. In such a case:

- The subject originally taken remains part of the student’s academic record and continues to be included in the calculation of the student’s WAM as before.
- The repeated subject is included in the WAM calculations of the year in which it is taken.
- If the student is awarded a failing grade in the repeated subject, the failure is treated in the same way as if the subject were attempted for the first time and the subject must be repeated.

Note: Students will not normally be permitted to repeat subjects in which they were awarded a final result of 55 or more, or a passing grade.

5. Academic Progression

(1) A student who achieves a WAM of 55 or more is considered to be clearly progressing at a satisfactory level in the course as a whole.

(2) A student who has a WAM of 54 or less at the conclusion of any year is considered to be at probation for the next year of enrolment in the course and in jeopardy of possible exclusion from the Faculty unless performance is improved sufficiently (see “Unsatisfactory Progress” below).

(3) If a student withdraws without penalty from all subjects in which they are enrolled whilst on probation, the term of their probation shall be deemed to be extended to the following year of enrolment.

(4) Except as otherwise approved by the Course Coordinator, a student on probation who wishes to follow a non-standard program shall not be permitted to enrol in an annual program of study of more than 60 credit points of which not more than 40 credit points may be taken in any one subject (also see the General Course Policies and Information above).

6. Unsatisfactory Progress

(1) Students on probation who fail to attain a WAM of 55 or more at the end of their probationary year and also fail to achieve an Annual WAM of 55 or more in that year shall be deemed not to have maintained a rate of progress considered satisfactory to the Faculty Board under Rule 4 of the Rules Governing Unsatisfactory Progress. The progress of such students will be reviewed by the Dean or Sub-Dean on behalf of the Faculty Board.

(2) Students subject to review shall be advised of their rights to make representations either in writing or in person prior to decisions under Rule 4 being taken.

(3) The Dean or Sub-Dean shall determine the time and place at which students may make representations in person.

(4) The Dean or Sub-Dean shall, after considering any representations made by any student subject to review and the recommendation of the Head of the designated Department, determine the action to be taken under Rule 4 of the Rules Governing Unsatisfactory Progress which include:

- Exclusion for a period of at least 1 year;
- Permission to continue enrolment on specified conditions; or
- Permission to continue

(5) A student subject to review who is permitted to continue studies in the Faculty is considered to remain on probation and continues to be subject to the provisions of the Policies of Faculty Board as would a student placed on probation under the provisions of Policy 5.2.

7. Satisfaction of Degree Requirements

(1) Students are considered to have passed the program of subjects approved by Faculty Board in accordance with the relevant schedule of the Regulations Governing Bachelor Degrees Offered in the Faculty of Engineering when they have both:

- attained a result of 45 or more (or a passing grade) in each of the subjects comprising the relevant program of subjects approved by Faculty Board; and
- attained a WAM of 55 or more at the completion of that program.

(2) If a student completes the relevant program of subjects but has not achieved a WAM of 55 or more, the student is not regarded as having passed the program of subjects to the satisfaction of the Faculty Board and is therefore ineligible for the award of the degree.

(3) A student who is ineligible for the award of a bachelor’s degree under the terms of Policy 7.2 may repeat any subject in which they were awarded a result in the range of 45 to 54 (in which case the conditions of Policy 4.7 apply) or enrol in such other subjects not previously attempted as the Dean, on the recommendation of the Head of the designated Department, may approve until such time as he or she attains a WAM of 55 or is excluded under the provisions of section 5 of these policies.

8. Awards of Honours - Engineering and Surveying

(1) Honours grades in the Bachelor of Engineering and Bachelor of Surveying programs will normally be awarded by Faculty Board on the basis of a graduating student’s performance in the course as a whole as measured by the WAM according to the following schedule:

<table>
<thead>
<tr>
<th>Minimum WAM</th>
<th>Honours</th>
</tr>
</thead>
<tbody>
<tr>
<td>77</td>
<td>Class 1</td>
</tr>
<tr>
<td>72</td>
<td>Class II Division 1</td>
</tr>
<tr>
<td>67</td>
<td>Class II Division 2</td>
</tr>
</tbody>
</table>

(2) If a student was awarded credit at the time of his or her admission or re-admission to a course offered within the Faculty, the record of that student upon which the credit was based may be considered by Faculty Board in connection with the determination of the award of honours.

(3) A Head of Department may recommend to Faculty Board that a grade of honours be awarded other than that indicated by the WAM of the student concerned, or that no honours be awarded to a particular student. In such a case Faculty Board may either make an award of honours in accordance with the recommendation of the Head of the Department concerned or in accordance with the schedule contained in Policy 8(1).

(4) Faculty Board will normally recommend BE and BSurv graduands who achieve a WAM in the order of 85 or more for the award of a University Medal.
Other Faculty Policies
Honours in Computer Science

The level of honours to be awarded to candidates completing the requirements of the Bachelor of Computer Science (Honours) degree shall be determined by Faculty Board on the recommendation of the Head of the Department of Computer Science.

Progress Requirements for Combined Degree Candidates

Students admitted to the BE/BMath, BE/BSc, BMath/BCompSc and BSc/BCompSc combined degree programs after 1990 and the BE/BCompSc program after 1991, shall be required to maintain a WAM of at least 65 or otherwise show cause as to why the Faculty Board should not refer their case to the Admissions and Progress Committee under the Rules Governing Unsatisfactory Progress with a recommendation that they be excluded from continued enrolment in the combined degree program for a specified period.

Missing an Examination

Failure to attend a formal written examination is a very serious matter. Students are expected to attend examinations unless prevented from doing so by circumstances beyond their control - in which case an application for Special Consideration should be lodged at the Faculty Office within the required time period (see below).

Special Consideration

It is recognised that during the course of their studies, students may suffer from illness or other serious circumstances beyond their control which affect their preparation for or performance at an examination. University Rules provide for students who believe that their performance in a subject has been adversely affected by such circumstances to apply for Special Consideration (also refer to the General University Information section of this Handbook).

Applications for Special Consideration MUST be made on the prescribed form and should be lodged at the Faculty Office. Forms are available from the Faculty Office - Room EA206 (telephone 049 51 6005).

As decisions can only be made on the basis of the information presented by the student, all available evidence should accompany each application. The medical certificate given on the prescribed form must be completed where an application is made on medical grounds unless a more extensive medical report is presented which includes the information required on the form. Where a request for Special Consideration is made on the grounds of misadventure, all available supporting evidence should be attached to the application. In some cases, particularly where no written evidence is available, the submission of a statutory declaration will be appropriate. Statutory declaration forms are available from most newsagents or the Faculty Office.

Applications for Special Consideration should be made as soon as possible after the occurrence of the circumstances leading to the request but not more than 3 days after the final examination in a subject. When considering requests for Special Consideration, it is the intention of the Faculty to take account of circumstances which adversely affect performance such that the performance of the student concerned does not reflect his or her true competence in a subject. In doing so, the Faculty will be conscious that any Special Consideration given should not disadvantage other students.

Enquiries regarding Special Consideration may be directed to the Faculty Office.

Further Assessment

A department may grant further assessment where: it considers it appropriate to do so after considering a request for Special Consideration or to resolve any doubt as to the appropriate result in a subject. Further assessment will normally occur shortly after the final examination in the subject concerned:

• in the case of first semester subjects, before the end of the fifth week of the mid-year recess;
• in the case of full-year and second semester subjects, before the end of the first week in December.

Students who have requested Special Consideration which may lead to further assessment should ensure that they are available to attend any further assessment required during these periods. If unable to do so because of serious circumstances beyond their control, they should advise the relevant Head of Department as soon as possible.

In view of the provision for further assessment by departments, the Faculty Board does not normally award results of Incomplete (I). However, it may do so if it deems it appropriate to allow a further short period for further assessment. A student in receipt of a result of Incomplete should immediately contact the Head of the Department offering the subject concerned to arrange a time to undertake further assessment. All further assessment for full-year or second semester subjects should be completed by the second week of January.

Failure by a Potential Graduate

Where a student fails a single subject other than the final year project and is thereby prevented from qualifying to graduate, the Faculty Board may award a result of Incomplete (I) in that subject. Such a decision will not be taken until the results of all other subjects required to meet degree requirements are known. Thus a failure in a single first semester subject will be recorded as an FF unless the student has been enrolled in a program which was potentially sufficient to complete degree requirements in first semester. A result of FF given in a first semester subject may be reviewed at the conclusion of second semester in the light of results obtained in the other subjects in that year and may be amended to T if it is then the only subject required to meet degree requirements. All such further assessments should be completed by the second week of January.

Review of Results

Students may apply through the University Examinations Office for a review of final results in subjects (see the General Information section of this Handbook for details of the procedure and the fee involved). All requests for review must be made by the date specified by the Department concerned (see Special Consideration policy above). As students are expected to anticipate some delay or difficulties during the course of their project, Special Consideration will not normally be granted for circumstances involving less than 4 weeks loss of working time for the student. In such cases, it is expected that final result recommendations will be submitted by departments before the end of the second week in January for consideration at the next meeting of the Faculty Board.

Submissions presented by the due date but not up to final presentation standard, which require an acceptably small amount of additional work, may be granted a result of Incomplete (I). Final submission of the report will then be required on a date (to be specified by the Department concerned) before the second week of January. The project will then not be awarded a result higher than 64.
Students enrolled for the final year of any combined course will be classified as Year 5.

**INDUSTRIAL EXPERIENCE - ENGINEERING**

**General**

Students enrolled in Bachelor of Engineering programs are required to complete a total of at least 12 weeks of practical work of a nature acceptable to the Faculty Board. This practical experience may be either gained during vacation employment or as part of an Industrial Experience elective. The University can accept no responsibility for finding employment for students wishing to enrol for Industrial Experience subjects or in fields of employment in order to satisfy Industrial Experience requirements. Students experiencing difficulty in obtaining suitable employment should contact the University's Careers and Student Employment Office.

**Full-Time Students**

Full-time students will normally gain their practical experience during vacation employment. Students should obtain a statement from their employer certifying the nature and period of the employment undertaken and retain the statement so as to be in a position to provide it when called upon to do so.

**Part-Time and Sandwich Pattern Students**

Students enrolled in the degree of Bachelor of Engineering on a part-time basis may choose to take Industrial Experience elective subjects as provided in the relevant course program. To be eligible for enrolment in an Industrial Experience subject, the student must be in approved employment on or after November preceding the year in which the subject is to be taken. This approved employment must continue for one calendar year, that is, until the 31 October of the year in which the subject is taken. Students enrolled in Industrial Experience subjects must attend such lectures and seminars and submit such reports, as the relevant Head of Department may require. Normally enrolment in an Industrial Experience subject will not be allowed in the first year of enrolment. Students attending on a 'thick sandwich' pattern should consult with the Course Coordinator before enrolling in an Industrial Experience subject. The successful completion of one Industrial Experience subject satisfies the requirement that students complete 12 weeks practical experience.

**Credit for Previous Studies**

Students entering courses who believe they may be eligible for credit on the basis of previous tertiary study should consult the Faculty Secretary. Evidence in the form of original academic transcripts and handbook descriptions of the content of the subjects studied should be provided.

**Credit for TAFE Associate Diplomas**

Faculty Board has approved the granting of credit to students enrolling in courses who hold certain TAFE Associate Diplomas (and TAFE Certificates obtained before the introduction of Associate Diploma programs). The credit to be granted will vary according to the TAFE qualification obtained, the course program in which the candidate is enrolled and the requirements of that program. Further information may be obtained from the Faculty Secretary.

**Leave of Absence**

The formal requirements regarding leave of absence are included in the relevant schedules to the Award Rules. The provisions are summarised below. Enquiries regarding Leave of Absence in undergraduate courses and graduate coursework programs should be directed to the Faculty Office. Enquiries regarding leave from research degrees should be directed to the Postgraduate Studies Office.

**Leave from Bachelor Degree Courses**

Students enrolled in bachelor degree programs are entitled to take leave of absence for one academic year provided they successfully completed at least one subject in the previous academic year and are entitled to re-enroll (ie. not excluded) in the year in which they take leave. Leave may not be taken in two consecutive years. This provision thus allows students to follow a 'thick sandwich' attendance pattern alternating years in industry and full-time study while maintaining their right to return to the course. As the requirements are specified in the Award Rules there is no need to apply for leave of absence.

It is important to note that students taking leave MUST re-apply to return to the course through UAC including a preference for the course from which leave was taken. If the student qualified for leave of absence and the course is the highest available preference, an offer will be made to return to the course via normal UAC procedures. UAC application materials are available from the Faculty Office in late August and should be lodged at UAC before the end of September.

Students holding scholarships should ensure that they consult the Scholarships Office regarding the effect leave may have on scholarship entitlements before taking leave of absence.

**Leave from Graduate Coursework Programs**

The Schedules of the Award Rules provide that no leave of absence may be taken. However, in practice students who must discontinue their studies may later be re-admitted to the course provided they can meet any time requirements on completion. Students discontinuing studies but intending to apply for readmission at a later date should consult the Faculty Office prior to discontinuing studies.

**Leave from Research Degrees**

Students enrolled in research degree programs should consult the Postgraduate Studies Office regarding any intention to apply for leave of absence.
Course Programs

Bachelor Degree Course Programs

Part-time Attendance
All or part of each Course Program may be completed by part-time attendance. Part-time students who normally take two years for each equivalent full-time year. Although a 6 year pattern of attendance, of which the last year is full-time, is possible in the Chemical Engineering program.

The first two part-time stages of all courses are timetabled to permit a single day work release attendance pattern with some evening lectures. In the latter years of each course, attendance will be required at various times during the day depending upon the subjects in which the student is enrolled and the requirements of the timetable. Full-time study is recommended after Stage 2.

While each student enrolled in less than 60 credit points is regarded as a part-time student, there is no minimum number of subjects in which part-time students must enrol in each year. Part-time students may also choose to enrol in Industrial Experience subjects and count these units as Elective units as permitted by the Elective Requirements of the relevant course.

Sandwich Programs
Each course may be undertaken on a 'sandwich' attendance pattern in which full-time attendance at University is alternated with full-time employment on an annual basis. This allows work to be undertaken in 15 month periods between Years I and II, Years II and III and Years III and IV. Such a pattern would require a minimum of 7 years to complete degree requirements.

The number of years of work experience undertaken may vary according to the needs of the student. At this attendance pattern, the student does not require attendance at University.

While gaining work experience, employment may be undertaken in areas remote from the University thereby adding to the diversity of the experience which may be gained and increasing the opportunities to obtain work experience employment.

Students following this pattern should contact the Faculty Office in August of each year of full-time employment for information on the appropriate procedure to apply for re-enrolment in their course the following year.

Traineeship Pattern
Traineeships may continue to be offered on the part-time only attendance pattern, however the Computing program is recommended as the most suitable method of combining academic course requirements with work experience.

Year 1 Stage 1 Part-time attendance at University plus vacation work
Year 2 Stage 2 Part-time attendance at University plus vacation work
Year 3 Year II Full-time attendance at University plus vacation work
Year 4 Year III Full-time attendance at University
Year 5 - Full-time work experience - 15 months (approx.)
Year 6 Year IV Full-time attendance at University - completion of studies.

A further 15 month period of work experience could be included between Years II and III resulting in a 7 year minimum program.

This attendance pattern allows both the employer and employee a period of assessment in Stages 1 and 2. After completing first year studies, trainees are in a position to give their full attention to their academic studies in Years II, III and IV of their course and to gain valuable practical experience during the 15 month period(s) of work experience.

The length of the major work experience period(s) makes it possible for the trainee to experience a full annual cycle of the operation of his or her employer's organisation and to give full attention to participating in the work of that organisation. The length of the major period(s) of work experience also enables trainees to gain practical experience in locations outside Newcastle.

Finding Employment
While the Careers and Student Employment Office of the University will assist students to find employment to complement their chosen attendance pattern, the University cannot accept any responsibility for finding appropriate positions for students.

section five

Bachelor Degree Course Programs
<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Course Code</th>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEEI13</td>
<td>Chemistry and Manufacturing Processes</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>CHEM101</td>
<td>Chemistry 101</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>MATH111</td>
<td>Mathematics 111 *</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>PHYS111</td>
<td>Physics 111 *</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Semester 2</td>
<td>CHEEI12</td>
<td>Introduction to Chemical Engineering</td>
<td>10</td>
</tr>
<tr>
<td>CHEM102</td>
<td>Chemistry 102</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>MATH112</td>
<td>Mathematics 112 *</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>MECH102</td>
<td>Introduction to Engineering Computing</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

* Approved Options
1. MATH102 and MATH103 may replace MATH111 and MATH112
2. PHYS113 may replace PHYS111.

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Course Code</th>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEEI12</td>
<td>Introduction to Chemical Engineering</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>CHEE491</td>
<td>Seminar</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>CHEE495</td>
<td>Design Project</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>CHEE497</td>
<td>Research Project</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>General Electives</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEE191</td>
<td>Industrial Experience *</td>
</tr>
<tr>
<td>CHEE192</td>
<td>Industrial Experience *</td>
</tr>
<tr>
<td>CHEE193</td>
<td>Industrial Experience *</td>
</tr>
<tr>
<td>CHEE194</td>
<td>Industrial Experience *</td>
</tr>
<tr>
<td>CHEE451</td>
<td>Surface Chemistry 2</td>
</tr>
<tr>
<td>CHEE452</td>
<td>Mineral Processing 2</td>
</tr>
<tr>
<td>CHEE453</td>
<td>Process Optimization</td>
</tr>
<tr>
<td>CHEE454</td>
<td>Fuel Technology 2</td>
</tr>
<tr>
<td>CHEE455</td>
<td>Heat Transfer</td>
</tr>
<tr>
<td>CHEE456</td>
<td>Process Metallurgy 2</td>
</tr>
<tr>
<td>CHEE461</td>
<td>Environmental Process Technology</td>
</tr>
<tr>
<td>CHEE462</td>
<td>Principles of Wastewater Treatment</td>
</tr>
<tr>
<td>CHEE466</td>
<td>Advanced Design Project</td>
</tr>
<tr>
<td>CHEE489</td>
<td>Advanced Research Project</td>
</tr>
<tr>
<td>CHEE490</td>
<td>Air Pollution Management</td>
</tr>
<tr>
<td>CHEE501</td>
<td>Technology and Human Values</td>
</tr>
<tr>
<td>CHEE502</td>
<td>Environmental Impact Assessment Techniques</td>
</tr>
<tr>
<td>CHEE503</td>
<td>Engineering Statistics</td>
</tr>
</tbody>
</table>

* Approved Options
1. MATH102 and MATH103 may replace MATH111 and MATH112
2. PHYS113 may replace PHYS111.

In the latter years of the course, attendance will be required at various times during the day depending upon the subjects in which the candidate study.

Technical Electives
Technical Elective subjects must be selected from the list below. Not all Technical Elective subjects will be offered in any one year. The subjects to be offered will be displayed on the Department Notice Board by September of the previous year.

Technical Elective Subjects

<table>
<thead>
<tr>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEE351</td>
</tr>
<tr>
<td>CHEE352</td>
</tr>
<tr>
<td>CHEE353</td>
</tr>
<tr>
<td>CHEE354</td>
</tr>
<tr>
<td>CHEE357</td>
</tr>
<tr>
<td>CHEE358</td>
</tr>
<tr>
<td>CHEE365</td>
</tr>
<tr>
<td>CHEE366</td>
</tr>
</tbody>
</table>

Part-time Attendance
All candidates for the degree must complete the requirements of the Course Program given above. All or part of this program may be completed by part-time attendance. As far as resources allow, the first two stages of the course are timetabled to permit a single-day work release attendance pattern with some evening lectures. These stages are:

**STAGE 1**

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Course Code</th>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEEI13</td>
<td>Chemical and Manufacturing Processes</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>CHEM101</td>
<td>Chemistry 101</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Semester 2</td>
<td>CHEE112</td>
<td>Introduction to Chemical Engineering</td>
<td>10</td>
</tr>
<tr>
<td>CHEM102</td>
<td>Chemistry 102</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>MATH112</td>
<td>Mathematics 112 *</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>MECH102</td>
<td>Introduction to Engineering Computing</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

**STAGE 2**

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Course Code</th>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH111</td>
<td>Mathematics 111 *</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>PHYS111</td>
<td>Physics 111 *</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Semester 2</td>
<td>CHEE112</td>
<td>Introduction to Chemical Engineering</td>
<td>10</td>
</tr>
<tr>
<td>MATH112</td>
<td>Mathematics 112 *</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Both Semesters</td>
<td>CHEE191</td>
<td>Industrial Experience</td>
<td>5</td>
</tr>
</tbody>
</table>

* Approved Options
1. MATH102 and MATH103 may replace MATH111 and MATH112.
2. PHYS113 may replace PHYS111.

In the latter years of the course, attendance will be required at various times during the day depending upon the subjects in which the candidate study.

Technical Electives
Technical Elective subjects must be selected from the list below. Not all Technical Elective subjects will be offered in any one year. The subjects to be offered will be displayed on the Department Notice Board by September of the previous year.

Technical Elective Subjects

<table>
<thead>
<tr>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEE351</td>
</tr>
<tr>
<td>CHEE352</td>
</tr>
<tr>
<td>CHEE353</td>
</tr>
<tr>
<td>CHEE354</td>
</tr>
<tr>
<td>CHEE357</td>
</tr>
<tr>
<td>CHEE358</td>
</tr>
<tr>
<td>CHEE365</td>
</tr>
<tr>
<td>CHEE366</td>
</tr>
</tbody>
</table>

Part-time Attendance
All candidates for the degree must complete the requirements of the Course Program given above. All or part of this program may be completed by part-time attendance. As far as resources allow, the first two stages of the course are timetabled to permit a single-day work release attendance pattern with some evening lectures. These stages are:

**STAGE 1**

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Course Code</th>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEEI13</td>
<td>Chemical and Manufacturing Processes</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>CHEM101</td>
<td>Chemistry 101</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Semester 2</td>
<td>CHEE112</td>
<td>Introduction to Chemical Engineering</td>
<td>10</td>
</tr>
<tr>
<td>CHEM102</td>
<td>Chemistry 102</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>MATH112</td>
<td>Mathematics 112 *</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>MECH102</td>
<td>Introduction to Engineering Computing</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

**STAGE 2**

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Course Code</th>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH111</td>
<td>Mathematics 111 *</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>PHYS111</td>
<td>Physics 111 *</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Semester 2</td>
<td>CHEE112</td>
<td>Introduction to Chemical Engineering</td>
<td>10</td>
</tr>
<tr>
<td>MATH112</td>
<td>Mathematics 112 *</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Both Semesters</td>
<td>CHEE191</td>
<td>Industrial Experience</td>
<td>5</td>
</tr>
</tbody>
</table>

* Approved Options
1. MATH102 and MATH103 may replace MATH111 and MATH112.
2. PHYS113 may replace PHYS111.

In the latter years of the course, attendance will be required at various times during the day depending upon the subjects in which the candidate study.

Technical Electives
Technical Elective subjects must be selected from the list below. Not all Technical Elective subjects will be offered in any one year. The subjects to be offered will be displayed on the Department Notice Board by September of the previous year.

Technical Elective Subjects

<table>
<thead>
<tr>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEE351</td>
</tr>
<tr>
<td>CHEE352</td>
</tr>
<tr>
<td>CHEE353</td>
</tr>
<tr>
<td>CHEE354</td>
</tr>
<tr>
<td>CHEE357</td>
</tr>
<tr>
<td>CHEE358</td>
</tr>
<tr>
<td>CHEE365</td>
</tr>
<tr>
<td>CHEE366</td>
</tr>
</tbody>
</table>
Transition Arrangements

The Course Program has been amended with effect from the commencement of the 1994 academic year. All students enrolled to meet the requirements of the new Course Program apply. The following equivalence between previously completed subjects and new subjects will determine the transition pattern to be followed. In exceptional circumstances the Dean may allow completion of the Combined degree programs are available which Chemical Engineering together with the requirements of 5 years. Combined degree programs, each require a minimum of 80 credit points. Also note that the choice of optional subjects.

Combined Degree Programs

Combined degree programs are available which allow completion of the requirements for the Bachelor of Engineering (BE) degree in the specialisation of Chemical Engineering together with the requirements for a degree of Bachelor of Mathematics (BMath) and Bachelor of Science (BSc) (Chemistry Major). The subjects undertaken in the first year of study of each program are identical to those required in the Chemical Engineering program except that the inclusion of MATH102 and MATH103 is required. Combined degree programs each require a minimum of 5 years full-time study. Note that students undertaking a combined degree program are attempting two distinct programs concurrently and therefore the annual enrolment required by such a program may exceed the normal annual load of 80 credit points. Also note that HECS will be calculated on the basis of the proportion which each individual subject counts in the program of the separate degree of which it forms part and not on the proportion it contributes to any combined degree program. Timetabling constraints may limit the choice of optional subjects.

Direct entry to combined programs may be gained via UAC by applicants who achieve high marks in the NSW HSC (or equivalent). Students may also enter combined degree programs at the conclusion of Year 1 if they have achieved a WAM of 70. Application should be made in conjunction with submission of the re-enrolment application. The Faculty Office may be consulted regarding application forms and course requirements.

Subject by Subject Transition

For the purposes of transition to the new Course Program, the following equivalence between previously completed subjects and new subjects will apply.

Previous subject                  New Subject
PHYS101                          PHYS111
PHYS102                          PHYS112
CHEE263                          CHEE266 and CHEE268
CHEE264                          CHEE265 and CHEE267
MECH1102                         MECH1102

In exceptional circumstances the Dean may determine the transition pattern to be followed.

Civil Engineering

Degree Bachelor of Engineering (BE) awarded in the specialisation of Civil Engineering

Designated Department Department of Civil Engineering and Surveying
Course Coordinator Dr W. G. Field
Course Code 10100

COURSE PROGRAM

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section I</td>
<td></td>
</tr>
<tr>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>CIVL111 Mechanics and Structures</td>
<td>5</td>
</tr>
<tr>
<td>MATH111 Mathematics 111 *</td>
<td>10</td>
</tr>
<tr>
<td>MECH121 Materials 1</td>
<td>5</td>
</tr>
<tr>
<td>PHYS111 Physics 111 *</td>
<td>10</td>
</tr>
<tr>
<td>SURV11 Surveying 1</td>
<td>10</td>
</tr>
<tr>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>CIVL113 Fluid Mechanics 1</td>
<td>5</td>
</tr>
<tr>
<td>CIVL141 Environmental Engineering 1</td>
<td>5</td>
</tr>
<tr>
<td>MATH112 Mathematics 112 *</td>
<td>10</td>
</tr>
<tr>
<td>MECH102 Introduction to Engineering Computing</td>
<td>5</td>
</tr>
<tr>
<td>MECH111 Engineering Drawing</td>
<td>5</td>
</tr>
<tr>
<td>SURV112 Surveying 2</td>
<td>10</td>
</tr>
<tr>
<td>Both Semesters</td>
<td></td>
</tr>
</tbody>
</table>

General Courses Policies

The attention of students is drawn to the General Course Policies of the Faculty published in the Faculty Policy Section of this Handbook. These policies are particularly important for students intending to enrol in a non-standard program.

Elective Requirements

General elective subjects may be chosen from any subjects which may normally be counted towards the award of the degrees of BA, BCom, BCompSc, BE, BEd, BMath or BSc provided that prerequisites are met for written permission is obtained from the Head of the Department offering the subject. In exceptional circumstances the Dean, on the recommendation of the relevant Heads of the Department, may approve selection of other elective subjects.

Students will be advised in September of the preceding year which CIVL400 level elective subjects will be available.
Recommended Elective Subjects

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVL191 Industrial Experience</td>
<td>5</td>
</tr>
<tr>
<td>CIVL192 Industrial Experience</td>
<td>5</td>
</tr>
<tr>
<td>CIVL193 Industrial Experience</td>
<td>5</td>
</tr>
<tr>
<td>CIVL194 Industrial Experience</td>
<td>5</td>
</tr>
<tr>
<td>CIVL343 Environmental Modelling</td>
<td>5</td>
</tr>
<tr>
<td>CIVL344 Environmental Modelling</td>
<td>5</td>
</tr>
<tr>
<td>CIVL345 Environmental Modelling</td>
<td>5</td>
</tr>
<tr>
<td>CIVL346 Environmental Modelling</td>
<td>5</td>
</tr>
<tr>
<td>CIVL419 Masonry and Timber Design</td>
<td>5</td>
</tr>
<tr>
<td>CIVL429 Rock Mechanics</td>
<td>5</td>
</tr>
<tr>
<td>CIVL435 River and Coastal Engineering</td>
<td>5</td>
</tr>
<tr>
<td>CIVL472 Highway Engineering</td>
<td>5</td>
</tr>
<tr>
<td>CIVL491 Special Topic</td>
<td>5</td>
</tr>
<tr>
<td>CIVL492 Special Topic</td>
<td>5</td>
</tr>
<tr>
<td>ECON351 Principles of Economics</td>
<td>10</td>
</tr>
<tr>
<td>MATH202 Partial Differential Equations</td>
<td>5</td>
</tr>
<tr>
<td>SURV213 Surveying 3</td>
<td>10</td>
</tr>
<tr>
<td>SURV214 Optics and Surveying</td>
<td>5</td>
</tr>
<tr>
<td>SURV215 Electronic Distance Measurement</td>
<td>5</td>
</tr>
<tr>
<td>SURV361 Photogrammetry 1</td>
<td>10</td>
</tr>
<tr>
<td>SURV473 Town Planning</td>
<td>10</td>
</tr>
</tbody>
</table>

STAGE 1

<table>
<thead>
<tr>
<th>Semester</th>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CIVL111 Mathematics 111 *</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>PHYS111 Surveying 1</td>
<td>5</td>
</tr>
</tbody>
</table>

STAGE 2

<table>
<thead>
<tr>
<th>Semester</th>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CIVL111 Mechanics and Structures</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>PHYS111 Physics 111 *</td>
<td>5</td>
</tr>
</tbody>
</table>

Combined Degree Programs

A program which allows completion of the requirements of the BE (Civil Engineering) and BSurv is also available. The subjects undertaken in the first year of each program are identical to those required in the Civil Engineering program. The BE/BSurv degree program requires a minimum of 5 years full-time study. Admission to the program will be granted after satisfactory completion of Year 1 of either program (that is a WAM of 55 or more).

Note that students undertaking a combined degree program are attempting two distinct programs concurrently and therefore the annual enrolment required by such a program may exceed the normal annual load of 80 credit points. Also note that HECS loan may be calculated on the basis of the proportion of the individual subject counts in the program depending upon the subjects in which the candidate is enrolled and the requirements of the time spent in full-time study is recommended after Stage 1.

Students considering part-time study are advised to consult the Guide to Attendance Patterns at the beginning of this Section of the Handbook.

Transition Arrangements

The Course Program has been amended from the commencement of the 1994 academic year. All students enrolled in this course or any combined degree program of which it forms part, are required to meet the requirements of the new Course Program.

Combined Degree Programs

A student degree programs may also be available after completion of the requirements for the BE (Civil Engineering) degree in the Department of Civil Engineering together with the subjects for another degree, for example Bachelor of Mathematics (BMath) and Bachelor of Science (BSc). The development of an individual degree program is not required. Students should apply to enter combined degree programs at the conclusion of Year 1. These combined degree programs require a WAM of 70 for entry.

Note: The development of an individual degree program is not required. Students should apply to enter combined degree programs at the conclusion of Year 1. These combined degree programs require a WAM of 70 for entry.
Computer Engineering

Degree: Bachelor of Engineering (BE) awarded in the specialisation of Computer Engineering

Designated Department: Department of Electrical and Computer Engineering

Course Coordinator Associate Professor P.J. Moyal

Course Code 10475

COURSE PROGRAM

YEAR I

Semester 1
- ELEC101 Introduction to Electrical and Computer Engineering 5
- MATH102 Mathematics 102 * 10
- MECH111 Materials 1 5
- PHYS113 Physics 113 10

Semester 2
- CIVIL111 Mechanics and Structures 5
- MATH103 Mathematics 103 * 10
- MATH111 Engineering Drawing 5
- PHYS114 Physics 114 10

* Approved Option

MATH111 and MATH112 may be taken in lieu of
MATH102 and MATH103

See note on Year 1 Mathematics Options below

YEAR II

Semester 1
- COMP111 Introduction to Computer Science 10
- MATH201 Multivariable Calculus 5
- MATH206 Complex Analysis 5
- MATH218 Linear Algebra 2 ** 5
- PHYS201 Quantum Mechanics and Electromagnetics 10

Semester 2
- COMP112 Discrete Structures 10
- ELEC220 Electronics I 10
- ELEC231 Electrical Circuits 10
- MATH203 Ordinary Differential Equations I 5

* Approved Option

MATH217 may be taken in lieu of MATH218

YEAR III

Semester 1
- COMP223 Analysis of Algorithms 5
- ELEC241 Digital Signal Processing 5

Semester 2
- MATH215 Operations Research or
- MATH218 Numerical Analysis 5
- ELEC322 Switching Electronics 5
- ELEC351 Telecommunications 5

YEAR IV

Semester 1 / Semester 2
- Computer Engineering Electives 400 level***
- Computer Engineering Electives 300 or 400 level***
- General Electives ***

* Approved Option

MATH111 and MATH112 may be taken in lieu of
MATH102 and MATH103

See note on Year 1 Mathematics Options below

Recommended General Electives are listed below.

Subjects
- ELEC102 Industrial Experience ** 5
- ELEC103 Industrial Experience ** 5
- ELEC194 Industrial Experience ** 5
- ELEC195 Industrial Experience ** 5
- MATH202 Partial Differential Equations 5
- MATH205 Analysis - Metric Spaces 5
- MATH211 Group Theory 5
- MATH213 Mathematical Modelling 5
- MATH214 Mechanics 5
- MATH215 Operations Research 5
- MATH216 Numerical Analysis 5
- MATH1398 Engineering Administration * 5
- MATH1462 Engineering Economics * 5
- PHIL101 Introduction to Philosophy 20
- PHIL301 Technology and Human Values 10

General Course Policies

The attention of students is drawn to the General Course Policies of the Faculty published in the Faculty Policy Section of this Handbook. The policies are particularly important for students intending to enrol in a non-standard program.

YEAR I Mathematics Option

MATH102 assumes attainment of a mark of at least 120/150 in 3 unit Mathematics at the NSW HSC examination. It is also recommended that students take MATH103. It is expected that students wishing to prepare for an honours degree and/or for entry to any combined degree program will take MATH102 and/or MATH103.

YEAR II Mathematics Option

MATH103 assumes attainment of a mark of at least 120/150 in 3 unit Mathematics at the NSW HSC examination. It is recommended that students take MATH102 and MATH103. Those students who successfully complete MATH102 and MATH103 in Year II, and undertake MATH218 in Year II.

Subjects
- ELEC420 VLSI Design 10
- MATH103 Mathematics 103 * 10
- MATH112 Computer Networks 10
- MATH129 Compiler Design 10
- MATH330 Graphic User Interfaces 10
- MATH331 Geometric Data Structures 10
- MATH332 Computer Graphics 10
- MATH344 Parallel Processing 10
- MATH351 Incremental Control Design 10
- MATH352 Automatic Control 10
- MATH353 Digital Signal Processing 5
- MATH355 Advanced Communications 5
- MATH370 Advanced Computer Architectures 10
- MATH390 Computer Software 10
- MATH391 Software Engineering 20
- MATH392 Computer Vision and Robotics 10
- MATH393 Computational Logic 10
- MATH394 Parallel Processing 10
- MATH395 Database Systems 10
- MATH396 Data Security 10
- MATH397 Operating Systems 10
- MATH398 Computer Networks 10
- MATH399 Compiler Design 10
- MATH430 Graphic User Interfaces 10
- MATH431 Geometric Data Structures 10
- MATH432 Computer Graphics 10
- MATH444 Parallel Processing 10
- MATH451 Incremental Control Design 10
- MATH452 Automatic Control 10
- MATH453 Digital Signal Processing 5
- MATH455 Advanced Communications 5
- MATH470 Advanced Computer Architectures 10
- MATH490 Computer Software 10
- MATH491 Software Engineering 20
- MATH492 Computer Vision and Robotics 10
- MATH493 Computational Logic 10
- MATH494 Parallel Processing 10
- MATH495 Database Systems 10
- MATH496 Data Security 10
- MATH497 Operating Systems 10
- MATH498 Computer Networks 10
- MATH499 Compiler Design 10
- MATH530 Graphic User Interfaces 10
- MATH531 Geometric Data Structures 10
- MATH532 Computer Graphics 10
- MATH544 Parallel Processing 10
- MATH551 Incremental Control Design 10
- MATH552 Automatic Control 10
- MATH553 Digital Signal Processing 5
- MATH555 Advanced Communications 5
- MATH570 Advanced Computer Architectures 10
- MATH590 Computer Software 10
- MATH591 Software Engineering 20
- MATH592 Computer Vision and Robotics 10
- MATH593 Computational Logic 10
- MATH594 Parallel Processing 10
- MATH595 Database Systems 10
- MATH596 Data Security 10
- MATH597 Operating Systems 10
- MATH598 Computer Networks 10
- MATH599 Compiler Design 10
- MATH630 Graphic User Interfaces 10
- MATH631 Geometric Data Structures 10
- MATH632 Computer Graphics 10
- MATH644 Parallel Processing 10
- MATH651 Incremental Control Design 10
- MATH652 Automatic Control 10
- MATH653 Digital Signal Processing 5
- MATH655 Advanced Communications 5
- MATH670 Advanced Computer Architectures 10
- MATH690 Computer Software 10
- MATH691 Software Engineering 20
- MATH692 Computer Vision and Robotics 10
- MATH693 Computational Logic 10
- MATH694 Parallel Processing 10
- MATH695 Database Systems 10
- MATH696 Data Security 10
- MATH697 Operating Systems 10
- MATH698 Computer Networks 10
- MATH699 Compiler Design 10

Elective Requirements

Credits: 30

Elective requirements must include at least 10cp of 400 level subjects. Not all Computer Engineering Electives may be offered in any one year. Students will be advised in September of the preceding year which 400 level elective subjects will be available.

Prerequisite and Corequisite Requirements

The prerequisite and corequisite requirements of individual subjects are listed in the schedule presented in Section 9 of this Handbook. Enrolment in a subject contrary to the provisions of this schedule will not be approved without the written permission of the Head of the Department offering the subject concerned.

Part-time Attendance

All candidates for the degree must complete the requirements of the Course Program given above. All or part of this program may be completed by part-time attendance. Part-time students will normally take two years for each equivalent full-time year. As far as resources allow, the first two stages of the course are timetabled to permit a single-day work release attendance pattern with some evening lectures. These stages are:

STAGE 1

Semester 1
- MATH112 Mathematics 102 * 10
- MATH113 Mathematics 103 * 10

Semester 2
- MATH113 Mathematics 103 * 10

Stages 3 and 4:
- ELEC190 Electrical Engineering I 10
- ELEC191 Electrical Engineering II 10
- COMP192 Computer Science 10
**Approved Option**

See note on Year I Mathematics Option above.

**STAGE 2**

Semester 1

- ELEC101 Introduction to Electrical and Computer Engineering 
- MECH111 Engineering Drawing 
- PHYS113 Physics 113 

Semester 2

- CIVL111 Mechanics and Structures 
- MECH121 Materials I 
- PHYS114 Physics 114 

After completion of the above program attendance will be required at various times during the day depending upon the subjects in which the candidate is enrolled and the requirements of the timetable.

Full-time study is recommended after Stage 2. Students considering part-time study are advised to consult the Guide to Attendance Patterns at the beginning of this Section of the Handbook.

**Transition Arrangements**

The Course Program has been amended with effect from the commencement of the 1994 academic year. All students enrolled in this course or any combined degree program of which it forms part, are required to meet the requirements of the new Course Program.

**Subject by Subject Transition**

Students who complete all subjects in which they were enrolled on 30 August 1993 without failure should re-enrol in accordance with the transition statement issued to them. Students who do not successfully complete all said subjects must clarify their position in the new Course Program before finalising their re-enrolment for 1994.

For the purposes of transition to the new Course Program, the following equivalences between previously completed subjects and new subjects will apply:

<table>
<thead>
<tr>
<th>Previous Subject</th>
<th>New Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS102</td>
<td>PHYS113</td>
</tr>
<tr>
<td>PHYS103</td>
<td>PHYS114</td>
</tr>
<tr>
<td>COMP101</td>
<td>COMP111 and COMP112</td>
</tr>
<tr>
<td>MATH121</td>
<td>5cp general elective</td>
</tr>
<tr>
<td>COMP201 and 5cp</td>
<td>COMP223</td>
</tr>
<tr>
<td>200** level COMP</td>
<td>5cp general elective</td>
</tr>
<tr>
<td>COMP205**</td>
<td>5cp general elective</td>
</tr>
</tbody>
</table>

**Direct Entry to Combined Programs**

Direct entry to combined programs may be gained via UAC by applicants who achieve high marks in the NSW HSC (or equivalent). Students may also enter combined degree programs at the conclusion of Year 1 if they have achieved a WAM of 70. Application should be made in conjunction with submission of the re-enrolment application. The Faculty Office may be consulted regarding application forms and course requirements.
## Section Five
### Bachelor Degree Course Programs

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP111</td>
<td>Introduction to Computer Science</td>
</tr>
<tr>
<td>MATH111</td>
<td>Mathematics 111</td>
</tr>
<tr>
<td>COMP112</td>
<td>Discrete Structures</td>
</tr>
<tr>
<td>MATH112</td>
<td>Mathematics 112</td>
</tr>
<tr>
<td>COMP113</td>
<td>Introduction to Artificial Intelligence</td>
</tr>
<tr>
<td>ELEC170</td>
<td>Computer Engineering 1</td>
</tr>
<tr>
<td>INFO101</td>
<td>Introduction to Information Systems</td>
</tr>
<tr>
<td>INFO102</td>
<td>Information Storage and Management*</td>
</tr>
<tr>
<td>PHIL101</td>
<td>Introduction to Philosophy</td>
</tr>
<tr>
<td>PSY101</td>
<td>Psychology Introduction 1*</td>
</tr>
<tr>
<td>PSY102</td>
<td>Psychology Introduction 2*</td>
</tr>
<tr>
<td>STAT101</td>
<td>Introductory Statistics</td>
</tr>
<tr>
<td>INFO201</td>
<td>Information Systems Design</td>
</tr>
<tr>
<td>INFO202</td>
<td>Computer Programming</td>
</tr>
<tr>
<td>INFO203</td>
<td>Information Systems Design</td>
</tr>
<tr>
<td>INFO301</td>
<td>Advanced Information Systems Design</td>
</tr>
<tr>
<td>INFO302</td>
<td>Information Systems and the Environment</td>
</tr>
<tr>
<td>INFO401</td>
<td>Knowledge Systems</td>
</tr>
<tr>
<td>PHIL301</td>
<td>Technology and Human Values I</td>
</tr>
<tr>
<td>PSY103</td>
<td>Advanced Foundations for Psychology</td>
</tr>
<tr>
<td>INF302</td>
<td>Topics in Neural Science</td>
</tr>
<tr>
<td>INF303</td>
<td>Directed Electives</td>
</tr>
<tr>
<td>INF304</td>
<td>Directed Electives</td>
</tr>
<tr>
<td>INF305</td>
<td>Directed Electives</td>
</tr>
</tbody>
</table>

### Faculty of Engineering

#### Computer Science

- **Degree:** Bachelor of Computer Science (BCompSc)
- **Designated Department:** Department of Computer Science
- **Course Coordinator:** Dr. M. Houle

---

### General Course Policies

The attention of students is drawn to the General Course Policies of the Faculty published in the Faculty Policy Section of this Handbook. The policies are particularly important for students intending to enrol in a non-standard program.

### Elective Requirements

A total of 60 credit points of General Electives are to be taken, comprising at least 20 credit points at 100 level and at least 20 credit points at 300 level. A total of 70 credit points of Directed Electives are to be taken consisting of 30 credit points at 200 level and 40 credit points at 300 level.

### Recommended General Electives

- **100-level Subjects:**
  - ELEC130 Electrical Engineering 1
  - INFO101 Introduction to Information Systems
  - INFO102 Information Storage and Management* 
  - PSY101 Psychology Introduction 1* 
  - PSY102 Psychology Introduction 2* 
  - STAT101 Introductory Statistics 

- **200-level Subjects:**
  - COMP211 Comparative Programming Languages 
  - COMP223 Analysis of Algorithms 
  - ELEC200 Theory of Computation 

- **300-level Subjects:**
  - COMP311 Software Engineering 

---

### Bachelor Degree Course Programs

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP331</td>
<td>Geometric Data Structures</td>
</tr>
<tr>
<td>COMP392</td>
<td>Computer Graphics</td>
</tr>
<tr>
<td>ELEC372</td>
<td>Computer Architecture</td>
</tr>
</tbody>
</table>

---

### Part-time Attendance

All candidates for the degree must complete the requirements of the Course Program given above. All or part of this program may be completed by part-time attendance. Part-time students will normally take two years for each equivalent full-time year. As far as resources allow, the first two stages of the course are timetabled to permit a single-day work release attendance pattern with some evening lectures. These stages are:

- **STAGE 1**
  - **Semester 1:** COMP11 Introduction to Computer Science
  - **Semester 2:** COMP112 Discrete Structures

- **STAGE 2**
  - **Semesters:** COMP113 Introduction to Artificial Intelligence

---

### Under special circumstances the Head of Department may approve enrolment in COMP400 subjects in lieu of 300-level Directed Elective subjects.

---

### Prerequisite and Corequisite Requirements

The prerequisite and corequisite requirements of individual subjects are listed in the schedule presented in Section 9 of this Handbook. Enrolment in a subject contrary to the provisions of this schedule will not be approved without the written permission of the Head of the Department offering the subject concerned.

---

### Faculty Policy

The policies are particularly intended to enrol in a non-standard program. Credit points at 300 level are met (or written permission from the Head of the Department offering the subject).
Students considering part-time study are advised to consult the Guide to Attendance Patterns at the beginning of this Section of the Handbook.

**Transition Arrangements**

The Course Program has been amended with effect from the commencement of the 1994 academic year. All students enrolled in this course or any combined degree program of which it forms part, are required to meet the requirements of the new Course Program. Appropriate exemptions in the new Course Program will be granted for work previously completed by continuing students.

200 level Computer Science (COMP) subjects completed prior to 1994 may be considered as 300 level General Electives in order to facilitate transition to the new Bachelor of Computer Science course program.

As a result of having been given credit for certain Computer Science (COMP) subjects which have been discontinued as of 1994, candidates who have enrolled in the BCompSc program before 1994 may be restricted in their choice of subjects. For a complete description of these restrictions refer to section eight of the handbook.

**By Year Transition**

Students who were enrolled in the BCompSc program before 1994 may be restricted in their choice of subjects. For a complete description of these restrictions refer to the Handbook.

**Combined Degree Programs**

Combined degree programs are available which allow completion of the requirements for the Bachelor of Computer Science together with the requirements for a degree of Bachelor of Arts, Bachelor of Science (BSocSc), Bachelor of Applied Science (BAppSc) or Bachelor of Environmental Management (BEnvMan) or Bachelor of Science (BSocSc) or Bachelor of Commerce (BCommerce) or Bachelor of Engineering (BEngg) or Bachelor of Music (BMus) or Bachelor of Fine Arts (BArts) or Bachelor of Design (BDes) or Bachelor of Speech and Drama (BSpam). These programs are only available and require a minimum of 5 years full-time study. Students enrolled in the BCompSc program who wish to undertake the combined degree program should contact the Faculty Office.

Note that students undertaking a combined degree program are attempting two distinct programs concurrently and therefore the annual enrolment required by such a program may exceed the normal annual load of 80 credit points. Also note that the degree will be calculated on the basis of the proportion which each individual subject counts in the program of the separate degree of which it forms part and on the proportion it contributes to any combined degree program. Timetabling constraints may limit the choice of optional subjects.

Direct entry to combined programs may be gained via UAC by applicants who achieve highly at NSW HSC or equivalent. Students may also enter combined degree programs at the conclusion of Year III if they have achieved a WAM of 70. Applicants should be advised to complete the re-enrolment application. The Faculty Office may be consulted regarding application forms for course requirements.

**Computer Science Honours**

Degree Bachelor of Computer Science (Honours) (BCompSc(Hons))

**Designated Department** Department of Computer Science

**Course Coordinator** Dr H. Elghdy

**Code** 10043

The BCompSc(Hons) program is a postgraduate degree taken over one full-time year or two part-time years. The program is normally undertaken by students with a superior record in the BCompSc program who wish to deepen their knowledge in the discipline of Computer Science as a preparation for professional practice or to meet the requirements for admission to a research degree program. Entry to the BCompSc(Hons) program is possible for graduates of other disciplines. Enquiries regarding admission should be directed to the Course Coordinator.

**BCompSc(Hons) course program approved by the Faculty Board is presented below.**

**BSc(Hons) PROGRAM**

** Subjects Credit Points**

| COMP25 Honours Project | 20 |
| COMP400 Level Subjects | 80 |

**COM400 Level Subjects**

A total of 60 credit points of Computer Science electives chosen from the following list is to be completed. It should be noted that all the listed 400 level COMP electives may not be offered every year. As a result of having been given credit for certain Computer Science (COMP) subjects which have been discontinued as of 1994, candidates who have enrolled in the BCompSc program before 1994 may be restricted in their choice of subjects. For a complete description of these restrictions refer to section eight of the handbook.

**Faculty by Subject Transition**

Students who complete all subjects in which they were enrolled on 30 August 1993 without failure should re-enroll in accordance with the transition statement issued to them. Students who do not successfully complete all said subjects must clarify their position in the new Course Program before finalising their re-enrolment for 1994.

For details of subject equivalence refer to section eight of the handbook.
Electrical Engineering
Degree Bachelor of Engineering (BE) awarded in the specialization of Electrical Engineering

Designated Department: Department of Electrical and Computer Engineering
Course Coordinator: Dr. I. Webster
Course Code: 10173

COURSE PROGRAM

YEAR I

Semester 1
ELEC101 Introduction to Electrical and Computer Engineering 5
MATH102 Mathematics 102* 10
MECH111 Engineering Drawing 5
PHYS113 Physics 113 10

Semester 2
CIVIL11 Mechanics and Structures 5
MATH103 Mathematics 103* 10
MECH112 Materials 1 5
PHYS114 Physics 114 10
Both Semesters
ELEC130 Electrical Engineering 1 10
ELEC170 Computer Engineering 1 10

* Approved Option
MATH111 and MATH112 may be taken in lieu of MATH102 and MATH103
See note on Year 1 Mathematics Option below

YEAR II

Semester 1
COMP110 Introduction to Programming 5
MATH201 Multivariable Calculus 5
MATH206 Complex Analysis 1 5
MATH218 Linear Algebra 2** 5
MECH233 Dynamics 5
PHYS201 Quantum Mechanics and Electromagnetics 10

Semester 2
ELEC220 Electronics 1 10
ELEC231 Electrical Circuits 10
MATH203 Ordinary Differential Equations 1 5
MECH205 Engineering Computations 5
MECH234 Dynamics of Engineering Systems 5
Both Semesters
ELEC210 Introduction to Energy Systems 10

** Approved Option
MATH217 may replace MATH218

YEAR III

80 credit points selected from the following subjects:
Semester 1
ELEC341 Digital Signal Processing 5
MECH271 Thermodynamics 5
Semester 1 or Semester 2
MATH217 Elective *** 5
Semester 2
ELEC312 Electrical Systems 5
ELEC322 Switching Electronics 5
ELEC351 Telecommunications 5
MECH382 Engineering Administration 5
Both Semesters
ELEC311 Electrical Power 5
ELEC321 Linear Electronics 5
ELEC352 Analogue and Digital Circuits 5
ELEC371 Microprocessor Systems 5
ELEC372 Computer Architecture 5
MECH361 Automatic Control 5
YEAR IV
Semester 1 / Semester 2
General Electives *** 20
Both Semesters
Electrical Engineering Electives *** 20
ELEC340 Electrical Engineering Project 5

*** See Elective Requirements listed below

General Course Policies
The attention of students is drawn to the General Course Policies of the Faculty published in the Faculty Policy Section of this Handbook. The policies are particularly important for students intending to enrol in a non-standard program.

YEAR I Mathematics Option
MATH102 assumes attainment of a mark of at least 120/150 in 3 unit Mathematics at the NSW HSC examination. It is expected that students wishing to prepare for an honors degree and/or for entry into any combined degree program, will take MATH102. It is also recommended that students who successfully complete MATH102 and MATH111 undertake MATH218 in Year II.

Students underprepared for entry to MATH102 may take MATH111 and MATH112 in lieu of MATH102. Those students who successfully complete MATH111 and MATH112 must take MATH217 in lieu of MATH218 in Year II, and then choose to take MATH218 as the Mathematics Elective in Year III.

Recommended General Electives are listed below.

Subjects Credit Points
ELEC102 Industrial Experience ** 5
ELEC103 Industrial Experience ** 5
ELEC104 Industrial Experience ** 5
ELEC105 Industrial Experience ** 5
MATH202 Partial Differential Equations 5
MATH205 Analysis of Metric Spaces 5
MATH211 Group Theory 5
MATH213 Mathematical Modelling 5
MATH214 Mechanics 5
MATH215 Operations Research 5
MATH216 Numerical Analysis 5
MECH202 Engineering Administration* 5
MECH202 Engineering Economics* 5
PHIL101 Introduction to Philosophy 20
PHIL201 Technology and Human Values 10
* Preferred General Elective choices.
** Industrial Experience subjects may be taken by part-time students after Stage 1.

Prerequisite and Corequisite Requirements
The prerequisite and corequisite requirements of individual Course Programs are listed in the schedule presented in Section 8 of this Handbook. Enrolment in a subject contrary to the provisions of this schedule will not be approved without the written permission of the Head of the Department offering the subject concerned.

Part-time Attendance
All candidates for the degree must complete the requirements of the Course Program given above. All or part of this program may be completed by part-time attendance. Part-time students will normally take two years for each equivalent full-time year. As far as resources allow, the first two stages of the course are timetabled to permit a single-day work release attendance pattern with some evening lectures. These stages are:

STAGE 1
Semester 1
MATH102 Mathematics 102* 10
Semester 2
MATH103 Mathematics 103* 10
Both Semesters
ELEC130 Electrical Engineering 1 10
ELEC170 Computer Engineering 1 10

Credit Points
5
Students who have completed ELEC350 will be exempt from ELEC341 and should enrol in ELEC351 in Semester 2 of 1994 and successfully complete the subject in order to be exempt from ELEC352.

In exceptional circumstances the Dean may determine the transition pattern to be followed.

**Combined Degree Programs**

Combined degree programs are available which allow completion of the requirements for the Bachelor of Engineering (BE) degree in the specialisation of Electrical Engineering together with the requirements for a degree of Bachelor of Mathematics (BMath) or Bachelor of Science (BSc) (Physics Major) by a minimum of 5 years full-time study. The subjects undertaken in the first year of study of each program are identical to those required in the Electrical Engineering program except that the inclusion of MATH1102 and MATH1103 is required.

Students undertaking the combined degree programs are attempting two distinct programs concurrently and therefore the annual enrolments required by such a program may exceed the normal annual load of 60 credit points. Also note that HIEC will be calculated on the basis of the proportion which each Individual subject counts in the program of the separate degree of which it forms part and not on the proportion it contributes to any combined degree program. Timetabling constraints may limit the choice of optional subjects.

Direct entry to combined programs may be gained via UAC by applicants who achieve high marks in the NSW HSC (or equivalent). Students may also enter combined degree programs at the conclusion of Year 11 if they have achieved a WAM of 70. Applicants should be made in conjunction with submission of the re-enrolment application. The Faculty Office may be consulted regarding application forms and co-requisite requirements.

**Approved Options**

Students taking the Chemical Engineering Strand must take CIVL212 Mechanics of Solids in place of CIVL226 Geotechnical Investigations 2.

<table>
<thead>
<tr>
<th>Faculty of Engineering</th>
<th>Section Five</th>
<th>Bachelor Degree Course Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Environmental Engineering</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Degree Bachelor of Engineering (BE) awarded in the specialisation of Environmental Engineering</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Designated Department: Department of Civil Engineering and Surveying</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Course Coordinator: Dr B.J. Williams</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Course Code: 10694</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>COURSE PROGRAM</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subjects</td>
<td>Credit Points</td>
<td></td>
</tr>
<tr>
<td>Semester 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ERM101 Chemistry 101</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>CIVL111 Mechanics and Structures</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>MATH111 Mathematics 111 *</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>CIVL121 Materials 1</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>PSYS111 Physics 111 *</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Semester 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EEE111 Industrial Process Principles</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>EM102 Chemistry 102</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>CIVL131 Fluid Mechanics 1</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>ELL141 Environmental Engineering 1</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>MATH112 Mathematics 112 *</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>EEE102 Introduction to Engineering Computing</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td><strong>Total Credit Points: 80</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Faculty of Engineering</th>
<th>Section Five</th>
<th>Bachelor Degree Course Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Previous Subject</strong></td>
<td><strong>New Subject</strong></td>
<td></td>
</tr>
<tr>
<td>PHYS102</td>
<td>PHYS113</td>
<td></td>
</tr>
<tr>
<td>PHYS103</td>
<td>PHYS114</td>
<td></td>
</tr>
<tr>
<td>COMP212</td>
<td>COMP110</td>
<td></td>
</tr>
<tr>
<td>COMP303</td>
<td>COMP328</td>
<td></td>
</tr>
<tr>
<td>ELEC322</td>
<td>ELEC322</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Faculty of Engineering</th>
<th>Section Five</th>
<th>Bachelor Degree Course Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Approved Options</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH102 and MATH1103 may replace MATH111 and MATH112.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHYS113 may replace PHYS111.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Semester 1 | |
| CIVL344 Environmental Modelling 1 | 5 |
| CIVL381 Statistical Methods | 5 |
| SCEN202 Environmental Planning and Pollution Control | 10 |
| ECON371 Economic Principles | 10 |
| Elective | 5 |
| Semester 2 | |
| BIOL308 Plant Physiology | 5 |
| CIVL342 Hydrology | 5 |
| CIVL344 Environmental Modelling 2 | 5 |
| CIVL345 Environmental Modelling 3 | 5 |
| CIVL346 Environmental Modelling 4 | 10 |
| Electives | 80 |

| Semester 1 | |
| CIVL443 Water Resources Engineering | 5 |
| MECH407 Air Pollution Management | 5 |
| Electives | 10 |
| Semester 2 | |
| CHEE462 Principles of Wastewater Treatment | 10 |
| MECH458 Environmental Risk Assessment | 10 |
| MECH309 Noise Pollution and Control | 5 |
| Both Semesters | |
| CIVL455 Project | 15 |
| CIVL457 Environmental Engineering Design | 15 |
| PHIL391 Technology and Human Values | 10 |
| Electives | 80 |

* Students taking the Chemical Engineering Strand must take CIVL212 Mechanics of Solids in place of CIVL226 Geotechnical Investigations 2.

<table>
<thead>
<tr>
<th>Faculty of Engineering</th>
<th>Section Five</th>
<th>Bachelor Degree Course Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Elective Options</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIVL212 Mechanics of Solids</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>CIVL226 Geotechnical Investigations 2</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>CHEE461 Environmental Process Technology</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

Students who completed the Chemical Engineering Strand in Year II must then take CHEM261 in place of 10 credit points of Elective in Year IV.

**Students taking the Chemical Engineering Strand must take CHEE461 Environmental Process Technology in place of CHEE462.**
General Course Policies

The attention of students is drawn to the General Course Policies of the Faculty published in the Faculty Policy Section of this Handbook. These policies are particularly important for students intending to enrol in a non-standard program.

Elective Requirements

Elective subjects may be chosen from the list of Approved Elective Subjects provided the prerequisite and corequisite requirements of the chosen subjects are met. Note that to gain maximum advantage from the choice of Elective subjects and Approved Requirements, each semester the student must enrol in at least 10 port points.

Recommended Elective Strands

The following Elective Strands have been formulated to allow some additional specialisation within the Environmental Engineering program. Advice regarding Elective strand selection may be obtained from the Course Coordinator.

- Biology Strand
  - Year II, Sem 2: BIOL207
  - Year III, Sem 1: Elective (5cp)

- Chemical Engineering Strand
  - Year II, Sem 1: CHEE265 and CHEE292 in place of CHEM261
  - Year II, Sem 2: CHEE267
  - Year III, Sem 1: Elective (5cp)
  - Year III, Sem 2: CHEE372
  - Year IV, Sem 1: CHEM261
  - Year IV, Sem 2: CHEE461 taken in lieu of CHEE462

- Chemistry Strand
  - Year II, Sem 2: SURV216
  - Year III, Sem 1: Elective (5cp)

- Engineering Strand
  - Year II, Sem 1: CHEE265 and CHEE292 in place of CHEM261
  - Year II, Sem 2: CHEE267
  - Year III, Sem 1: Elective (5cp)
  - Year III, Sem 2: CHEE372
  - Year IV, Sem 1: CHEM261
  - Year IV, Sem 2: CHEE461 taken in lieu of CHEE462

- Environmental Strand
  - Year II, Sem 1: CHEE265 and CHEE292 in place of CHEM261
  - Year II, Sem 2: CHEE267
  - Year III, Sem 1: Elective (5cp)
  - Year III, Sem 2: CHEE372
  - Year IV, Sem 1: CHEM261
  - Year IV, Sem 2: CHEE461 taken in lieu of CHEE462

- Environmental Strand
  - Year II, Sem 1: CHEE265 and CHEE292 in place of CHEM261
  - Year II, Sem 2: CHEE267
  - Year III, Sem 1: Elective (5cp)
  - Year III, Sem 2: CHEE372
  - Year IV, Sem 1: CHEM261
  - Year IV, Sem 2: CHEE461 taken in lieu of CHEE462

Approved Electives

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL201</td>
<td>Biochemistry</td>
<td>10</td>
</tr>
<tr>
<td>BIOL207</td>
<td>Ecology</td>
<td>10</td>
</tr>
<tr>
<td>BIOL204</td>
<td>Cell and Molecular Biology</td>
<td>10</td>
</tr>
<tr>
<td>BIOL303</td>
<td>Environmental Plant Physiology</td>
<td>10</td>
</tr>
<tr>
<td>BIOL311</td>
<td>Environmental Biology</td>
<td>10</td>
</tr>
<tr>
<td>CHEM211</td>
<td>Analytical Chemistry</td>
<td>10</td>
</tr>
<tr>
<td>CHEM221</td>
<td>Inorganic Chemistry</td>
<td>10</td>
</tr>
<tr>
<td>CHEM231</td>
<td>Organic Chemistry</td>
<td>10</td>
</tr>
<tr>
<td>CHEM241</td>
<td>Physical Chemistry</td>
<td>10</td>
</tr>
<tr>
<td>CHEM261</td>
<td>Environmental Chemistry</td>
<td>10</td>
</tr>
<tr>
<td>CHEM361</td>
<td>Environmental Chemistry</td>
<td>10</td>
</tr>
<tr>
<td>CHEE265</td>
<td>Transfer Processes</td>
<td>5</td>
</tr>
<tr>
<td>CHEE267</td>
<td>Transfer Processes</td>
<td>5</td>
</tr>
<tr>
<td>CHEE292</td>
<td>Transfer Processes Laboratory</td>
<td>5</td>
</tr>
<tr>
<td>CHEE372</td>
<td>Separation Processes</td>
<td>5</td>
</tr>
<tr>
<td>CHEE461</td>
<td>Environmental Process Technology</td>
<td>5</td>
</tr>
<tr>
<td>CHEE462</td>
<td>Principles of Water Treatment</td>
<td>5</td>
</tr>
<tr>
<td>CIVL212</td>
<td>Mechanics of Solids</td>
<td>5</td>
</tr>
<tr>
<td>CIVL236</td>
<td>Geotechnical Investigations</td>
<td>5</td>
</tr>
<tr>
<td>CIVL325</td>
<td>Soil Mechanics 1</td>
<td>5</td>
</tr>
<tr>
<td>CIVL326</td>
<td>Soil Mechanics 2</td>
<td>5</td>
</tr>
<tr>
<td>CIVL389</td>
<td>Finite Element Methods</td>
<td>5</td>
</tr>
<tr>
<td>CIVL420</td>
<td>Geotechnical Engineering</td>
<td>10</td>
</tr>
<tr>
<td>LAW201</td>
<td>Introduction to Legal Studies</td>
<td>5</td>
</tr>
<tr>
<td>MATH102</td>
<td>Partial Differential Equations</td>
<td>5</td>
</tr>
<tr>
<td>MATH120</td>
<td>Complex Analysis</td>
<td>5</td>
</tr>
<tr>
<td>MATH121</td>
<td>Group Theory</td>
<td>5</td>
</tr>
<tr>
<td>MATH122</td>
<td>Discrete Mathematics</td>
<td>5</td>
</tr>
<tr>
<td>MATH123</td>
<td>Mathematical Modelling</td>
<td>5</td>
</tr>
<tr>
<td>MATH127</td>
<td>Linear Algebra 1</td>
<td>5</td>
</tr>
<tr>
<td>MATH128</td>
<td>Linear Algebra 2</td>
<td>5</td>
</tr>
<tr>
<td>SURV110</td>
<td>Introductory Surveying</td>
<td>5</td>
</tr>
</tbody>
</table>

In exceptional circumstances the Head of the Department of Civil Engineering and Surveying may approve alternative Elective subjects.

Elective Programs

- Bachelor Program
  - III. Sem I: Elective (5cp)
  - III. Sem 2: CHEM261
  - IV. Sem I: CHEE265 and CHEE292
  - IV. Sem 2: CHEE372

- Master Program
  - I Semester 1: ECON371
  - II Semester 1: CIVL225 and CIVL226
  - II Semester 2: CHEE267

- Ph.D. Program
  - I Year: ECON371
  - II Year: CIVL225 and CIVL226

Part-time Attendance

All candidates for the degree must complete the requirements of the Course Program given above. All or part of this program may be completed by part-time attendance. Part-time students will normally take two years for each equivalent full-time year. As far as resources allow, the first two stages of the course are timetabled to permit a single-day work attendance pattern with some evening lectures. These stages are:

- Subjects
  - Credit Points
    - I Year
      - Stage 1: CHEE111
        - Mechanics and Structures
        - Credit Points: 5
    - Stage 2: CHEE112
      - Fluid Mechanics 1
        - Credit Points: 5

- II Year
  - Stage 1: CHEE211
    - Industrial Process Principles
    - Credit Points: 5
  - Stage 2: CHEE212
    - Fluid Mechanics 2
    - Credit Points: 5

- III Year
  - Stage 1: CHEE311
    - Environmental Engineering
    - Credit Points: 5

- IV Year
  - Stage 1: CHEE411
    - Environmental Engineering
    - Credit Points: 5

Approved Options

- MATH102 and MATH103 may replace MATH111 and MATH112
- MATH113 may replace PHYS111.

In exceptional cases the Head of the Department offering the subject is required to allow some additional specialisation within the Environmental Strand.

Subject by Subject Transition

For the purposes of transition to the new Course Program, the following equivalence between previously completed subjects and new subjects will apply.

- Previous subject
  - New Subject
    - PHYS101
      - PHYS111
    - PHYS102
      - PHYS113
    - BIOL207
      - BIOL206
    - CHEM111
      - CHEE111
    - GROL101
      - CIVL225 and CIVL226
    - SURV111
      - CIVL251 and 5cp Elective
    - SURV112
      - ECON371

Year by Year Transition

Students following the previous standard programs will proceed as follows.

- Year completed
  - Year completed in 1993
    - Required to complete in 1994 (plus Chemical Engineering Strand: CIVL225 and CIVL226)
    - Year I: less ECON371 plus 5cp Elective
    - Year II: less ECON371 plus 5cp Elective
    - Year IV: less ECON371 plus 5cp Elective

In order to provide for exceptional cases in transition, the Dean may determine the transition program to be followed.
### Bachelor Degree Course Programs

#### Bachelor of Industrial Engineering (BE) awarded in the specialisation of Industrial Engineering

<table>
<thead>
<tr>
<th>YEAR II</th>
<th>Semester 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH201</td>
<td>Multivariable Calculus 5</td>
</tr>
<tr>
<td>MEC1204</td>
<td>Experimental Methods 1 5</td>
</tr>
<tr>
<td>MEC1203</td>
<td>Dynamics 5</td>
</tr>
<tr>
<td>MEC1241</td>
<td>Mechanics of Solids 1 5</td>
</tr>
<tr>
<td>MEC1271</td>
<td>Thermodynamics 1 5</td>
</tr>
<tr>
<td>STAT205</td>
<td>Engineering Statistics 5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH203</td>
</tr>
<tr>
<td>MEC1206</td>
</tr>
<tr>
<td>MEC1212</td>
</tr>
<tr>
<td>MEC1222</td>
</tr>
<tr>
<td>MEC1234</td>
</tr>
<tr>
<td>MEC1291</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BOTH SEMESTERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH111 Mathematics 111 10</td>
</tr>
<tr>
<td>MATH102 Introduction to Programming Computing 5</td>
</tr>
<tr>
<td>MEC1103 Engineering Chemistry 5</td>
</tr>
<tr>
<td>MEC1111 Engineering Drawing 5</td>
</tr>
<tr>
<td>PHYS111 Physics 111 10</td>
</tr>
<tr>
<td>CIVL11 Mechanics and Structures 5</td>
</tr>
<tr>
<td>MATH112 Mathematics 112 10</td>
</tr>
<tr>
<td>MEC1101 Introduction to Mechanical Engineering 5</td>
</tr>
<tr>
<td>MEC1211 Materials 1 5</td>
</tr>
<tr>
<td>PHYS112 Physics 112 10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BOTH SEMESTERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MECH482 Engineering Economics 1 10</td>
</tr>
<tr>
<td>MECH488 Production Scheduling 5</td>
</tr>
<tr>
<td>Both Semesters</td>
</tr>
<tr>
<td>MECH484 Engineering Economics 2 5</td>
</tr>
<tr>
<td>MECH486 Project/Seminar 5</td>
</tr>
<tr>
<td>ELECTIVES</td>
</tr>
</tbody>
</table>

### Course Coordinator
Mr. J.W. Hayes

### Course Code
10293

No new admissions will be accepted for this course from 1995.

### Course Program

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>YEAR I</td>
<td></td>
</tr>
<tr>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>MATH111</td>
<td>Mathematics 111 * 10</td>
</tr>
<tr>
<td>MEC1102</td>
<td>Introduction to Programming Computing 5</td>
</tr>
<tr>
<td>MEC1103</td>
<td>Engineering Chemistry 5</td>
</tr>
<tr>
<td>MEC1111</td>
<td>Engineering Drawing 5</td>
</tr>
<tr>
<td>PHYS111</td>
<td>Physics 111 * 10</td>
</tr>
<tr>
<td>CIVL11</td>
<td>Mechanics and Structures 5</td>
</tr>
<tr>
<td>MATH112</td>
<td>Mathematics 112 * 10</td>
</tr>
<tr>
<td>MEC1101</td>
<td>Introduction to Mechanical Engineering 5</td>
</tr>
<tr>
<td>MEC1211</td>
<td>Materials 1 5</td>
</tr>
<tr>
<td>PHYS112</td>
<td>Physics 112 * 10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BOTH SEMESTERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELECTIVES</td>
</tr>
</tbody>
</table>

### General Course Policies

- At least 5 credit points of Elective must be taken at the 300 level.
- Electives must be chosen from the list of Approved Elective Subjects given below. Not all electives are offered in any one year and the entry requirements for selected subjects must be met. Students will be advised in Semester 1 of the following year which electives are available.

### Elective Requirements

- At least 5 credit points of Elective must be taken at the 300 level.

### Approved Elective Subjects

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>MECH1211</td>
<td>Mechanical Engineering Design 1</td>
</tr>
<tr>
<td>MECH1212</td>
<td>Design of Machine Components</td>
</tr>
<tr>
<td>MEC1222</td>
<td>Materials 2</td>
</tr>
<tr>
<td>MEC1234</td>
<td>Dynamics of Engineering Systems</td>
</tr>
<tr>
<td>MEC1291</td>
<td>Fluid Mechanics 1</td>
</tr>
</tbody>
</table>

### Credit Points

- MATH111 Mathematics 111 10
- MATH102 Introduction to Programming Computing 5
- MEC1103 Engineering Chemistry 5
- MEC1111 Engineering Drawing 5
- PHYS111 Physics 111 10
- CIVL11 Mechanics and Structures 5
- MATH112 Mathematics 112 10
- MEC1101 Introduction to Mechanical Engineering 5
- MEC1211 Materials 1 5
- PHYS112 Physics 112 * 10

### Thesis/Project

- MECH496 Project/Seminar 10

### General Electives

- Approved Options
  - MATH102 and MATH103 may replace MATH111 and MATH112.
  - PHYS113 and PHYS114 may replace PHYS111 and PHYS112.

### Supplementary Details

- The prerequisite and corequisite requirements of the Course Program given above. All candidates for the degree must complete the requirements of the Department offering the subject.

### Bachelor of Industrial Engineering (BE)

- Directed Reading ** 10
- Introduction to Management Systems 10
- Information Storage and Management 10
- Analysis of Information Systems 10
- Information Systems Design 10
- Commercial Programming 10
- Technology and Human Values 2 20

- Industrial Experience may be taken by part-time students after Stage 1.

- In exceptional circumstances the Dean, on the recommendation of the relevant Heads of Department, may approve selection of other elective subjects.

### Prerequisite and Corequisite Requirements

The prerequisite and corequisite requirements of individual subjects are listed in the schedule presented in Section 5 of this Handbook. Enrolment in a subject contrary to the provisions of this schedule will not be approved without the written permission of the Head of the Department offering the subject.

### Part-time Attendance

All candidates for the degree must complete the requirements of the Course Program given above. All or part of this program may be completed by part-time attendance. Part-time students will normally take two years for each equivalent full-time year. As resources allow, the first two stages of the course are timetabled to permit a single-day work release attendance pattern with some evening lectures. These stages are:
Subjects Credit Points
STAGE 1
Semester 1
MATH111 Mathematics 111 * 10
MECH103 Engineering Chemistry 5
MECH111 Engineering Drawing 5
Semester 2
CIVL11 Mechanics & Structures 5
MATH112 Mathematics 112 * 10
MECH101 Introduction to Mechanical Engineering 5

STAGE 2
Semester 1
MECH102 Introduction to Engineering Computing 5
PHYS111 Physics 111 * 10
Semester 2
MECH121 Materials 1 5
PHYS112 Physics 112 * 10
Both Semesters
ELEC170 Computer Engineering 1 40

* Approved Options
1. MATH102 and MATH103 may replace MATH111 and MATH112.
2. PHYS113 and PHYS114 may replace PHYS111 and PHYS112.

After completion of the above program attendance will be required at various times during the day depending upon the subjects in which the candidate is enrolled and the requirements of the timetable. Full-time study is recommended after Stage 2. Students considering part-time study are advised to consult the Guide to Attendance Patterns at the beginning of this Section of the Handbook.

Transition Arrangements
The Course Program has been amended with effect from the commencement of the 1994 academic year. All students enrolled in this course or any combined degree program of which it forms part, are required to meet the requirements of the new Course Program.

Subject by Subject Transition
For the purposes of transition to the new Course Program, the following equivalence between previously completed subjects and new subjects will apply.

<table>
<thead>
<tr>
<th>Previous subject</th>
<th>New Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS101</td>
<td>PHYS111</td>
</tr>
<tr>
<td>PHYS102</td>
<td>PHYS112</td>
</tr>
<tr>
<td>PHYS102 and PHYS103 PHYS113 and PHYS114</td>
<td></td>
</tr>
<tr>
<td>MECH102</td>
<td>MECH102</td>
</tr>
<tr>
<td>MECH1232</td>
<td>MECH1233 and MECH1234</td>
</tr>
<tr>
<td>MECH134</td>
<td>MECH1311 and MECH1316</td>
</tr>
<tr>
<td>MECH1384</td>
<td>MECH1842</td>
</tr>
</tbody>
</table>

In exceptional circumstances the Dean may determine the transition pattern to be followed.

Combined Degree Programs
Students intending to enrol in a combined degree program which includes the Industrial Engineering specialisation should contact the Faculty Office, to meet the requirements of the new Course Program.

Degree Bachelor of Engineering (BE) awarded in the specialisation of Mechanical Engineering

Designated Department: Department of Mechanical Engineering

Course Coordinator: Mr. J.W. Hayes

Course Code: 10205

YEAR I
Semester 1
MATH111 Mathematics 111 * 10
MECH102 Introduction to Engineering Computing 5
MECH103 Engineering Chemistry 5
MECH111 Engineering Drawing 5
PHYS111 Physics 111 * 10
Semester 2
CIVL11 Mechanics & Structures 5
MATH112 Mathematics 112 * 10
MECH101 Introduction to Mechanical Engineering 5

Approved Options
1. MATH102 and MATH103 may replace MATH111 and MATH112.
2. PHYS113 and PHYS114 may replace PHYS111 and PHYS112.

General Course Rules
The attention of students is drawn to the General Course Rules of Faculty published in the Faculty Policy Section of this Handbook. These rules are particularly important for students intending to enrol in a non-standard program.

Elective Requirements
Directed Electives
Directed Electives allow students to specialise in one of the strands listed below. Students must choose Directed Electives from only one of the specialist strands.

(Note: If MECH103 and MECH102 are taken as General Electives, MECH113 may be included in any of the Directed Electives strands).
The subjects undertaken in the first year of study of the program are identical to those required in the Mechanical Engineering program except that the inclusion of Math1102 and Math1103 is required. Note that students undertaking a combined degree program are attempting two distinct programs concurrently and therefore the annual enrolment required by such a program may exceed the normal annual load of 80 credit points. Also note that HECS will be calculated on the basis of the proportion which each individual subject counts in the program of the separate degree of which it forms part and not on the proportion it contributes to any combined degree program. Timetabling constraints may limit the choice of optional subjects.

Direct entry to the combined program may be gained via UAC by applicants who achieve highly at the NSW HSC (or equivalent). Students may also enter combined degree programs at the conclusion of Year 11 if they have achieved a WAM of 70. Application should be made in conjunction with submission of the re-enrolment application. The Faculty Office may be consulted regarding application forms and course requirements.

The subjects undertaken in the first year of study of the program are identical to those required in the Mechanical Engineering program except that the inclusion of Math1102 and Math1103 is required. Note that students undertaking a combined degree program are attempting two distinct programs concurrently and therefore the annual enrolment required by such a program may exceed the normal annual load of 80 credit points. Also note that HECS will be calculated on the basis of the proportion which each individual subject counts in the program of the separate degree of which it forms part and not on the proportion it contributes to any combined degree program. Timetabling constraints may limit the choice of optional subjects.

Direct entry to the combined program may be gained via UAC by applicants who achieve highly at the NSW HSC (or equivalent). Students may also enter combined degree programs at the conclusion of Year 11 if they have achieved a WAM of 70. Application should be made in conjunction with submission of the re-enrolment application. The Faculty Office may be consulted regarding application forms and course requirements.
### Bachelor Degree Course Programs

<table>
<thead>
<tr>
<th>Faculty of Engineering</th>
<th>Section Five</th>
<th>Bachelor Degree Course Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Surveying</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree</td>
<td>Bachelor of Surveying (BSurv)</td>
<td></td>
</tr>
<tr>
<td>Designated Department</td>
<td>Department of Civil Engineering and Surveying</td>
<td></td>
</tr>
<tr>
<td>Course Coordinator</td>
<td>Professor J.G. Fryer</td>
<td></td>
</tr>
<tr>
<td>Course Code</td>
<td>10374</td>
<td></td>
</tr>
<tr>
<td><strong>PROGRAM</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subjects</td>
<td>Credit Points</td>
<td></td>
</tr>
<tr>
<td><strong>YEAR I</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semester 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIVL11</td>
<td>Mechanics and Structures</td>
<td>5</td>
</tr>
<tr>
<td>MATH111</td>
<td>Mathematics 111</td>
<td>10</td>
</tr>
<tr>
<td>MECH121</td>
<td>Materials 1</td>
<td>5</td>
</tr>
<tr>
<td>PHYS121</td>
<td>Physics 111</td>
<td>10</td>
</tr>
<tr>
<td>SURV121</td>
<td>Surveying 1</td>
<td>10</td>
</tr>
<tr>
<td><strong>Semester 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIVL131</td>
<td>Fluid Mechanics 1</td>
<td>5</td>
</tr>
<tr>
<td>CIVL141</td>
<td>Geotechnical Investigation 1</td>
<td>5</td>
</tr>
<tr>
<td>MATH121</td>
<td>Mathematics 112</td>
<td>*</td>
</tr>
<tr>
<td>MECH121</td>
<td>Introduction to Computing</td>
<td>5</td>
</tr>
<tr>
<td>MATH111</td>
<td>Engineering Drawing</td>
<td>5</td>
</tr>
<tr>
<td>SURV122</td>
<td>Surveying 2</td>
<td>10</td>
</tr>
<tr>
<td><strong>Approved Options</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. MATH102 and MATH103 may replace MATH111 and MATH112.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. PHYS113 may replace PHYS111.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>YEAR II</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semester 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIVL212</td>
<td>Mechanics of Solids</td>
<td>5</td>
</tr>
<tr>
<td>CIVL225</td>
<td>Geotechnical Investigation 2</td>
<td>5</td>
</tr>
<tr>
<td>CIVL226</td>
<td>Geotechnical Investigation 2</td>
<td>5</td>
</tr>
<tr>
<td>LAWS21</td>
<td>Introduction to Legal Studies</td>
<td>5</td>
</tr>
<tr>
<td>MATH201</td>
<td>Multivariable Calculus</td>
<td>5</td>
</tr>
<tr>
<td>SURV214</td>
<td>Optics and Imaging Surveying</td>
<td>5</td>
</tr>
<tr>
<td><strong>Semester 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIVL251</td>
<td>Systems</td>
<td>5</td>
</tr>
<tr>
<td>LAWS22</td>
<td>Property and Survey Law</td>
<td>5</td>
</tr>
<tr>
<td>MATH203</td>
<td>Ordinary Differential Equations</td>
<td>5</td>
</tr>
<tr>
<td>SURV215</td>
<td>Surveying 2</td>
<td>10</td>
</tr>
<tr>
<td>SURV215</td>
<td>Electronic Distance Measurement</td>
<td>5</td>
</tr>
<tr>
<td>SURV223</td>
<td>Survey Computations</td>
<td>5</td>
</tr>
<tr>
<td><strong>Both Semesters</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIVL271</td>
<td>Transportation Engineering</td>
<td>10</td>
</tr>
</tbody>
</table>

**YEAR III**

| Semester 1 | CIVL325 | Soil Mechanics 1 | 5 |
| Semester 2 | CIVL381 | Statistical Methods | 5 |
| CIVL381    | ECON1371 Principles of Economics | 10 |
| SURV316    | Hydrographic Surveying | 5 |
| SURV334    | Error Theory | 5 |
| SURV351    | Geodesy 1 | 10 |
| CIVL282    | Soil Mechanics 2 | 5 |
| CIVL342    | Hydrology | 5 |
| CIVL352    | Management | 5 |
| SURV381    | Photogrammetry 1 | 10 |
| SURV392    | Remote Sensing | 5 |
| SURV393    | Land Boundary Definition* | 5 |
| **Semester 2** | CIVL282 | Soil Mechanics 2 | 5 |
| CIVL342    | Hydrology | 5 |
| CIVL352    | Management | 5 |
| SURV381    | Photogrammetry 1 | 10 |
| SURV392    | Remote Sensing | 5 |
| SURV393    | Land Boundary Definition* | 5 |
| CIVL443    | Water Resources Engineering | 5 |
| SURV417    | Industrial and Other Surveying | 10 |
| SURV418    | Control Networks | 5 |
| SURV494    | project | 10 |
| **Semester 2** | CIVL443 | Water Resources Engineering | 5 |
| MATH103    | Mathematics 103 | 10 |
| MATH102    | Partial Differential Equations | 5 |
| MECH204    | Experimental Methods | 10 |
| PHIL301    | Technology and Human Values | 10 |

* Approved Options
1. MATH102 and MATH103 may replace MATH111 and MATH112.
2. PHYS113 may replace PHYS111.

**General Course Policies**

The attention of students is drawn to the General Course Policies of the Faculty published in the Faculty Policy Section of this Handbook. These policies are particularly important for students intending to enrol in a non-standard program.

**Elective Requirements**

General elective subjects may be chosen from any subjects which may normally be counted towards the award of the degrees of BA, BCom, BCom(Adv), BE, BEng, BMath or BSc provided that prerequisites are met (or written permission is obtained from the Head of the Department offering the subject).

In exceptional circumstances the Dean, on the recommendation of the relevant Heads of Department, may approve selection of other elective subjects.

**Recommended General Electives are listed below.** Not all electives may be offered in any one year. Students will be advised in September of the preceding year which SURV400 level elective subjects will be available.

**Elective Subjects**

| Semester 1 | CIVL111 | Engineering Drawing | 5 |
| Semester 2 | SURV191 | Industrial Experience | 5 |
| CIVL192 | Industrial Experience | 5 |
| CIVL193 | Industrial Experience | 5 |
| SURV452 | Geodesy 2 | 5 |
| SURV462 | Photogrammetry 2 | 5 |
| SURV463 | Advanced Cartography | 5 |
| SURV466 | Special Topic | 5 |
| SURV467 | Special Topic | 5 |
| CIVL222 | Materials 2 | 5 |
| CIVL233 | Materials 3 | 5 |
| CIVL237 | Fluid Mechanics 3 | 5 |
| CIVL242 | Environmental Engineering 2 | 5 |
| CIVL354 | Open Channel Hydraulics | 5 |
| MATH103 | Mathematics 103 | 10 |
| MATH102 | Partial Differential Equations | 5 |
| MECH204 | Experimental Methods | 5 |
| PHIL301 | Technology and Human Values | 10 |

* May be taken by part-time students after stage 1.

**Prerequisite and Corequisite Requirements**

The prerequisite and corequisite requirements of individual subjects are listed in the schedule presented in Section 8 of that Handbook. Enrollment in a subject contrary to the provisions of this schedule will not be approved without the written permission of the Head of the Department offering the subject concerned.

**Part-time Attendance**

All candidates for the degree must complete the requirements of the Course Program given above. All or part of this program may be completed by part-time attendance. Part-time students will normally take two years for each equivalent full-time year. As far as resources allow, the first two stages of the course are timetabled to permit a single-day work release attendance pattern with some evening lectures. These stages are:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH111 Mathematics 111</td>
<td>10</td>
</tr>
<tr>
<td>SURV111 Surveying 1</td>
<td>10</td>
</tr>
</tbody>
</table>

**STAGE 2**

| Semester 1 | CIVL111 | Mechanics and Structures | 5 |
| Semester 2 | CIVL131 | Fluid Mechanics 1 | 5 |
| CIVL141 | Environmental Engineering 1 | 5 |
| MECH121 | Introduction to Engineering | 5 |
| MECH111 | Engineering Drawing | 5 |
| SURV122 | Surveying 2 | 10 |
| **Approved Options** | 1. MATH102 and MATH103 may replace MATH111 and MATH112. | |
| 2. PHYS113 may replace PHYS111. | |

After completion of the above program attendance will be required at various times during the day depending upon the subjects in which the candidate is enrolled and the requirements of the timetable. Full-time study is recommended after Stage 2. Students considering part-time study are advised to consult the Guide to Attendance Patterns at the beginning of this Section of the Handbook.

**Transition Arrangements**

The Course Program has been amended with effect from the commencement of the 1994 academic year. All students enrolled in this course or any combined degree program of which it forms part, are required to meet the requirements of the new Course Program.

**Subject by Subject Transition**

For the purposes of transition to the new Course Program, the following equivalences between previously completed subjects and new subjects will apply:

<table>
<thead>
<tr>
<th>Previous Subject</th>
<th>New Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS101</td>
<td>PHYS111</td>
</tr>
<tr>
<td>PHYS102</td>
<td>PHYS112</td>
</tr>
<tr>
<td>CIVL224</td>
<td>CIVL225 and CIVL226</td>
</tr>
</tbody>
</table>

In exceptional circumstances the Dean may determine the transition pattern to be followed.
Faculty of Engineering  
Section Five  
Bachelor Degree Course Programs

Combined BE/BSurv Degree Program

The combined degree program allows completion of the requirements for the Bachelor of Engineering (BE) degree in the specialisation of Civil Engineering together with the requirements for a degree of Bachelor of Surveying (BSurv) degree in a minimum of 5 years full time study.

Note that students undertaking a combined degree program are attempting two distinct programs concurrently and therefore the annual enrolment required by such a program may exceed the normal annual load of 80 credit points. Also note that HECS will be calculated on the basis of the proportion which each individual subject counts in the program of the separate degree of which it forms part and not on the proportion it contributes to any combined degree program.

Students normally apply to enter combined degree programs at the conclusion of Year 1. Students who have completed the first year of either the Surveying or Civil Engineering program and have attained a weighted average mark (W AM) of 55 for entry may be admitted. Application should be made in conjunction with submission of the re-enrolment application. The Faculty Office may be consulted regarding application forms and course requirements. The Course Coordinator may be consulted regarding course requirements.

The detailed requirements are set out below.

Year I: Year 1 of either the Surveying or Civil Engineering program (Total 80 credit points)

Year II: CIVL212, CIVL213, CIVL222, CIVL223, CIVL225, CIVL226, CIVL227, CIVL228, CIVL231, MATH201, MATH203, MECH205, SURV214, SURV215, SURV233 (Total 90 credit points)

Year III: CIVL314, CIVL316, CIVL317, CIVL325, CIVL326, CIVL327, LAW291, LAW292, SURV213, SURV334, SURV393, PHIL391 or ECON371 (Total 90 credit points)

Year IV: CIVL315, CIVL334, CIVL342, CIVL352, CIVL361, CIVL382, SURV331, SURV391, SURV392, SURV417, SURV418, SURV441 (Total 85 credit points)

Year V: CIVL418, CIVL420, CIVL443, CIVL453, CIVL454, SURV472, SURV473, CIVL455 or SURV481 (Total 85 credit points)

Section Six

Master and Doctoral Degree Rules

About This Section

This section contains the 1991 Regulations which, at the time of printing, governed the following postgraduate degrees offered in the Faculty of Engineering:

- Master of Computer Science
- Master of Computing
- Master of Engineering
- Master of Engineering Science
- Master of Surveying
- Doctor of Philosophy

Review of Requirements

The Regulations appearing in this section were under review at the time of printing. It is not expected that admission requirements or the general provisions of coursework requirements will alter substantially. However, students enrolled in 1993 should ensure that they are aware of the relevant provisions of the new Rules which are expected to be operative from 1993.

Rules Governing Masters Degrees

Part I - General

1. (1) These Rules prescribe the conditions and requirements relating to the degrees of Master of Applied Ethics, Master of Architecture, Master of Arts, Master of Building, Master of Commerce, Master of Computer Science, Master of Computing, Master of Early Childhood Education, Master of Education, Master of Educational Studies, Master of Engineering, Master of Engineering Science, Master of Environmental Studies, Master of Industrial Education, Master of Law, Master of Laws, Master of Letters, Master of Mathematics, Master of Psychology (Clinical), Master of Psychology (Educational), Master of Science, Master of
(3) In these Rules and the Schedules thereto, unless the context or subject matter otherwise indicates or requires:

"Faculty Board" means the Faculty Board of the Faculty responsible for the course to which a person is enrolled or is proposing to enrol. 

"Program" means the program of research and study prescribed in the Schedule; 

"Schedule" means the Schedule of these Rules pertaining to the course to which a person is enrolled or is proposing to enrol; and

"Thesis" means any thesis or dissertation submitted by a candidate.

(4) These Rules shall not apply to degrees conferred honoris causa.

(5) A candidate may withdraw from a subject only as may be specified in the Schedule.

(6) A candidate may appeal to the Vice-Chancellor against any decision made following the review under Rule 8(1) of these Rules.

9. In exceptional circumstances arising in a particular case, the Academic Senate, on the recommendation of the Faculty Board, may relax any provision of these Rules.

PART II - EXAMINATION AND RESULTS

10. The Examination Rules approved from time to time by the Council shall apply to all examinations with respect to a degree of Master with the exception of the examination of a thesis which shall be conducted in accordance with the provisions of Rules 12 to 16 inclusive of these Rules.

11. The Faculty Board shall consider the results in subjects, the reports of examiners and any other recommendations prescribed in the Schedule and shall decide:

(a) to require the candidate to undertake further oral, written or practical examinations as the Faculty Board may prescribe; or

(b) not to recommend that the candidate be admitted to the degree, in which case the candidature shall be terminated.

PART III - PROVISIONS RELATING TO THESES

12. (1) The subject of a thesis shall be approved by the Faculty Board on the recommendation of the Head of the Department in which the candidate is carrying out the research for the thesis.

(2) The thesis shall not contain its main content any work or material which has previously been submitted by the candidate for a degree in any tertiary institution unless the Faculty Board otherwise permits.

13. The candidate shall give to the Secretary to the University three months' written notice of intention to submit a thesis and such notice shall be accompanied by any prescribed fee.

14. (1) The candidate shall comply with the following provisions concerning the presentation of a thesis:

(a) the thesis shall contain an abstract of approximately 200 words describing its content;

(b) the thesis shall be typed and bound in a manner prescribed by the University;

(c) three copies of the thesis shall be submitted together with:

(i) a certificate signed by the candidate that the main content of the thesis has not been submitted by the candidate for a degree of any other tertiary institution; and

(ii) a certificate signed by the supervisor indicating whether the candidate has completed the program and whether the thesis is of sufficient academic merit to warrant examination; and

(iii) if the candidate so desires, any documents or published work of the candidate whether bearing on the subject of the thesis or not.

(2) The Faculty Board shall determine the course of action to be taken should the...
certificate of the supervisor indicate that in the opinion of the supervisor the thesis is not of sufficient academic merit to warrant examination.

15. The University shall be entitled to retain the submitted copies of the thesis, accompanying documents and published work. The University shall be free to allow the thesis to be consulted or borrowed and, subject to the provisions of the Copyright Act, 1968 (Cmul), may issue it in whole or any part in photocopy or microfilm or other copying medium.

16. (1) For each candidate two examiners, at least one of whom shall be an external examiner (being a person who is not a member of the staff of the University), shall be appointed either by the Faculty Board or otherwise as prescribed in the Schedule.

(2) If the candidates' reports are such that the Faculty Board is unable to make any decision pursuant to Rule 11 of these Rules, a third examiner shall be appointed either by the Faculty Board or otherwise as prescribed in the Schedule.

SCHEDULE 17 — MASTER OF COMPUTER SCIENCE

1. The Faculty of Engineering shall be responsible for the course leading to the degree of Master of Computer Science.

2. To be eligible for admission to candidature an applicant shall:

(a) have satisfied all the requirements for admission to the degree of Bachelor of Computer Science with Honours Class 1 or Class II of the University of Newcastle or to an Honours degree, approved for this purpose by the Faculty Board, of the University of Newcastle or any other university; or

(b) have satisfied all the requirements for admission to a degree of the University of Newcastle or to a degree, approved for this purpose by the Faculty Board, of another tertiary institution and have completed such work and passed such examinations as the Faculty Board may have determined and have achieved a standard at least equivalent to that required for admission to a degree of bachelor with second class Honours; or

(c) in exceptional cases produce evidence of possessing such academic or professional qualifications as may be approved by the Faculty Board on the recommendation of the Head of the Department of Electrical Engineering and Computer Science.

3. To qualify for admission to the degree a candidate shall complete the satisfaction of the Faculty Board a program consisting of:

(a) such work and examinations as may be prescribed by the Faculty Board; and

(b) a thesis embodying the results of an original investigation or design.

4. Except with the permission of the Faculty Board, which shall be given only in special circumstances, a candidate shall:

(a) conduct the major proportion of the investigation or design work in the University; and

(b) take part in research seminars within the Department of Electrical Engineering and Computer Science.

5. Except with the special permission of the Faculty Board:

(a) a full-time candidate shall complete the program in not less than two and not more than three calendar years from its commencement;

(b) a part-time candidate shall complete the program in not less than three and not more than five calendar years from its commencement.

SCHEDULE 18 — MASTER OF COMPUTING SCIENCE

1. The degree of Master of Computing shall be a degree by coursework offered in the Faculty of Engineering.

Admission to Candidature

2. To be eligible for admission to candidature an applicant shall:

(a) (i) have satisfied all the requirements for admission to the degree of Bachelor of Computer Science of the University of Newcastle or to any other degree approved for this purpose by the Faculty Board; or

(b) have satisfied the requirements for admission to a degree with honours in the University of Newcastle or other university approved for this purpose by the Faculty Board and have completed the requirements for a degree of Bachelor with Honours in Electrical Engineering or other university approved for this purpose by the Faculty Board.

(c) in exceptional cases produce evidence of possessing such academic or professional qualifications as may be approved by the Faculty Board.

(d) complete such additional work and pass such examinations as the Faculty Board may determine.

Qualification for the Degree

3. (1) To qualify for admission to the degree a candidate shall pass a program of subjects approved by the Faculty Board on the recommendation of the Head of the Department of Computer Science totalling not less than 160 credit points.

(2) The program referred to in sub-Clause (1) shall contain 60 credit points comprising the investigation of and report on a project specified by the candidate's supervisor or supervisors.

(3) The candidate's supervisor or supervisors referred to in sub-Clause (2) shall be appointed by the Head of the Department of Computer Science.

Credit

4. A candidate may be granted credit by the Faculty Board on such conditions as it may determine for up to 60 credit points.

Time Requirements

5. Except with the permission of the Faculty Board a candidate shall complete the program in not less than two and not more than five years from its commencement.

SCHEDULE 6 — MASTER OF ENGINEERING

1. The Faculty of Engineering shall be responsible for the course leading to the degree of Master of Engineering.

Admission to Candidature

2. To be eligible for admission to candidature an applicant shall:

(a) have satisfied the requirements for admission to a degree in Engineer Science in the University of Newcastle or other university approved for this purpose by the Faculty Board; and

(b) have satisfied the requirements for admission to a degree in engineering in the University of Newcastle or other university approved for this purpose by the Faculty Board.

(c) have achieved a standard at least equivalent to that required for admission to a degree of Bachelor of
Engineering of the University or hold an equivalent qualification requiring at least four years of full-time study; or
(b) have satisfied the requirements for admission to any other Bachelor degree of the University or any other approved university and have had at least two years of relevant industrial experience and/or have completed to the satisfaction of the Faculty Board such work and examinations as determined by the Faculty Board; or
(c) in exceptional cases produce evidence of such academic and professional attainments as may be approved by the Faculty Board.

Qualification for the Degree
3. To qualify for admission to the degree a candidate shall pass a program of subjects approved by the Faculty Board totalling not less than 80 credit points.

Credit
4. A candidate may be granted credit by the Faculty Board on such conditions as the Faculty Board may determine for up to 40 credit points in recognition of subjects completed in this University or elsewhere which have not already been counted towards an award.

Time Requirements
6. Except with the permission of the Faculty Board, a candidate shall complete the program in not less than one and not more than five years from the date of enrolment.

SCHEDULE 15 — MASTER OF SURVEYING
1. The Faculty of Engineering shall be responsible for the course leading to the degree of Master of Surveying.
2. To be eligible for admission to candidature an applicant shall:
(a) have satisfied the requirements for admission to a degree in Surveying with Honours in the University of Newcastle or other university approved for this purpose by the Faculty Board; or
(b) have satisfied the requirements for admission to a degree in the University of Newcastle or other tertiary institution approved for this purpose by the Faculty Board and have completed to the satisfaction of the Faculty Board such work and such examinations as determined by the Faculty Board; or
(c) in exceptional cases produce evidence of possessing such other qualifications as may be approved by the Faculty Board on the recommendation of the Head of the Department of Civil Engineering and Surveying.
3. To qualify for admission to the degree a candidate shall complete to the satisfaction of the Faculty Board a program consisting of:
(a) such work and examinations as may be prescribed by the Faculty Board; and
(b) a thesis embodying the results of an original investigation or design.
4. The program shall be completed:
(a) in not less than two academic years except that, in the case of a candidate who has completed the requirements for a degree of Bachelor with Honours or a qualification deemed by the Faculty Board to be equivalent to one who has had previous research experience, the Faculty Board may reduce this period to not less than one academic year; and
(b) except with the permission of the Faculty Board, in not more than five years.
5. Except with the permission of the Faculty Board, a candidate shall take part in research seminars within the Department of Civil Engineering and Surveying.

Doctoral Degree Regulations
General
1. (a) These Regulations are made in accordance with the powers vested in the Council under By-law 5.2.1 and shall relate to the degree of Doctor of Engineering, Doctor of Letters, Doctor of Science, Doctor of Medicine and Doctor of Philosophy.
(b) In order to qualify for a doctoral degree the candidate shall comply with the requirements for the degree as set out in the appropriate Schedule of the Regulations.
(c) In these Regulations "Doctoral Degree Committee" means the Doctoral Degree Committee for the Faculty in which the candidate is enrolled or is proposing to enrol.

Doctoral Degree Committee
2. (a) The Senate shall appoint for each Faculty a Doctoral Degree Committee consisting of:
(i) the Dean of the Faculty who shall preside at meetings of the Committee,
(ii) the Deputy Chairman of the Senate or the nominee of the Deputy Chairman, and
(iii) three members of the academic staff of the University nominated by the Board of the Faculty concerned.
Where the Committee is to discuss matters affecting the candidature of a particular person the Head of the Department or Division in which the candidate is carrying out research, or the nominee of the Head, shall, if not already a member of the Committee, be invited to take part in such discussion as a non-voting member.
(b) The number of members constituting a quorum of the Committee shall be three.
(i) A member nominated by the Faculty Board shall hold office for three years from the date of appointment and shall be eligible for reappointment; provided that the first three members appointed shall hold office for one, two and three years respectively.
(ii) In the event of a casual vacancy, a new member shall be appointed by the Senate on the nomination of the Faculty Board and shall hold office for the residue of the predecessor's term of office.
(c) The Doctoral Degree Committee shall be responsible for:

(c) Admission to Candidature
(i) considering the evidence of qualification for admission submitted by applicants;
(ii) considering the adequacy of facilities for supervision and research within the department or division concerned;
(iii) approving admission to candidature and the area of investigation and any subsequent variations in this area.

Supervision of Candidates
(a) appointing a supervisor or supervisors on the recommendation of the Head of the Department or Division in which the candidate is carrying out research;
(b) ensuring adequate supervision of candidates;
(c) concluding progress reports submitted annually by candidates and supervisors to ensure that progress is satisfactory;
(d) terminating candidature if progress is considered unsatisfactory.

Examination of Candidates
(a) recommending to the Senate the examiners to be appointed by the Senate;
(b) considering, before the acceptance of the thesis for examination, the report of the supervisor certifying the fitness or otherwise of the thesis for examination and determining the course of action should the report be unfavourable;
(c) receiving the reports of examiners and, in the light of these and any subsequent reports recommending to the Senate Review Committee that the degree be conferred or not conferred.

Reporting to Faculty Board
(a) informing the Faculty Board from time to time of the policies it has adopted in respect of (a), (b) and (c) above;
(b) noting any comments made by the Faculty Board and, where it considers it appropriate, seeking the advice of the Faculty Board on any policies adopted or envisaged.
4. Where the examiners' reports received by the 
Doctoral Degree Committee contain 
recommendations which are not unanimous 
the Senate may before making any 
recommendation under Regulation 5(1) of 
these Regulations take one or more of the 
following actions, namely 
(a) review the reasons expressed by the 
examiners for their recommendations; 
(b) direct that the candidate undertake such 
other examinations or work as the Committee may 
require; 
(c) recommend that the Senate appoint a 
new examiner or examiners or a different examiner 
who may or may not be 
appointed to act as an adjudicator; 
(d) invite the examiners to confer, either in 
writing or in person, with each other or 
with the Committee with a view to the 
preparation of a consolidated recommendation.

Senate Review Committee

5. (a) There shall be a Doctoral Degree Review 
Committee consisting of the 
Chairman of the Senate who shall preside at meetings of the Committee and 
two members to be appointed by the Senate 
on the nomination of the Deputy Chairman of the Senate. 
(b) The number of members constituting a 
quorum of the Committee shall be two. 
(c) (i) The two members appointed by the 
Senate shall hold office for three years 
from the date of appointment and shall 
be eligible for reappointment. 
(ii) In the event of a casual vacancy, a new 
member shall be appointed by the Senate 
upon the nomination of the Deputy 
Chairman of the Senate and shall hold 
office for the residue of the predecessor's 
term of office. 
6. The Senate Review Committee shall be 
responsible for 
(a) advising Doctoral Degree Committees of 
procedures to be followed to resolve any 
doubt concerning the recommendation to 
be made to the Senate Review Committee. 
(b) considering the recommendation of the 
Doctoral Degree Committee in the light of 
the report submitted with the recommendation and 
(i) recommending that the Senate 
recommend to the Council that the degree 
be conferred; or 
(ii) requesting the Doctoral Degree 
Committee to take specified further action; or 
(iii) recommending to the Senate that the 
degree be not conferred.

SCHEDULE II — REQUIREMENTS FOR THE 
DEGREE OF DOCTOR OF PHILOSOPHY

1. An applicant for admission to candidature for 
the degree of Doctor of Philosophy shall 
(a) have satisfied all of the requirements for 
admission to the degree of Master or the 
degree of Bachelor with first or second class 
honours in the University of Newcastle or 
a degree from another university approved 
for this purpose by the Doctoral Degree 
Committee; or 
(b) have satisfied all the requirements for 
admission to the degree of Bachelor with 
third class honours or the ordinary degree 
of Bachelor in the University of Newcastle 
or a degree from another university approved 
for this purpose by the Doctoral Degree 
Committee, and have achieved, by 
subsequent work and study a standard 
recognised by the Doctoral Degree 
Committee as equivalent to at least second 
class honours; or 
(c) have evidence of general and professional 
qualifications as may be approved by the 
Senate.

2. Before approving an admission to candidature 
the Doctoral Degree Committee 
(a) shall be satisfied that the applicant can 
devote sufficient time to advanced study and 
research; and 
(b) may require an applicant to sit for such 
examinations or carry out such work as the 
Committee may prescribe.

3. Upon admission to candidature the candidate 
shall enrol and shall pursue a program of 
advanced study and research (which in these 
requirements shall be referred to as "the program") prescribed by the Doctoral Degree Committee for not less than three nor more than five consecutive years or such different 
period as the Doctoral Degree Committee may 
approve, provided that in no case shall the 
period be less than two years.

4. (a) The program shall be carried out in the 
University under the direction of a 
supervisor or supervisors appointed by the 
Doctoral Degree Committee on the 
recommendation of the Head of the 
Department or Division in which the 
candidate is to carry out the research. 
(b) Notwithstanding the provisions of 
subsection (a) of this section, a candidate 
may be granted special permission by the 
Doctoral Degree Committee to spend a 
period of not more than one year in research 
at another institution approved by the 
Doctoral Degree Committee.

5. The candidate and the supervisor shall submit 
to the Doctoral Degree Committee reports on the candidate's 
progress. If after 
considering these reports, the Committee is of 
the opinion that the candidate is not making 
satisfactory progress towards the degree then 
the Committee may terminate the candidature or 
place such conditions on the continuation of the 
candidature as it deems fit.

6. Not later than one year after admission to 
candidature the candidate shall submit the 
thesis, the candidate must have completed the 
thesis 
and have appeared before the candidate 
whether bearing on the 
thesis or not; and 
(a) a report from the supervisor advising 
that the candidate has completed the 
prescribed program and certifying that 
the thesis is of sufficient academic merit to warrant examination provided 
that if the supervisor is unwilling to 
give such a certificate the candidate 
may nevertheless request that the thesis 
be accepted for examination.

7. The thesis shall contain an abstract of 
approximately 300 words describing its 
content; 
(b) the thesis shall be typed and bound in a 
manner prescribed by the University; 
(c) four copies of the thesis shall be submitted 
together with 
(i) the thesis; and 
(ii) if the candidate so desires, any 
documents or work published by the 
candidate whether bearing on the 
thesis or not; and 
(iii) a report from the supervisor advising 
that the candidate has completed the 
prescribed program and certifying that 
the thesis is of sufficient academic merit to warrant examination provided 
that if the supervisor is unwilling to 
give such a certificate the candidate 
may nevertheless request that the thesis 
be accepted for examination.

8. The University shall be entitled to retain the 
submitted copies of the thesis, accompanying 
documents and published work. The University 
shall be free to allow the thesis to be consulted
or borrowed. Subject to the provisions of the Copyright Act (1968) the University may issue the thesis in whole or any part in photostat or microfilm or other copying medium.

11. On the recommendation of the Doctoral Degree Committee the Senate shall appoint three examiners of whom at least two shall not be members of the staff of the University.

12. The candidate may be required by the Doctoral Degree Committee to undertake further oral, written or practical examinations concerning the subject of the thesis or work.

13. A candidate permitted by the Doctoral Degree Committee to resubmit a thesis for examination shall do so within a period of one year from the date on which the candidate is advised of the result of the first examination.

14. In exceptional circumstances arising in a particular case the Senate on the recommendation of the Doctoral Degree Committee may relax any requirement of this Schedule.

---

**Section Seven**

**Graduate Coursework Programs**

**About This Section**

This section contains the course programs which have been approved by the Faculty Board in accordance with the Rules governing Graduate Diplomas and coursework Masters programs offered in the Faculty of Engineering.

Enquiries may be directed to the Faculty Office or the Course Coordinator indicated in the course entry concerned.

**Graduate Diploma in Computer Science**

*Designated Department* Department of Computer Science

*Course Coordinator* Dr H. Elgindy

*Course Code* 10179

The GradDipCompSc is intended as a part-time degree for graduates of various disciplines to provide them with sufficient computer science knowledge to fully utilise their computer systems, to collaborate effectively with computing professionals, or to pursue a career in computer science. The required credit points are to be expected to be accumulated by part-time students over a two year period. However, candidates with a strong background in at least one programming language (such as Pascal or C) may be able to meet the requirements in one year.

To qualify for admission to the award of GradDipCompSc, a candidate must pass a program of subjects totalling 80 credit points which include COMP321 'Software Engineering & Project' and 20 credit points of 300 level or 400 level Computer Science (COMP) subjects and 40 credit points of directed electives in addition to subjects previously completed. Previously completed subjects will be counted at the level at which they were taken prior to 1994.

The GradDipCompSc course program approved by the Faculty Board is presented below.
Upon the completion of 40 credit points of Computer Science (COMP) subjects at the 300 level or higher, GradDipCompSc students may apply for transfer to the Master of Computing program. It should be noted that there is no guarantee that an application to transfer will be successful. Recommendation for performance and perceived potential.

Subject prerequisites are prescribed in the schedule of subjects and primarily relate to the BCompSc program. The prescribed prerequisites may therefore be waived for GradDipCompSc students with an appropriate background. Enquiries regarding waiver of prerequisites should be directed to the Course Coordinator.

Elective Requirements

A total of 40 credit points of electives are to be chosen from the range of subjects offered by the Department of Computer Science except for COMP101 and/or from the following listed subjects.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEC372 Computer Architecture</td>
<td>10</td>
</tr>
<tr>
<td>INFO204 Commercial Programming</td>
<td>10</td>
</tr>
<tr>
<td>MATH111 Mathematics 111</td>
<td>10</td>
</tr>
<tr>
<td>MATH112 Mathematics 112</td>
<td>10</td>
</tr>
<tr>
<td>MATH121 Discrete Mathematics</td>
<td>5</td>
</tr>
<tr>
<td>MATH123 Mathematical Modelling</td>
<td>5</td>
</tr>
<tr>
<td>MATH125 Operations Research</td>
<td>5</td>
</tr>
<tr>
<td>MATH126 Numerical Analysis</td>
<td>5</td>
</tr>
<tr>
<td>MATH127 Linear Algebra 1</td>
<td>5</td>
</tr>
<tr>
<td>INFO501 Computing and Information Systems</td>
<td>10</td>
</tr>
<tr>
<td>INFO503 Systems Analysis</td>
<td>10</td>
</tr>
<tr>
<td>INFO504 Systems Design</td>
<td>10</td>
</tr>
<tr>
<td>INFO505 Management Information Systems</td>
<td>10</td>
</tr>
<tr>
<td>PHIL242 Basic Symbolic Logic</td>
<td>5</td>
</tr>
<tr>
<td>STAT201 Mathematical Statistics</td>
<td>10</td>
</tr>
</tbody>
</table>

** Not available to students who have enrolled in COMP112.

** Sample Subject Selections for GradDipCompSc

The elective structure of the GradDipCompSc program allows candidates to choose subjects which best match their individual needs and objectives. The sample selections appearing below illustrate only some of the ways these choices may be made. Many other combinations are possible.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP211 Software Engineering</td>
<td>20</td>
</tr>
<tr>
<td>COMP221 Programming Languages</td>
<td>10</td>
</tr>
<tr>
<td>COMP223 Analysis of Algorithms</td>
<td>10</td>
</tr>
<tr>
<td>COMP224 Unix Operating System</td>
<td>10</td>
</tr>
<tr>
<td>COMP252 Graphical User Interfaces</td>
<td>10</td>
</tr>
<tr>
<td>COMP253 Database Systems</td>
<td>10</td>
</tr>
<tr>
<td>COMP254 Unix Operating System</td>
<td>10</td>
</tr>
<tr>
<td>COMP255 Database Systems</td>
<td>10</td>
</tr>
<tr>
<td>COMP256 Data Security</td>
<td>10</td>
</tr>
<tr>
<td>COMP311 Introduction to AI</td>
<td>20</td>
</tr>
<tr>
<td>COMP321 Software Engineering</td>
<td>20</td>
</tr>
</tbody>
</table>

The following sample selection of subjects totalling 80 credit points assumes no previous knowledge of computer science.

<table>
<thead>
<tr>
<th>Year</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

The elective structure of the GradDipCompSc program allows candidates to choose subjects which best match their individual needs and objectives. The sample selections appearing above illustrate only some of the ways these choices may be made. Many other combinations are possible.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP211 Software Engineering</td>
<td>20</td>
</tr>
<tr>
<td>COMP221 Programming Languages</td>
<td>10</td>
</tr>
<tr>
<td>COMP223 Analysis of Algorithms</td>
<td>10</td>
</tr>
<tr>
<td>COMP224 Unix Operating System</td>
<td>10</td>
</tr>
<tr>
<td>COMP252 Graphical User Interfaces</td>
<td>10</td>
</tr>
<tr>
<td>COMP253 Database Systems</td>
<td>10</td>
</tr>
<tr>
<td>COMP254 Unix Operating System</td>
<td>10</td>
</tr>
<tr>
<td>COMP255 Database Systems</td>
<td>10</td>
</tr>
<tr>
<td>COMP256 Data Security</td>
<td>10</td>
</tr>
<tr>
<td>COMP311 Introduction to AI</td>
<td>20</td>
</tr>
<tr>
<td>COMP321 Software Engineering</td>
<td>20</td>
</tr>
</tbody>
</table>

** Sample Subject Selections for GradDipCompSc

The elective structure of the GradDipCompSc program allows candidates to choose subjects which best match their individual needs and objectives. The sample selections appearing above illustrate only some of the ways these choices may be made. Many other combinations are possible.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP211 Software Engineering</td>
<td>20</td>
</tr>
<tr>
<td>COMP221 Programming Languages</td>
<td>10</td>
</tr>
<tr>
<td>COMP223 Analysis of Algorithms</td>
<td>10</td>
</tr>
<tr>
<td>COMP224 Unix Operating System</td>
<td>10</td>
</tr>
<tr>
<td>COMP252 Graphical User Interfaces</td>
<td>10</td>
</tr>
<tr>
<td>COMP253 Database Systems</td>
<td>10</td>
</tr>
<tr>
<td>COMP254 Unix Operating System</td>
<td>10</td>
</tr>
<tr>
<td>COMP255 Database Systems</td>
<td>10</td>
</tr>
<tr>
<td>COMP256 Data Security</td>
<td>10</td>
</tr>
<tr>
<td>COMP311 Introduction to AI</td>
<td>20</td>
</tr>
<tr>
<td>COMP321 Software Engineering</td>
<td>20</td>
</tr>
</tbody>
</table>

** Subject by Subject Transition

Students who complete all subjects in which they were enrolled on 30 August 1993 without failure who complete all subjects in which they were enrolled on 30 August 1993 without failure should re-enroll in accordance with the transition statement issued to them. Students who do not successfully complete all said subjects must clarify their position in the new Course Program before finalising their re-enrolment for 1994.

Transition Arrangements

The Course Program has been amended with effect from the commencement of the 1994 academic year. Students enrolled in this course are required to meet the requirements of the new Course Program. Appropriate exemptions in the new Course Program may be granted for work previously completed by students as a result of having been given credit for certain computer science (COMP) subjects which have been discontinued as of 1994, candidates who have failed in the GradDipCompSc program before 1994 may be restricted in their choice of subjects.

A complete description of these restrictions refer section eight of the handbook.
Graduate Diploma in Computing
Designated Department: Department of Computer Science
Course Coordinator: Dr. H. Elgindy
Course Code: 10516

There will be no further admissions to candidature for the GradDipComp.

Candidates who have already enrolled in the GradDipComp program may qualify for admission to the award of GradDipComp by successfully completing a program of subjects totalling 80 credit points including subjects previously completed as part of this course.

Subject prerequisites are prescribed in the schedule of subjects and primarily relate to the BCompSc program. The prescribed prerequisites may therefore be waived for GradDipComp students with an appropriate background. Enquiries regarding waiver of prerequisites should be directed to the Course Coordinator.

COURSE PROGRAM
Directed Electives
A total of 80 credit points of subjects are to be chosen from the range of 200 and 300 level subjects offered by the Department of Computer Science and/or from the following listed subjects:

Subject | Credit Points
--- | ---
ELEC372 Computer Architecture | 10
INFO204 Commercial Programming | 10
MATH111 Mathematics I | 10
MATH112 Mathematics II | 10
MATH122 Discrete Mathematics | 5
MATH123 Mathematical Modelling | 5
MATH125 Operations Research | 5
MATH126 Numerical Analysis | 5
MATH127 Linear Algebra | 5
INFO301 Computing and Information Systems | 10
INFO303 Systems Analysis | 10
INFO304 Systems Design | 10
INFO305 Management Information Systems | 10
PHIL243 Basic Symbolic Logic | 5
STAT201 Mathematical Statistics | 10

Subject prerequisites are prescribed in the schedule of subjects and primarily relate to the BCompSc program. The prescribed prerequisites may therefore be waived for GradDipComp students with an appropriate background. Enquiries regarding waiver of prerequisites should be directed to the Course Coordinator.

Transition Arrangements
The Course Program has been amended with effect from the commencement of the 1994 academic year. All students enrolled in this course are required to meet the requirements of the new Course Program. Appropriate exemptions in the new Course Program will be granted for work previously completed by continuing students.

For details of subject equivalence refer to section eight of the handbook.

As a result of having been given credit for certain Computer Science (COMP) subjects which have been discontinued as of 1994, candidates who have enrolled in the GradDipComp program before 1994 may be restricted in their choice of subjects. For a complete description of these restrictions refer to section eight of the handbook.

Students enrolling in Graduate Diploma courses are referred to the Award Rules in Section 3 of this handbook.

Graduate Diploma in Surveying
Designated Department: Department of Civil Engineering and Surveying
Course Coordinator: Professor J.G. Fryer
Course Code: 10507

The Graduate Diploma in Surveying is designed to broaden and further the education of the practising surveyor, particularly in the light of recent technological changes which have significantly altered the role and operational techniques of professional surveyors.

While a full workload for a single year of a course is normally considered to be 80 credit points, it might not be possible to complete the requirements of the GradDipSurv course program in a single year of attendance because of subject prerequisite requirements. Subject prerequisites are, however, prescribed mainly in relation to the BSurv program.

Students enrolling in Graduate Diploma courses are referred to the Award Rules in Section 3 of this handbook.

Course Program
The GradDipSurv course program approved by the Faculty Board requires completion of 80 credit points selected from the list of approved subjects given below and approved by the Course Coordinator.

In exceptional circumstances the Head of the Department of Civil Engineering and Surveying may approve enrolment in other subjects.

Approved Diploma in Surveying Subjects

Subjects | Credit Points
--- | ---
SURV418 Control Networks | 5
SURV441 Astronomy | 10
SURV452 Geodesy I | 5
SURV462 Photogrammetry II | 5
SURV463 Advanced Cartography | 5
SURV472 Land Valuation | 10
SURV473 Town Planning | 10
SURV481 Project ** | 15
SURV482 Minor Project A ** | 20
SURV483 Minor Project B ** | 20
SURV484 Major Project ** | 40
* A ten day live-in Survey Camp is included as part of SURV383.
** No more than 40cp of project subjects may be counted towards Diploma requirements.

Students enrolling in Graduate Diploma courses are referred to the Award Rules in Section 3 of this handbook.
Master of Computing

Designated Department: Department of Computer Science
Course Coordinator: Dr. H. Elghindy
Course Code: 10067

The Master of Computing (MComp) program is a postgraduate coursework degree program which incorporates advanced project work. To be eligible for admission to candidacy, an applicant must have satisfied all the requirements for admission to a Bachelor’s degree at the University of Newcastle for any other equivalent degree approved for that purpose by the Faculty Board with knowledge of computer science examinations as the Faculty may determine. To qualify for admission to the degree of MComp a candidate must pass a program of subjects totaling 160 credit points, the equivalent of 2 years’ full-time study, including a compulsory advanced project of 60 credit points, 60 credit points of 400 level Computer Science (COMP) subjects and 40 credit points of 300 or 400 level Computer Science (COMP) subjects. The compulsory project work may be taken as COMP501 in a single year or as both COMP501 and COMP502 over 2 years.

COURSE PROGRAM

Subjects Credit Points

Master of Computing Project

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Project A</th>
<th>Project B</th>
<th>Project C</th>
</tr>
</thead>
<tbody>
<tr>
<td>30cp</td>
<td>30cp</td>
<td>60cp</td>
<td></td>
</tr>
</tbody>
</table>

Subject prerequisites are prescribed in the schedule of subjects and primarily relate to the BCompSci program. The prescribed prerequisites may therefore be waived for MComp students with an appropriate background. Enquiries regarding waiver of prerequisites should be directed to the Course Coordinator.

A candidate may be granted credit by the Faculty Board in up to 60 credit points in recognition of subjects completed as part of the GradDipCompSci.

Transition Arrangements

The Course Program has been amended with effect from the commencement of the 1994 academic year. All students enrolled in this course are required to meet the requirements of the new Course Program. Appropriate exemptions in the new Course Program will be granted for work previously completed by continuing students.

For details of subject equivalence refer to section eight of the handbook.

As a result of having been given credit for certain Computer Science (COMP) subjects which have been discontinued as of 1994, candidates who have enrolled in the MComp program before 1994 may be restricted in their choice of subjects. For a complete description of these restrictions refer to section eight of the handbook.

Master of Computing Science - Industrial Systems

Degree: Master of Computing Science
Course Coordinator: Associate Professor A.J. Chambers
Course Code: 10688

This course is offered in a part-time, intensive teaching format to maximise access for practising engineers. The course program is indicated below.

COURSE PROGRAM

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>MECH519</td>
<td>Maintenance Management 30</td>
</tr>
<tr>
<td>MECH564</td>
<td>Engineering Economics 30</td>
</tr>
<tr>
<td>PHIL591</td>
<td>Technology and the Environment 10</td>
</tr>
<tr>
<td>ELEC511</td>
<td>Project/Seminar 20</td>
</tr>
<tr>
<td>ELEC512</td>
<td>Power System Operation and Control 20</td>
</tr>
<tr>
<td>ELEC541</td>
<td>Central System Design and Management 20</td>
</tr>
<tr>
<td>CHEE516</td>
<td>Conveying of Bulk Materials 20</td>
</tr>
<tr>
<td>CHEE573</td>
<td>Advanced Thermodynamics 20</td>
</tr>
</tbody>
</table>

Selection of the project area occurs in the first teaching session.

Core course work and elective subjects are offered in alternate years and intending students should consult with the appropriate departments regarding the offering of particular subjects in any year.

Core Subjects

The following elective subjects will be offered from time to time in the intensive teaching format. To qualify for admission to the degree of MComp a candidate may be granted credit by the Faculty Board in up to 60 credit points in recognition of subjects completed as part of the GradDipCompSci.

Transition Arrangements

The Course Program has been amended with effect from the commencement of the 1994 academic year. All students enrolled in this course are required to meet the requirements of the new Course Program. Appropriate exemptions in the new Course Program will be granted for work previously completed by continuing students.

For details of subject equivalence refer to section eight of the handbook.

As a result of having been given credit for certain Computer Science (COMP) subjects which have been discontinued as of 1994, candidates who have enrolled in the MComp program before 1994 may be restricted in their choice of subjects. For a complete description of these restrictions refer to section eight of the handbook.

Master of Engineering Science - Industrial Systems

Degree: Master of Engineering Science
Course Coordinator: Associate Professor A.J. Chambers
Course Code: 10688

This course is offered in a part-time, intensive teaching format to maximise access for practising engineers. The course program is indicated below.

COURSE PROGRAM

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>MECH519</td>
<td>Maintenance Management 30</td>
</tr>
<tr>
<td>MECH564</td>
<td>Engineering Economics 30</td>
</tr>
<tr>
<td>PHIL591</td>
<td>Technology and the Environment 10</td>
</tr>
<tr>
<td>ELEC511</td>
<td>Project/Seminar 20</td>
</tr>
<tr>
<td>ELEC512</td>
<td>Power System Operation and Control 20</td>
</tr>
<tr>
<td>ELEC541</td>
<td>Central System Design and Management 20</td>
</tr>
<tr>
<td>CHEE516</td>
<td>Conveying of Bulk Materials 20</td>
</tr>
<tr>
<td>CHEE573</td>
<td>Advanced Thermodynamics 20</td>
</tr>
</tbody>
</table>

Selection of the project area occurs in the first teaching session.

Core course work and elective subjects are offered in alternate years and intending students should consult with the appropriate departments regarding the offering of particular subjects in any year.

Core Subjects

The following elective subjects will be offered from time to time in the intensive teaching format. To qualify for admission to the degree of MComp a candidate may be granted credit by the Faculty Board in up to 60 credit points in recognition of subjects completed as part of the GradDipCompSci.

Transition Arrangements

The Course Program has been amended with effect from the commencement of the 1994 academic year. All students enrolled in this course are required to meet the requirements of the new Course Program. Appropriate exemptions in the new Course Program will be granted for work previously completed by continuing students.

For details of subject equivalence refer to section eight of the handbook.

As a result of having been given credit for certain Computer Science (COMP) subjects which have been discontinued as of 1994, candidates who have enrolled in the MComp program before 1994 may be restricted in their choice of subjects. For a complete description of these restrictions refer to section eight of the handbook.

Master of Computing Science - Industrial Systems

Degree: Master of Computing Science
Course Coordinator: Associate Professor A.J. Chambers
Course Code: 10688

This course is offered in a part-time, intensive teaching format to maximise access for practising engineers. The course program is indicated below.

COURSE PROGRAM

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>MECH519</td>
<td>Maintenance Management 30</td>
</tr>
<tr>
<td>MECH564</td>
<td>Engineering Economics 30</td>
</tr>
<tr>
<td>PHIL591</td>
<td>Technology and the Environment 10</td>
</tr>
<tr>
<td>ELEC511</td>
<td>Project/Seminar 20</td>
</tr>
<tr>
<td>ELEC512</td>
<td>Power System Operation and Control 20</td>
</tr>
<tr>
<td>ELEC541</td>
<td>Central System Design and Management 20</td>
</tr>
<tr>
<td>CHEE516</td>
<td>Conveying of Bulk Materials 20</td>
</tr>
<tr>
<td>CHEE573</td>
<td>Advanced Thermodynamics 20</td>
</tr>
</tbody>
</table>

Selection of the project area occurs in the first teaching session.

Core course work and elective subjects are offered in alternate years and intending students should consult with the appropriate departments regarding the offering of particular subjects in any year.

Core Subjects

The following elective subjects will be offered from time to time in the intensive teaching format. To qualify for admission to the degree of MComp a candidate may be granted credit by the Faculty Board in up to 60 credit points in recognition of subjects completed as part of the GradDipCompSci.

Transition Arrangements

The Course Program has been amended with effect from the commencement of the 1994 academic year. All students enrolled in this course are required to meet the requirements of the new Course Program. Appropriate exemptions in the new Course Program will be granted for work previously completed by continuing students.

For details of subject equivalence refer to section eight of the handbook.

As a result of having been given credit for certain Computer Science (COMP) subjects which have been discontinued as of 1994, candidates who have enrolled in the MComp program before 1994 may be restricted in their choice of subjects. For a complete description of these restrictions refer to section eight of the handbook.
Subject Descriptions

About This Section
This section contains descriptions of the content of the subjects offered by the departments of the Faculty of Engineering together with subjects offered by other faculties which are included in the course programs set out in Sections 5 and 7.

Guide to Subject Descriptions

Credit Point Value
The course programs require full-time students completing course requirements in minimum time to undertake an annual workload of 80 credit points. The credit point value of a subject thus indicates the workload of a subject as a proportion of a normal annual full-time program. Similarly, the credit point value of a subject indicates the proportion of the annual HECS liability which arises from enrolment in that subject. Further information on the meaning of credit points is given in the General Course Policies and Information in Section 4.

The credit point value (cp) of each subject is indicated in each subject description.

Subject Codes
Each subject has been given a unique code (e.g. CIVL111). This code identifies the subject within the University’s computer system and should be entered on each form dealing with subjects. The alpha section of the code indicates the department responsible for offering the subject. The first number in the code indicates the level at which the subject is offered (e.g. 100, 200, 300, 400 etc.) and in the Faculty of Engineering, also indicates the WAM weighting of the subject. The latter two numbers may indicate the sequence of a subject in a stream of subjects or within a course.

The departmental indicators included in this Handbook are listed below.

<table>
<thead>
<tr>
<th>Code</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>BION</td>
<td>Biology</td>
</tr>
<tr>
<td>CHEE</td>
<td>Chemical Engineering</td>
</tr>
<tr>
<td>CHEM</td>
<td>Chemistry</td>
</tr>
<tr>
<td>CIVL</td>
<td>Civil Engineering and Surveying (Civil Engineering subject)</td>
</tr>
<tr>
<td>COMM</td>
<td>Commerce</td>
</tr>
<tr>
<td>COMP</td>
<td>Computer Science</td>
</tr>
<tr>
<td>ECON</td>
<td>Economics</td>
</tr>
<tr>
<td>ELEC</td>
<td>Electrical and Computer Engineering</td>
</tr>
<tr>
<td>GEGO</td>
<td>Geography</td>
</tr>
<tr>
<td>GEOG</td>
<td>Geology</td>
</tr>
<tr>
<td>INFO</td>
<td>Management (Information Science subject)</td>
</tr>
<tr>
<td>LAW</td>
<td>Law</td>
</tr>
<tr>
<td>MATH</td>
<td>Mathematics</td>
</tr>
<tr>
<td>MECH</td>
<td>Mechanical Engineering</td>
</tr>
<tr>
<td>MNGT</td>
<td>Management</td>
</tr>
<tr>
<td>PHIL</td>
<td>Philosophy</td>
</tr>
<tr>
<td>PHYS</td>
<td>Physics</td>
</tr>
<tr>
<td>PSYC</td>
<td>Psychology</td>
</tr>
<tr>
<td>SCEN</td>
<td>Applied Science and Technology (Environmental Science subject)</td>
</tr>
<tr>
<td>STAT</td>
<td>Statistics</td>
</tr>
<tr>
<td>SURV</td>
<td>Civil Engineering and Surveying (Surveying subject)</td>
</tr>
</tbody>
</table>

Prerequisites and Corequisites
Many subjects have prerequisite and/or corequisite requirements. The meaning of these terms are defined in the Award Rules. The prerequisite and corequisite requirements of the subjects described in this Handbook are set out in Section 9.

The head of the department offering a subject may waive the prerequisite or corequisite requirements of a subject offered by that department. Students should obtain any such waiver in writing on the form available from the Faculty Office and submit the completed form to the head of the department offering the subject.

Assumed Knowledge
Many subjects also have assumed knowledge requirements. These are also set out in Section 9 of this Handbook. Students are strongly advised to have completed the subjects prescribed as assumed knowledge before enrolling or to otherwise discuss the extent of their disadvantage with the head of department or the lecturer concerned.

Examinations and Assessment
Refer to policies 3(1) and 3(8) of the Faculty’s Policies on Undergraduate Performance and Progress published in Section 4 of this Handbook.

Students will be advised of the assessment procedures for each subject within the first 2 weeks of classes.

Contact Hours
The credit point value of a subject gives an indication of the workload required of a student as a proportion of the normal full-time annual workload of 80 credit points (see General Course Rules and Information in Section 4). Contact hours vary according to the content and teaching requirements of each subject.

In most cases, however, a 5 credit point subject offered in one semester requires 3 contact hours per week. Scheduled contact hours are specified in the University Timetable.

Texts
The information on required texts available at the time of publication is included in each subject description. In most cases it is recommended that students purchase the texts specified, however, it is suggested that students consult with the lecturer concerned before finalising the purchase of texts.

References
Information on reference material is not published in this Handbook. In the case of subjects offered by the departments of the Faculty of Engineering, the details of appropriate reference material will be supplied by the lecturer concerned. In the case of other subjects, reference material may be specified in the handbook of the faculty in which the subject originates.

Availability of Subjects
Not all subjects are necessarily available in each academic year. In particular, elective subjects may not proceed if the department concerned considers that there is insufficient demand for the subject or if insufficient resources are available.

Students requesting enrolment in elective subjects should check with the department in the first week of the semester to ensure that the subject that they have chosen will indeed be offered.
Text

Rickels, R.E. 1990, Ecology, 3rd edn, Freeman or

References


Chemical Engineering Subjects

CHEE111 INDUSTRIAL PROCESS

Principles

5cp


Texts


CHEE112 INTRODUCTION TO CHEMICAL ENGINEERING

10cp


Text


CHEE113 CHEMICAL AND MANUFACTURING PROCESSES

10cp

An introduction to the structure and organisation of the chemical and process metallurgical industries in Australia, with reference to the world scene. Descriptions of processes used in the manufacture of the major industrial chemicals, including hydrometallurgical and smelting operations. Outline of typical unit operations. Descriptions of various processes used in the fabrication and utilisation of materials. Introduction to process plant and equipment. Visits to a number of industrial plants illustrating the course material, and preparation of process flow diagrams. To Australian Standards requirements.

Text


CHEE191 INDUSTRIAL EXPERIENCE

5cp

CHEE192 INDUSTRIAL EXPERIENCE

5cp

CHEE193 INDUSTRIAL EXPERIENCE

5cp

CHEE194 INDUSTRIAL EXPERIENCE

5cp

These subjects are designed to formalise periods of Industrial Experience gained by part-time students. Only one such subject may be taken in any one year. Students will be required to present a report giving a connected account and critical evaluation of their engineering activities and experience during the year. Industrial Experience subjects may be taken by part-time students in any year after completion of Stage 1 and counted towards satisfaction of the Elective requirements of the course.

CHEE241 DESIGN PRINCIPLES

10cp

Materials: Materials of construction for process equipment in chemical industry. Use, limitations and cost, problems of fabrication. Design: Procedures for basic mechanical design of beams, columns and simple structures. Elementary theoretical basis for design of pressure vessels; design procedures from code-requirements. Preliminary sketchings and drafting of several chemical equipment items. Use of computer aided design packages.

Text


CHEE242 CHEMICAL ENGINEERING COMPUTATIONS

10cp

An introduction to the writing and use of computer programs and packages which use numerical techniques to solve problems in engineering. Emphasis is placed on the use of both main frame computers and PCs. Topics include numerical solutions of ordinary and partial differential equations. Techniques for the solution of linear and nonlinear algebraic equations, systems of linear and nonlinear equations. Numerical integration and differentiation techniques. Sources of errors and error estimation in numerical techniques.

Text


CHEE265 TRANSFER PROCESSES 1

5cp


Texts


CHEE266 ENERGY AND EXTRACTIVE PROCESSES

5cp


CHEE267 TRANSFER PROCESSES 2

5cp

Step phase mass transfer and estimation of balances. Analogies of heat, mass and momentum transfer. Combination of heat and mass transfer. Introduction to design of mass transfer equipment.

CHEE268 TRANSFER PROCESSES 3

5cp


Texts


CHEE281 LABORATORY 1

5cp

Experimental investigations into the fundamentals of mass, momentum and heat transfer. An introduction into technical report writing.

CHEE282 LABORATORY 2

10cp

Experimental investigations into elementary unit operations, flow measurement and measurement of chemical and physical properties. Technical report writing. An Introduction into applied statistics.

CHEE292 TRANSFER PROCESSES LABORATORY

5cp

This subject is only available to students enrolled in the Environmental Engineering program. A selection of experiments designed to illustrate principles of heat and mass transfer.

CHEE301 SELECTED TOPIC IN CHEMICAL ENGINEERING

5cp

A topic in Chemical Engineering to be approved by the Head of Department.

CHEE321 MODELLING OF PROCESSES

5cp

An introduction to mathematical modelling and the unsteady state behaviour of chemical plant and processes. Revision of Laplace transformations, transfer function concept, unsteady state materials and energy balances as a technique for system modelling, first order systems, second order systems, response to disturbances-modelling of selected processes; response of sensing elements. Introduction to the principles of process control.

Texts

Faculty of Engineering  
Section Eight  
Guide to Subject Descriptions

CHEE332 THERMODYNAMICS 10cp


Texts

CHEE341 PROJECT ENGINEERING AND MANAGEMENT 10cp
Management: A review of background economics, estimation of capital and operating costs, discounting techniques, cash flow, depreciation, incentives, inflation, Sensitivity analysis and uncertainty. Project implementation, the project manager and team, scheduling and network analysis. Budgetary control, engineering procurement, construction and commissioning.

Project Engineering: Assessment of economic feasibility and profitability. Selection of major equipment items appropriate to the operating environment. Plant utilities and process instrumentation. An overview of AC and DC power engineering, transmission, transformers, switchgear. Site inspections of appropriate industries.

Text

CHEE342 SAFETY AND ENVIRONMENT 10cp
General introduction to the inherent hazards of the materials and processes relevant to the chemical industry. Elements of hazard analysis and optimization. Aspects of industrial toxicology. Sources, types and effects of explosions. Legal, environmental and ecological considerations in the disposal of industrial wastes. Waste disposal and pollution control; treatment and disposal of solid, liquid and gaseous effluents; recycle possibilities, statutory requirements and environmental regulations; E.I.S. assessment.

Text

CHEE351 ELECTROCHEMISTRY AND CORROSION 5cp
Physical chemistry: Interfaces, solid surfaces and adsorption, surface chemistry. Surfactants, micelles, emulsion stability, flocculation, froth flotation, wetting.

Electrochemical corrosion: Cathodic and anodic protection, passivation.

Electrochemical processes: Batteries, gold extraction, galvanising, chlor-alkali and non ferrous metal industries.

Text

CHEE352 TRANSPORT PHENOMENA 5cp
An introduction to momentum energy and mass transport as a continuous approach. Shell balances and unsteady state solutions by algebraic and numerical procedures using computer packages such as Fripap.

Text

CHEE353 SURFACE CHEMISTRY 1 10cp
Properties of minerals and their relation to mineral beneficiation. Techniques of separation based on volume properties (gravity, electrostatic, magnetic and surface properties (charge, hydrophobic, flotation). Action of collectors, modifiers, frothers.

Electrokinetic phenomena. Oxide and sulphide flotation. Flocculation and agglomeration.

Text


CHEE354 BIOTECHNOLOGY 5cp
Properties of important micro-organisms; thermodynamic and stoichiometric aspects of microbial metabolism and activity. Product pathways and enzymes. Reactions and flow behaviour of fermentation fluids; transfer processes and unit operations for product recovery; with examples from pharmaceutical, agriculture, food, energy and liquid effluent control.

Text

CHEE355 PROCESS SYNTHESIS 5cp

Text

CHEE356 FUEL TECHNOLOGY 1 5cp
The properties of gaseous, liquid and solid fuels including their analysis. Combustion mechanisms, including air requirements, mixing and ignition in burners. Coal combustion in suspension and in fluidized beds.

Text


CHEE357 PROCESS METALLURGY 1 5cp
In addition to formal lecture courses, students undertake relevant practical exercises involving, for example, assembly, installation and operation of equipment. Students will acquire a good level of understanding and experience in the implementation of appropriate safe working practices.

Text

CHEE358 PROCESS METALLURGY 2 5cp


CHEE361 ENGINEERING APPLICATION LABORATORY 5cp
In addition to formal lecture courses, students undertake relevant practical exercises involving, for example, assembly, installation and operation of equipment. Students will acquire a good level of understanding and experience in the implementation of appropriate safe working practices.

Text

CHEE362 LABORATORY 3 5cp
A number of open-ended investigations illustrating Year III lecture topics, including experiments on instrumentation and control of process plant.
CHEE383 LABORATORY 4 5cp
A number of open-ended investigations illustrating Year III lecture topics, including experiments on instrumentation and control of process plant.

CHEE401 SPECIAL TOPIC 5cp
A topic in Chemical Engineering to be approved by Head of Department.

CHEE421 PROCESS CONTROL AND INSTRUMENTATION 10cp

Text

CHEE422 KINETICS AND REACTION ENGINEERING 10cp

Texts

CHEE451 SURFACE CHEMISTRY 2 5cp
Selected topics in surface chemistry relevant to chemical engineering and mineral processing.

CHEE452 MINERAL PROCESSES 2 5cp
A treatment of unit operations of mineral processing.

CHEE453 PROCESS OPTIMIZATION 5cp
Introduction to stochastic processes and their simulation. Analytical and numerical techniques for optimization with single and multiple variable problems. Development of simple flowsheets, process synthesis, to emphasize optimization possibilities or alternatives.

Texts

CHEE454 FUEL TECHNOLOGY 2 5cp

CHEE456 HEAT TRANSFER 5cp
Analytical solutions and numerical methods in convection, conduction and thermal radiation, with detailed examinations of selected applications.

CHEE456 PROCESS METALLURGY 2 5cp
Chemistry of extraction, metal extractant chemistry, interphase mass transfer, dispersion and coalescence. Computational techniques, industrial extraction equipment and costs, mixer-settlers, columns, bucket, G machines, heap leaching, biological extraction. Industrial processes.

CHEE461 ENVIRONMENTAL PROCESS TECHNOLOGY 10cp

CHEE462 PRINCIPLES OF WASTEWATER TREATMENT 10cp
Overview of design principles for wastewater treatment plants. Sizing and performance of various types of wastewater plants for BOD, COD, nitrate and phosphate removal. Water treatment. Processes for flocculation, clarification and filtration. Plant, equipment and reverse osmosis technology. Plant visits to a number of operating effluent treatment and potable water plants.

CHEE463 SEMINAR 5cp
Regular sessions will be held throughout the year for discussion of literature reviews, chemical engineering practice and departmental research. Each student will orally present no less than two half-hour papers in the course of the series.

CHEE469 ADVANCED DESIGN PROJECT 10cp
Major extension to CHEE 495 Design Project.

CHEE479 RESEARCH PROJECT 20cp
Experimental or theoretical investigation, or the design, construction and testing of experimental equipment to be reported formally in a project report.

CHEE498 ADVANCED RESEARCH PROJECT 10cp
Major extension to CHEE 497 Research Project.

CHEE511 COAL COMBUSTION 10cp
Course will cover the existing technologies associated with coal use, particularly those for coal fired plant. Topics covered may include: an introduction to coal geology and mining; coal transport, handling and storage; pulverising mills; boilers and furnaces; slagging, fouling, erosion; corrosion; ash collection; NOx and SOx; ash handling. An outline of developing firing techniques such as slurry firing, fluidised bed and clean up for gases and solids will also be given.

CHEE513 FURNACE TECHNOLOGY 10cp
Furnace construction and refractories. Heat balances and efficiency. The importance of convection and radiative transfer. The treatment of radiation in furnaces, emitters in coal fired furnaces, surface emissivities and the thermal conductivity or ash layers. The use of the well-mixed furnace model in quantifying the effects of fuel changes (from oil to gas and coal) and operational changes. An introduction to the zone method of analysis. Flames and jets, entrainment and mixing, swirling jets. The modelling of flame processes and furnace heat transfer.

CHEE521 COAL COMBUSTION 5cp
Principles of coal combustion: Coal properties; classification; combustion; devolatilization; ignition; burn-out of char. Laboratory techniques of characterising coal.

CHEE523 WATER TREATMENT TECHNOLOGY 5cp
Furnace construction and refractories. Heat balances and efficiency. The importance of convection and radiative transfer. The treatment of radiation in furnaces, emitters in coal fired furnaces, surface emissivities and the thermal conductivity or ash layers. The use of the well-mixed furnace model in quantifying the effects of fuel changes (from oil to gas and coal) and operational changes. An introduction to the zone method of analysis. Flames and jets, entrainment and mixing, swirling jets. The modelling of flame processes and furnace heat transfer.

CHEE542 POWER ENGINEERING PROCESSES AND THE ENVIRONMENT 5cp
Pulverising mills, boilers and furnaces, slagging, fouling, erosion, corrosion. Ash collection and
### CHEE694 ENVIRONMENTAL AUDITS AND MANAGEMENT

The final section of the major project will be reported at seminars given by candidates and by the substitution of a project report in July. Submission of the final project report will be required by the 31st October followed by a formal presentation of the results of the project at a later date.

### CHEE594 INDOOR SYSTEMS PROJECT/SEMINAR A

The first section of the major project in the Master of Engineering Science - Power Engineering program undertaken in the Department of Chemical Engineering is expected that most projects will be of an applied research nature in an area relevant to the candidates' employment and co-supervised by a professional engineer on site. Coursework components will cover areas of problem identification, research skills, communication skills and strategies for applied research. Progress will be reported at seminars given by candidates and by the submission of progress reports in July and November. Satisfactory completion of this subject will result in the award of a result of up to 20 credits.

### CHEE590 INDUSTRIAL PROJECT/SEMINAR B

The final section of the major project in the Master of Engineering Science - Power Engineering program undertaken in the Department of Chemical Engineering commenced in CHEE590. Submission of the final Project Report will be required by 31 October followed by a formal presentation of the results of the project at a later date. The results awarded for this subject will reflect the quality of the Project Report resulting from the work undertaken in both CHEE594 and CHEE595.

### CHEE390 INDUSTRIAL PROJECT/SEMINAR C

The major project in the Master of Engineering Science: Industrial Systems program undertaken in the Department of Chemical Engineering for students intending to complete the course in a singular academic year, is expected that most projects will be of an applied nature in an area relevant to the candidate's employment and co-supervised by a professional engineer on site. Coursework components will cover areas of problem identification, research skills, communication skills and strategies for applied research. Progress will be reported at seminars given by candidates and by the substitution of a project report in July. Submission of the final project report will be required by the 31st October followed by a formal presentation of the results of the project at a later date.

### CHEM102 CHEMISTRY 102

Organic Chemistry: Approximately 12 lectures on inorganic solids and their structures. Simple molecular orbital theory and structure and bonding in metals. Transition metal chemistry, coordination compounds.

Physical Chemistry: Approximately 24 lectures on chemical equilibria, thermodynamics, electrochemistry, chemical kinetics.

### CHEM104 INORGANIC CHEMISTRY

The laboratory work will count for 10% of the final assessment but a pass in the laboratory work is a prerequisite for a pass in the subject. See Faculty of Science and Mathematics Handbook for further information.

Text

### CHEM211 ANALYTICAL CHEMISTRY

Evaluation and manipulation of analytical data, statistical methods of analysis including theory of acid-base, complex formation and reaction-rate titrations. Selected Instrumental methods of analysis, atomic spectroscopy, absorption spectrophotometry, potentiometric techniques, gas chromatography.

Text

### CHEM221 INORGANIC CHEMISTRY

Main group chemistry and transition metal chemistry. Coordination complexes and metal-ligand interactions; ionic bonding; symmetry and structure.

Introduction to reactions and mechanisms, synthesis, spectroscopic methods, bonding and second field theory in coordination compounds and organometallic chemistry.

Note: The laboratory work will count for 10% of the final assessment but a pass in the laboratory work is a prerequisite for a pass in the subject. See Faculty of Science and Mathematics Handbook for further information.

Text

### CHEM231 ORGANIC CHEMISTRY

Course covering the basic chemistry of aliphatic and aromatic compounds and their spectroscopic properties. An introduction to spectroscopic methods and structure determination (infra-red, proton magnetic resonance, mass spectrometry); acidity, basicity of organic compounds; reactions of aldehyde compounds; aromaticity; electrophilic substitution in aromatic systems; reactions of aromatic compounds. An introduction to carbohydrates.

Note: The laboratory work will count for 15% of the final assessment but a pass in the laboratory work is a prerequisite for a pass in the subject. See Faculty of Science and Mathematics Handbook for further information.

Text

or (Recommended for students proceeding to Level 300 subjects)


### CHEM241 PHYSICAL CHEMISTRY

Chemical dynamics laws of chemical kinetics, principles of mechanism, determination; transition state theory; electrolyte activity; thermodynamics of galvanic cells.

Surface Chemistry definitions; binding in crystals; condensation coefficient; sticking probability; adsorption (isotherms); Langmuir model; types of isotherms; determination of surface area of adsorbents (BET); applications of adsorption. Atomic and Molecular Spectroscopy — structure of free atoms; molecular electronic structure of diatomic molecules; potential energy curves; rotational spectroscopy; vibrational spectroscopy; vibration-rotation spectroscopy.

Note: The laboratory work will count for 15% of the final assessment but a pass in the laboratory work is a prerequisite for a pass in the subject. See Faculty of Science and Mathematics Handbook for further information.

Text
id complexation in natural and waste
atical aspects of microbial cycles; water
ture and composition of the atmosphere;
mospheric pollutants; photochemical
pheric monitoring; an overview of energy
library/workshops/site visits will
of Science and Mathematics Handbook

Note: The laboratory work will count for 20% of the
final assessment but a pass in the laboratory work
is a prerequisite for a pass in the subject.
See Faculty of Science and Mathematics Handbook
for further information.

Texts
As for CHEM231 plus
Williams, D.H. and Fleming, I. 1988, Spectroscopic
Methods in Organic Chemistry, 4th edn. McGraw-
Hill.

CHEM361 ENVIRONMENTAL
CHEMISTRY 10cp
Principles laid down in CHEM261 will be expanded
into a more detailed treatment of the chemistry of
the hydrosphere, the atmosphere, and the geosphere.
Specific topics include: gas-liquid-solid interactions
in water chemistry; water treatment methods;
environmental chemistry of the geosphere; particular
matter in the atmosphere; organic pollutants in the
atmosphere and geosphere; environmental toxicology;
the nature, sources, and chemistry of hazardous wastes.
The laboratory/library/workshop/site visits will
count for 20% of the final assessment but a pass in
this work is a prerequisite for a pass in the subject.
See Faculty of Science and Mathematics Handbook
for further information.

Text
Manahan, S.E. 1990, Environmental Chemistry, 4th
drn. Lewis.

Civil Engineering Subjects

CIVIL11 MECHANICS AND
STRUCTURES 5cp
Introduction to the behaviour of structures. Statically
forced as vectors, resultant, equilibrium in two
dimensions. Beams, trusses; method of joints
method of sections. Statical determination
Statically determinate. Shrinkage, properties of sections, stress, strain
Mohr's circle. Columns; stability, Euler's formula.

CIVIL13 FLUID MECHANICS 1 5cp
Fluid properties. Fluid statics, stability of submerged
and floating bodies, relative equilibrium. Fluid forces
cons and basic equations of continuity, one

Text
Streeter, V.L. and Wylie, E.B., Fluid Mechanics, SI

CIVIL141 ENVIRONMENTAL
ENGINEERING 1 5cp
Life cycles. Material and energy balances. Chemical
Text
Masters, G. M. 1991, Introduction to Environmental
Engineering and Science, Prentice-Hall.

CIVIL181 INDUSTRIAL
EXPERIENCE 5cp
These subject units are designed to formalise periods
of Induslrial Experience gained by part-time students
only. Students will also be required to present a
report giving a connected account and critical
evaluation of their engineering activities and
experience during the year. Such subjects may be
counted by part-time students as electives. (See
section 4 of this Handbook).

CIVIL12 MECHANICS OF SOLIDS 5cp
Discuss stress and strain, extenmion of bars. Simple
determined problems, thermal stresses,
superposition, strain energy, nonlinear deformation
axially loaded bars. Thin shells subject to internal
pressure, Mohr's circle of stresses. Shear strain.
generalised stress-strain relations. (See further information.
Text
Manahan, S.E. 1990, Environmental Chemistry, 4th
drn. Lewis.

Civil Engineering Subjects

CIVIL11 MECHANICS AND
STRUCTURES 5cp
Introduction to the behaviour of structures. Statically
forced as vectors, resultant, equilibrium in two
dimensions. Beams, trusses; method of joints
method of sections. Statical determination
Statically determinate. Shrinkage, properties of sections, stress, strain
Mohr's circle. Columns; stability, Euler's formula.

CIVIL13 FLUID MECHANICS 1 5cp
Fluid properties. Fluid statics, stability of submerged
and floating bodies, relative equilibrium. Fluid forces
cons and basic equations of continuity, one

Text
Streeter, V.L. and Wylie, E.B., Fluid Mechanics, SI

CIVIL141 ENVIRONMENTAL
ENGINEERING 1 5cp
Life cycles. Material and energy balances. Chemical
Text
Masters, G. M. 1991, Introduction to Environmental
Engineering and Science, Prentice-Hall.

CIVIL181 INDUSTRIAL
EXPERIENCE 5cp
These subject units are designed to formalise periods
of Induslrial Experience gained by part-time students
only. Students will also be required to present a
report giving a connected account and critical
evaluation of their engineering activities and
experience during the year. Such subjects may be
counted by part-time students as electives. (See
section 4 of this Handbook).

CIVIL12 MECHANICS OF SOLIDS 5cp
Discuss stress and strain, extenmion of bars. Simple
determined problems, thermal stresses,
superposition, strain energy, nonlinear deformation
axially loaded bars. Thin shells subject to internal
pressure, Mohr's circle of stresses. Shear strain.
generalised stress-strain relations. (See further information.
Text
Manahan, S.E. 1990, Environmental Chemistry, 4th
drn. Lewis.

Civil Engineering Subjects

CIVIL11 MECHANICS AND
STRUCTURES 5cp
Introduction to the behaviour of structures. Statically
forced as vectors, resultant, equilibrium in two
dimensions. Beams, trusses; method of joints
method of sections. Statical determination
Statically determinate. Shrinkage, properties of sections, stress, strain
Mohr's circle. Columns; stability, Euler's formula.
CIVL420 GEOTECHNICAL ENGINEERING 10cp

CIVL420 ROCK MECHANICS 5cp
Index properties and classification, rock strength and failure criteria, deformation of rocks, in situ stress, planes of weakness, foundations on rock, underground openings, rock slopes.

CIVL435 RIVER AND COASTAL ENGINEERING 5cp

CIVL443 WATER RESOURCES ENGINEERING 5cp
This course considers several areas of applied water resources engineering emphasizing synthesis of basic principles and design. Multi-objective planning. Urban drainage: layout and design, runoff routing, retarding basins. Water supply systems: objectives, stochastic behaviour, design, operation, modelling.

CIVL453 CIVIL ENGINEERING DESIGN 1 15cp
Examples of Civil Engineering design in steel and concrete structures, geomechanics and water resource systems. Visits to works of interest. Interaction with other professions, regulatory authorities and practising engineers.

CIVL454 CIVIL ENGINEERING DESIGN 2 15cp
Further examples as per CIVL453.

CIVL455 PROJECT 15cp
Literature review, analytical and/or experimental investigation of one or more civil engineering design problems. Presentation of seminar.

CIVL457 ENVIRONMENTAL ENGINEERING DESIGN 15cp
Analysis and design of major case studies. Investigation for Environmental impact assessment; design of pollution control systems. Visits to sites of interest. Interaction with a broad range of professionals, regulatory authorities and practising engineers.

CIVL458 ENGINEERING RISK ASSESSMENT 5cp
Consideration of the assessment and evaluation of risks associated with a wide variety of engineering projects, including environmental, mechanical, chemical, geotechnical, water resource and structural engineering projects. The need for risk assessment in decision-making, decision criteria, probabilistic descriptions of uncertainty; stochastic processes and natural phenomena; human error; hazard scenarios; fault and event trees; complex systems; first order reliability methods; simulation; updating; prediction.

CIVL472 HIGHWAY ENGINEERING 5cp

CIVL491 SPECIAL TOPIC 5cp
A contemporary topic in civil engineering approved by the Head of Department.

CIVL492 SPECIAL TOPIC 5cp
A contemporary topic in civil engineering approved by the Head of Department.

Commerence Subjects

COMM102 FINANCIAL MANAGEMENT FUNDAMENTALS 10cp
Consideration of fundamental financial management concepts and practice, and the use of accounting information therein. Introduction to the Australian capital market, and analysis and interpretation of financial statements. Development of basic management accounting techniques to provide data primarily for internal financial assessments by management; including: allocation of overheads, product costing, budgeting, cost-volume-profit analysis, differential analysis and variable capital investment models. These are developed in relation to operating, investment and financial decisions of a business entity.

See Faculty of Economics and Commerce Handbook for further information.
SUBJECT EQUIVALENCES

General Transition Arrangements for Computer Science Degree Programs

The following arrangements generally apply to the BComp, BComp(Hons) and MComp programs, but may also act as a guide to students enrolled in other courses who have completed and intend to enrol in Computer Science subjects. Students currently enrolled in the GradDipComp degree program should contact the Faculty Office regarding transition arrangements. Students who have taken subjects under both old and new curricula will be given equivalence for old subjects in terms of new ones. The transition arrangements are outlined in the tables shown below. In certain situations, to complete their transition, students may be required to pass either or both of the special "project" subjects COMP198 and COMP299.

Any COMP subject offered before 1994 which is not listed in the table below has no equivalent in the new curriculum; such subjects are treated as Directed Electives of the appropriate level (100, 200, 300, or 400-level). Any COMP subject offered before 1994 which is not listed in the table below has no equivalent in the new curriculum; such subjects are treated as Directed Electives of the appropriate level (100, 200, 300, or 400-level).

Table 1 — SUBJECT EQUIVALENCES

<table>
<thead>
<tr>
<th>Title</th>
<th>Equivalence</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP101 Computer Science 1</td>
<td>To be determined</td>
<td>[Refer to Table 2 below]</td>
</tr>
<tr>
<td>COMP201 Advanced Data Structures</td>
<td>To be determined</td>
<td>[Refer to Table 2 below]</td>
</tr>
<tr>
<td>COMP202 Computer Architecture</td>
<td>—</td>
<td>Directed Elective</td>
</tr>
<tr>
<td>COMP203 Assembly Language</td>
<td>—</td>
<td>Directed Elective</td>
</tr>
<tr>
<td>COMP204 Prog Lang Semantics</td>
<td>—</td>
<td>Directed Elective</td>
</tr>
<tr>
<td>COMP205 Programming in C</td>
<td>—</td>
<td>Directed Elective</td>
</tr>
<tr>
<td>COMP206 Theory of Computation</td>
<td>COMP110</td>
<td>May still be counted towards the GradDip Comp and GradDipComp Sci degrees COMP241 Cognitive Science — Directed Elective</td>
</tr>
<tr>
<td>COMP212 Intro to Programming</td>
<td>COMP310</td>
<td>No change</td>
</tr>
<tr>
<td>COMP299 Project</td>
<td>COMP299</td>
<td>—</td>
</tr>
<tr>
<td>COMP301 Compiler Design</td>
<td>COMP329</td>
<td>—</td>
</tr>
<tr>
<td>COMP302 Artificial Intelligence</td>
<td>COMP325</td>
<td>—</td>
</tr>
<tr>
<td>COMP303 Computer Networks</td>
<td>COMP328</td>
<td>—</td>
</tr>
<tr>
<td>COMP304 Database Design</td>
<td>COMP325</td>
<td>—</td>
</tr>
<tr>
<td>COMP305 Algorithm Design</td>
<td>COMP323</td>
<td>—</td>
</tr>
<tr>
<td>COMP306 Computer Graphics</td>
<td>COMP332</td>
<td>—</td>
</tr>
<tr>
<td>COMP307 Software Engineering Principles plus any one 10cp 300-level COMP subject</td>
<td>COMP321</td>
<td>—</td>
</tr>
<tr>
<td>COMP308 Operating Systems</td>
<td>COMP327</td>
<td>—</td>
</tr>
<tr>
<td>COMP309 Special Topic 1</td>
<td>—</td>
<td>Directed Elective</td>
</tr>
<tr>
<td>COMP401 Adv. Artificial Intelligence</td>
<td>COMP443</td>
<td>—</td>
</tr>
<tr>
<td>COMP402 Formal Semantics</td>
<td>COMP444</td>
<td>—</td>
</tr>
<tr>
<td>COMP404 Parallel Computation &amp; VLSI</td>
<td>COMP324</td>
<td>Still counted towards the 60cp elective requirement for BCompSci(Hons)</td>
</tr>
<tr>
<td>COMP405 Digital Image Processing</td>
<td>—</td>
<td>Directed Elective</td>
</tr>
<tr>
<td>COMP502 Master of Computing Proj. Part A</td>
<td>COMP501</td>
<td>No change</td>
</tr>
<tr>
<td>COMP503 Master of Computing Proj. Part B</td>
<td>COMP502</td>
<td>No change</td>
</tr>
<tr>
<td>COMP503 Master of Computing Project</td>
<td>COMP503</td>
<td>No change</td>
</tr>
</tbody>
</table>

The subjects COMP101, MATH212, and PHIL242 together are equivalent under the 1994 curriculum to the subjects COMP111, COMP112, and COMP113. However, if one or more of COMP101, MATH212, and PHIL242 have not been completed, then only a partial equivalence may be granted, depending on the combination of completed subjects. Table 2 shows the equivalence granted for in each of the possible combinations:

Table 2 — 100-LEVEL EQUIVALENCES

<table>
<thead>
<tr>
<th>Title</th>
<th>Equivalence</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP101</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>MATH212</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>PHIL242</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Must pass COMP111, COMP112, COMP113

Grant 5cp of 200-level General Electives, & must pass COMP111, COMP112, COMP113

Grant 5cp of 200-level General Electives, & must pass COMP111, COMP112, COMP113

Grant 10cp of 200-level General Electives, & must pass COMP111, COMP112, COMP113

Grant COMP111. Must pass MATH212 to be granted COMP112. Must pass PHIL242 (or COMP190) to be granted COMP113

Grant COMP111. Must pass MATH212 to be granted COMP112. Must pass PHIL242 (or COMP190) to be granted COMP113

Grant COMP111. Must pass MATH212 to be granted COMP112. Must pass PHIL242 (or COMP190) to be granted COMP113

Grant COMP111, COMP112, COMP113
The 5cp subjects COMP201, COMP204, COMP205, and COMP206 together are equivalent under the 1994 curriculum to the 10cp subjects COMP221 and COMP222. However, if one or more of COMP201, COMP204, COMP205, and COMP206 have not been completed, then only a partial equivalence may be granted, depending on the combination of completed subjects. In those cases where only 5 or 10 credit points have been accumulated from among these four subjects, an additional 5cp must be taken and passed. This is normally done by enrolling in and passing the project course COMP299. The topic of the project depends on the exact combination of 5cp subjects completed.

Table 3 shows the equivalence granted for each of the possible combinations, as well as the allowed topics for the COMP299 Project, where applicable. Students enrolled in degree courses which are not administered by the Department of Computer Science, but which include 200-level COMP subjects as required subjects, should consult their own Departments concerning 200-level equivalence.

<table>
<thead>
<tr>
<th>COMP</th>
<th>201</th>
<th>204</th>
<th>205</th>
<th>206</th>
<th>Equivalence</th>
<th>COMP229 Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>1</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>COMP222</td>
<td>Program Semantics</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>COMP21</td>
<td>—</td>
<td>Comparative Programming Lang.</td>
</tr>
<tr>
<td>3</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>COMP22</td>
<td>—</td>
<td>Comparative Programming Lang.</td>
</tr>
<tr>
<td>4</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>COMP21</td>
<td>Data Structures</td>
</tr>
<tr>
<td>5</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>COMP222</td>
<td>Program Semantics or Data Structures</td>
</tr>
<tr>
<td>6</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>COMP21</td>
<td>Comparative Programming Lang.</td>
</tr>
<tr>
<td>7</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>COMP22</td>
<td>—</td>
<td>Theory of Computation</td>
</tr>
<tr>
<td>8</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>COMP21</td>
<td>—</td>
</tr>
<tr>
<td>9</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>COMP22</td>
<td>—</td>
<td>Theory of Computation</td>
</tr>
<tr>
<td>10</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>COMP22</td>
<td>—</td>
<td>Theory of Computation</td>
</tr>
<tr>
<td>11</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>COMP22</td>
<td>—</td>
<td>Theory of Computation</td>
</tr>
<tr>
<td>12</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>COMP21</td>
<td>—</td>
</tr>
<tr>
<td>13</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>COMP22</td>
<td>—</td>
<td>Theory of Computation</td>
</tr>
<tr>
<td>14</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>COMP22</td>
<td>—</td>
<td>Theory of Computation</td>
</tr>
<tr>
<td>15</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>COMP22</td>
<td>—</td>
<td>Theory of Computation</td>
</tr>
</tbody>
</table>

COMP299 projects may be in one of four areas, as indicated in Table 3: Comparative Programming Languages, Program Semantics, Data Structures, Theory of Computation. Typically, a project would involve a major programming and/or directed reading assignments and/or quizzes, but no lectures.

Students who otherwise would be required to enrol in the COMP299 Project subject may instead opt to disregard the credit for one of COMP201, COMP204, COMP205, or COMP206, and to follow the transition rule for the resulting combination. For example, a student who has successfully completed COMP204 or COMP205 and COMP206 but not COMP201 (combination 7) would ordinarily receive an equivalence for COMP221 and COMP222 provided that a COMP299 Project were completed. However, if the student prefers to take COMP221 instead of COMP299, he or she could choose to disregard COMP201 and opt for combination 5 (COMP204 and COMP206 only). In so doing, the student would enrol in COMP221, and if successfully completed, the 10cp earned from COMP221 would replace the 5cp earned from COMP201.

Any student who believes that they are disadvantaged by these transition arrangements may, after consulting the course coordinator, apply in writing to the Dean for consideration of their case.

In order to provide for exceptional cases in transition the Dean may determine the transition programme to be followed.

1994 SUBJECT DESCRIPTIONS

COMP110 INTRODUCTION TO PROGRAMMING 5cp

This subject is not available to candidates enrolled in Computer Science projects, or to students who have passed or been exempted from COMP101, COMP201 prior to 1991, COMP212 or COMP111. An introduction to structured programming and the design of algorithms using a procedural language.

COMP111 INTRODUCTION TO COMPUTER SCIENCE 1 10cp

This subject introduces the computer as a system by which problems may be solved. Students are introduced to the process of designing and implementing algorithms to solve problems. Data types are covered, and sorting and searching techniques are introduced to help motivate the theoretical issues. Students are introduced to control structures, data types and procedural abstraction. An overview is also given of the basic software and hardware components of a computer system, including operating systems, compilers, memory and control logic. The social implications of computing is discussed, and an overview of the curriculum is given.

COMP122 DISCRETE STRUCTURES 10cp

This subject continues the development of fundamental ideas in algorithm design and complexity analysis in conjunction with an introduction to discrete mathematics. The concepts in abstract data type is contrasted with that of a data structure implementation, beginning with lists, queues, and binary trees. Classical algorithms using these structures are investigated and analysed, using tools drawn from areas of discrete mathematics such as recurrence relations, combinatorics, probability, and elementary graph theory.

Finally, a project subject may be undertaken in any of four areas, as indicated in Table 3: Comparative Programming Languages, Program Semantics, Data Structures, Theory of Computation. Typically, a project would involve major programming and/or directed reading assignments and/or quizzes, but no lectures.

Students who otherwise would be required to enrol in the COMP299 Project subject may instead opt to disregard the credit for one of COMP201, COMP204, COMP205, or COMP206, and to follow the transition rule for the resulting combination. For example, a student who has successfully completed COMP204 or COMP205 and COMP206 but not COMP201 (combination 7) would ordinarily receive an equivalence for COMP221 and COMP222 provided that a COMP299 Project were completed. However, if the student prefers to take COMP221 instead of COMP299, he or she could choose to disregard COMP201 and opt for combination 5 (COMP204 and COMP206 only). In so doing, the student would enrol in COMP221, and if successfully completed, the 10cp earned from COMP221 would replace the 5cp earned from COMP201.

Any student who believes that they are disadvantaged by these transition arrangements may, after consulting the course coordinator, apply in writing to the Dean for consideration of their case.

In order to provide for exceptional cases in transition the Dean may determine the transition programme to be followed.

1994 SUBJECT DESCRIPTIONS

COMP110 INTRODUCTION TO PROGRAMMING 5cp

This subject is not available to candidates enrolled in Computer Science projects, or to students who have passed or been exempted from COMP101, COMP201 prior to 1991, COMP212 or COMP111. An introduction to structured programming and the design of algorithms using a procedural language.

COMP109 PROJECT 5cp

A project in computer science for candidates enrolled in the Bachelor of Computer Science program and the Graduate Diploma in Computer Science program.

COMP221 COMPARATIVE PROGRAMMING LANGUAGES 10cp

This subject introduces the student to the nature of contemporary programming languages, including true object-oriented languages (such as Smalltalk or Eiffel). The evolution of imperative languages (FORTRAN, Algol, PL/I, Pascal, C, Ada) and functional languages (Lisp, Scheme, ML) and logic programming (Prolog) are discussed. In addition, fundamental design and implementation concepts for high-level programming languages are introduced, including the concepts of binding, type checking and run-time storage management.

COMP222 THEORY OF COMPUTATION 10cp

This subject introduces the theory of computability, including important results from the study of automata and formal languages. The subject begins with a discussion of automata and their relationship to regular, context free and context sensitive languages. General theories of computability are presented, including Turing machines, recursive functions and lambda calculus. Notions of decidability and undecidability are discussed and this is related to complexity analysis. Finally, formal program verification is presented and analysed, leading to the topic of formal program verification.

COMP223 ANALYSIS OF ALGORITHMS 10cp

This subject covers data structures and algorithms in depth. Topics covered include data structures developed in more depth than in COMP129, and an introduction to computability classes. Various algorithms are presented in the light of specific problem-solving strategies and complexity issues. Advanced topics such as balanced search trees, graph algorithms, parallel and distributed algorithms, and randomised algorithms are discussed.
THE UNIX OPERATING SYSTEM 10cp

In which the UNIX operating system is a top-down fashion. Topics covered are the UNIX file system, the shell and utilities, system calls, security, management systems such as X11, and manipulation. The subject is oriented towards the use of individual UNIX user, and is offered to professionals alike.

ARTIFICIAL INTELLIGENCE 2 10cp

A broad scope of Artificial Intelligence, with attention to the topics of knowledge representation, search techniques, artificial computer programming, artificial neural networks, natural language processing, and architectures for AI.

SOFTWARE ENGINEERING AND PROJECT 20cp

This subject presents an in-depth treatment of software engineering topics, including engineering paradigms, requirements specifications, functional and object-oriented design, verification and maintenance. Societal implications are considered, and the basic principles of technical writing are presented. Expect to complete a major project.

COMPUTER VISION AND ROBOTICS 10cp

Robotics provides applications for many areas of Artificial Intelligence. Robots have a necessity to plan routes, to form world situations, to understand if they can hear; if they trusted in natural language rather than dis; if they can reason; if they can learn. This subject will examine some of these.

COMP320 COMPILER DESIGN 10cp

Introduction to the theory of grammars, Lexical analyses, syntactic analyses, elementary semantic analyses, Parsing techniques, object code generation and optimisation, Scanner and parser generators.

COMP329 GRAPHIC USER INTERFACES 10cp

Almost all computer systems designed in the next 10 years will involve a graphic user interface. Graphic user interfaces are increasingly common feature of modern computer systems. This subject discusses the use of GUIs in software engineering, and includes visual programming and some aspects of CASE tools. Further, we study the fundamental design issues for GUIs, concentrating on applications to database design and software engineering.

COMP325 DATABASE SYSTEMS 10cp

The subject covers the three level architecture for database systems, relational database model, database normalization, data security and integrity, recovery and concurrency, and distributed databases. Additionally, students learn the SQL query language, and get a hands-on experience of modern relational database management systems such as Sybase.

COMP326 DATA SECURITY 10cp

This subject covers various topics in data security, including cryptography, encryption algorithms, Data Encryption Standard, public-key encryption, cryptanalysis, key exchange protocols, key management, secret sharing schemes, access controls, authentication, digital signatures, information flow controls, security of statistical databases.

COMP327 PRINCIPLES OF OPERATING SYSTEMS 10cp

This subject provides a thorough introduction to operating systems. Topics include: tasking and processes, process coordination, process synchronization, resource scheduling, physical and virtual memory organization, security issues, communications and networking, and distributed operating systems.

COMP328 COMPUTER NETWORKS 10cp

An introduction to data communication networks.

COMP329 COMPILER DESIGN 10cp

Introduction to the theory of grammars. Lexical analyses, syntactic analyses, elementary semantic analyses. Parsing techniques, object code generation and optimisation. Scanner and parser generators.

COMP330 GRAPHIC USER INTERFACES 10cp

Almost all computer systems designed in the next 10 years will involve a graphic user interface. Graphic user interfaces are increasingly common feature of modern computer systems. This subject discusses the use of GUIs in software engineering, and includes visual programming and some aspects of CASE tools. Further, we study the fundamental design issues for GUIs, concentrating on applications to database design and software engineering. This subject involves a major project to create a GUI.

COMP331 GEOMETRIC DATASTRUCTURES 10cp

Geometric data structures are used to represent geometric structures such as in image analysis and solid modelling, as well as implicitly geometric structures such as relational databases. In this subject we study fundamental data structures which have applications for both implicitly and explicitly geometric data, as well as topological data structures and solid modelling.

COMP332 COMPUTER GRAPHICS 10cp

Graphical Interface, the cost effective method to present information in a fashion that supports rapid exploration and comprehension. The issues to be solved, related to the displaying of objects, may include: graphics hardware, windows programming, graphics interface formats, 2D drawing primitives and their raster algorithms, 2D & 3D geometrical transformations, projections, geometric models, colour theory, 3D viewing, visible-surface determination, illumination and shading, ray tracing and radiosity, and computer animation.

COMP411 SPECIAL TOPIC A 10cp

A series of lectures and/or practical work in an area of advanced computer science. The content may vary from year to year according to developments in technology and the presence of academic visitors.

COMP412 SPECIAL TOPIC B 10cp

This subject covers advanced topics in data security. Students are expected to implement additional security features to Sybase using embedded SQL. Possible features include key exchange and authentication protocols, and mechanisms for the protection of statistical databases. Students are also expected to write a major essay on an advanced topic in data security.

COMP413 SPECIAL TOPIC C 10cp

A substantial project usually involving a literature review together with a theoretical and/or practical investigation of a computer science problem. Project work normally commences in early February. The project work is embodied in a thesis, two copies of which are required. Students are also required to present seminars on their project work.

Faculty of Engineering Guide to Subject Descriptions

Section Eight

THE UNIX OPERATING SYSTEM 10cp

In which the UNIX operating system is a top-down fashion. Topics covered are the UNIX file system, the shell and utilities, system calls, security, management systems such as X11, and manipulation. The subject is oriented towards the use of individual UNIX user, and is offered to professionals alike.

ARTIFICIAL INTELLIGENCE 2 10cp

A broad scope of Artificial Intelligence, with attention to the topics of knowledge representation, search techniques, artificial computer programming, artificial neural networks, natural language processing, and architectures for AI.

SOFTWARE ENGINEERING AND PROJECT 20cp

This subject presents an in-depth treatment of software engineering topics, including engineering paradigms, requirements specifications, functional and object-oriented design, verification and maintenance. Societal implications are considered, and the basic principles of technical writing are presented. Expect to complete a major project.

COMPUTER VISION AND ROBOTICS 10cp

Robotics provides applications for many areas of Artificial Intelligence. Robots have a necessity to plan routes, to form world situations, to understand if they can hear; if they trusted in natural language rather than dis; if they can reason; if they can learn. This subject will examine some of these.

COMP320 COMPILER DESIGN 10cp

Introduction to the theory of grammars, Lexical analyses, syntactic analyses, elementary semantic analyses. Parsing techniques, object code generation and optimisation. Scanner and parser generators.

COMP329 GRAPHIC USER INTERFACES 10cp

Almost all computer systems designed in the next 10 years will involve a graphic user interface. Graphic user interfaces are increasingly common feature of modern computer systems. This subject discusses the use of GUIs in software engineering, and includes visual programming and some aspects of CASE tools. Further, we study the fundamental design issues for GUIs, concentrating on applications to database design and software engineering. This subject involves a major project to create a GUI.

COMP325 DATABASE SYSTEMS 10cp

The subject covers the three level architecture for database systems, relational database model, database normalization, data security and integrity, recovery and concurrency, and distributed databases. Additionally, students learn the SQL query language, and get a hands-on experience of modern relational database management systems such as Sybase.

COMP326 DATA SECURITY 10cp

This subject covers various topics in data security, including cryptography, encryption algorithms, Data Encryption Standard, public-key encryption, cryptanalysis, key exchange protocols, key management, secret sharing schemes, access controls, authentication, digital signatures, information flow controls, security of statistical databases.

COMP327 PRINCIPLES OF OPERATING SYSTEMS 10cp

This subject provides a thorough introduction to operating systems. Topics include: tasking and processes, process coordination, process synchronization, resource scheduling, physical and virtual memory organization, security issues, communications and networking, and distributed operating systems.

COMP328 COMPUTER NETWORKS 10cp

An introduction to data communication networks.
PROGRAM SEMANTICS 10cp
The subject covers denotational logic, semantic algebraic specification, logics of programs, and logics for proving programs. Operational semantics of concurrent processes, and computing.

COMPUTATIONAL GEOMETRY 10cp
This subject is concerned with the design and algorithms of a fundamentally geometric and their applications in fields such as robotics and VLSI design. Topics to be covered may include convexity and its applications, full algorithms and applications, duality, on algorithms, Voronoi diagrams and line arrangements.

ADVANCED COMPUTATIONAL COMPLEXITY 10cp
This subject covers topics in discrete and computational complexity and are covered in a workshop-style setting. Solutions to unsolved research problems are expected.

GRAPH ALGORITHMS 10cp
In this subject, students complete a major project. Symbol table structures for block structured languages, and special features such as backtracking, and exporting. Run-time structures for interpreted languages and abstract data types, operation to assembly language, machine dependent and machine dependent optimisation.

ADVANCED PARALLEL PROCESSING DESIGN 10cp
This subject introduces advanced techniques and paradigms of parallel programming. Techniques are discussed, and unsolved problems are investigated.

COMP451 ADVANCED PARALLEL PROCESSING APPLICATIONS 10cp
The use of parallel processing to achieve high performance in certain application areas is investigated. Such areas could include image processing, scientific computing, distributed operating systems, etc. The particular area to be studied in depth will be selected and announced by the lecturer prior to the start of each subject offering.

COMP452 THEORY OF DATABASES 10cp
This subject covers advanced topics in the theory of databases. Students are required to implement features in Sybase using embedded SQL. The possible topics include semantic integrity rules, security mechanisms and a treatment of missing values. Students are also expected to write a major essay on an advanced topic in the theory of databases.

COMP501 MASTER OF COMPUTING PROJECT PART A 30cp
A major project at Master level usually involves a literature review together with a theoretical and/or practical investigation of a computer science problem. This subject is available for students in the MCompSc degree program who are permitted by the Course Coordinator in Computer Science to meet the requirements of that program, normally taken over two years. Satisfactory completion of this subject will lead to the award of 'Ungraded Pass' (UP) and enable the student to complete the subject by undertaking COMP502. Attendance at Department of Computer Science seminars, presented by invited speakers, is compulsory.

COMP502 MASTER OF COMPUTING PROJECT PART B 30cp
This subject enables completion of the major project requirement of the MCompSc program commenced in COMP501. The project work is embodied in a thesis, two copies of which are required. Students are required to present a seminar based on their project work. Attendance at Department of Computer Science seminars, presented by invited speakers, is compulsory.

ECON111 MACROECONOMICS I 10cp
This course introduces students to macroeconomic concepts, principles and policy. Topics covered include national income accounting, income and employment determination, inflation, the balance of payments, monetary and fiscal policy.

ECON110 MICROECONOMICS I 10cp
Microeconomics, the foundation of all economics, is the study of the allocation of resources and the distribution of income and wealth arising from the interaction of market forces and government intervention. This course introduces the theoretical concepts, principles and relationships which are the basis of every economist's tool-kit. Taking the household and the firm as decision-making units, the course examines the nature of Demand and Supply and how they interact in competitive, monopolistic and monopolistic markets for both products and factors. This leads to consideration of the limitations of market forces and the appropriate form of policy intervention.

ECON371 PRINCIPLES OF ECONOMICS 10cp
An introduction to the fundamental theorems and principles of modern economic thought and their application to the real world problems arising in the context of regional and urban planning. Micro and macro-economic principles will be introduced as required. Major problems to be examined: backward and underdeveloped regions, unemployment, labour migration policies for balanced regional growth, urban development, poverty and crime, traffic congestion, pollution, and declining quality of life.

ELEC101 INTRODUCTION TO ELECTRICAL AND COMPUTER ENGINEERING 5cp
A course intended to give a broad introduction to practical and theoretical aspects of electrical and computer engineering.

ELEC130 ELECTRICAL ENGINEERING 10cp
Enrolment in this subject is limited to students enrolled in the BE program in Computer Engineering, Electrical Engineering, Industrial Engineering and Mechanical Engineering or the BCompSc program. Introduction to Electrical Engineering. Concepts of voltage, current, impedance, power and units of voltage and current. Sources and current sources. Ohm's law. And other fundamental concepts and theories.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.

This subject is offered as a service subject and is not available to students enrolled in the Computer Engineering or Electrical Engineering programs.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEC380</td>
<td>Project/Directed Reading</td>
<td>5cp</td>
<td>This subject is only available to Electrical or Computer Engineering students with the written permission of the Head of Department. Private work of laboratory, literature search or theoretical nature requiring the preparation of a report taken under the direction of a supervisor with whom the topic should be negotiated.</td>
</tr>
<tr>
<td>ELEC413</td>
<td>Electrical Technology</td>
<td>5cp</td>
<td>Not offered in 1994. An advanced subject on materials, instrumentation, high voltage technology, testing, lightning protection and earthing.</td>
</tr>
<tr>
<td>ELEC420</td>
<td>VLSI Design</td>
<td>10cp</td>
<td>Introduction to VLSI and MOS technology. MOS transistor theory. Inverters design. MOS processing technology and design rules. Circuit characterisation and performance estimation. Circuit and logic design. Design tools. Subsystem design. The subject consists of lectures and project work on MOS VLSI design.</td>
</tr>
<tr>
<td>ELEC431</td>
<td>Electronics Design</td>
<td>10cp</td>
<td>An advanced subject on electronics: noise and interference in electronic circuits, analogue and digital interfacing, active filters, high frequency amplifiers, oscillators, modulators, phase locked loops, switched capacitor filters.</td>
</tr>
<tr>
<td>ELEC440</td>
<td>Advanced Control</td>
<td>10cp</td>
<td>Not offered in 1994. This subject gives an advanced treatment of estimation and control theory with emphasis on techniques with industrial relevance. State space models, digital control, advanced transform techniques, controllability, observability, modern control system design, multivariable systems, digital filtering, adaptive control and digital implementation issues. The material will be illustrated by industrial case studies. The theory outlined above will be used to design controllers for practical examples. Simulation studies and/or laboratory experiments will be conducted. Text: Middleton, R.H. and Goodwin, G.C., Digital Estimation and Control, A Unified Approach.</td>
</tr>
<tr>
<td>ELEC441</td>
<td>Control System Design and Management</td>
<td>10cp</td>
<td>Design issues in Control Systems. Integration of Control Systems with corporate and management policies. Emphasis will be given to the assessment of control opportunities in the industrial context, the evaluation of cost benefit trade-offs, and total quality control issues. Content will be illustrated by a number of design examples such as: Telecommunications, Power/Thermoelectric, Gauge Thickness Control in Rolling Mills, and Flow Control in Chemical Processes. Text: Glover, J.D. and Sarma, M., 1989, Power System Analysis and Design, PWS-Kent.</td>
</tr>
<tr>
<td>ELEC445</td>
<td>Advanced Signal Processing</td>
<td>5cp</td>
<td>This subject focuses primarily on applications of advanced analogue and digital signal processing techniques. Topics covered include, for example, radar signal processing, spectral estimation, image processing, adaptation and adaptive algorithms, the wavelet transform, speech recognition, and signal processing.</td>
</tr>
<tr>
<td>ELEC446</td>
<td>Electromagnetics</td>
<td>5cp</td>
<td>Not available to students who completed ELEC350 Communications prior to 1982. Such students who intended to undertake ELEC446 Advanced Electromagnetic communications may undertake ELEC380 and ELEC455. Review of Maxwell's equations, solutions to various media, reflection, refraction, Poinget's power flow theorem, attenuation and surface impedance, free space and guided wave propagation including coastal, wave-guide and stripe configurations, electromagnetic sources and potential functions, radiation and elementary antenna theory, techniques for obtaining the surface current distribution on an antenna by analytic and computational methods, solutions of potential equations, near and far field distributions, characteristics of common antenna configurations including primary source wire antennas, antenna arrays, and secondary source antennas, ground wave and ionospheric propagation.</td>
</tr>
<tr>
<td>ELEC447</td>
<td>Advanced Communications</td>
<td>5cp</td>
<td>This subject focuses primarily on applications of advanced analogue and digital communication techniques. Topics covered include, for example, design and management of baseband and bandpass communication systems, satellite, microwave, optical fibre and cabled systems, communication standards and protocols, spread spectrum techniques and cellular telephone structure. Text: Peck, G., 1992, Communication Engineering, PWS-Kent.</td>
</tr>
<tr>
<td>ELEC460</td>
<td>Computer Software</td>
<td>10cp</td>
<td>The aim of this subject is to consolidate software design skills by working on a large software development project, and to gain experience in the project management issues which arise out of working with a team.</td>
</tr>
<tr>
<td>ELEC470</td>
<td>Advanced Computer Architecture</td>
<td>10cp</td>
<td>This subject is specifically directed towards parallel computing involving the most popular network architectures: arrays, trees, hypercubes, and some closely related networks. Relationships between the resultant network architectures as well as fastest and most efficient parallel algorithms for a wide variety of problems are covered.</td>
</tr>
<tr>
<td>ELEC480</td>
<td>Electrical Engineering Project</td>
<td>30cp</td>
<td>Final year project for Electrical Engineering students, generally consisting of literature survey and review, analytical and/or experimental investigation of a particular electrical engineering problem. Students are required to give one or more seminars, to prepare a Project Report (2 copies required), and to present their project work for exhibition and/or demonstration.</td>
</tr>
</tbody>
</table>
| ELEC541 | Control System Design and Management | 5cp | The aim of this course is to acquaint students with design issues in Control Systems as well as their integration with corporate and management policies. Emphasis will be given to the assessment of control systems.
<table>
<thead>
<tr>
<th>Faculty of Engineering</th>
<th>Section Eight</th>
<th>Guide to Subject Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC545 NONLINEAR SYSTEMS ANALYSIS 5cp</td>
<td>Basic techniques in nonlinear systems analysis: Lyapunov stability theory, Grownon Lemma, Input-output methods, oscillations, singular perturbations. Text</td>
<td></td>
</tr>
<tr>
<td>ELEC546 TOPICS IN SYSTEM DESIGN 1 5cp</td>
<td>A topic oriented to students concerned with advanced design rather than basic research.</td>
<td></td>
</tr>
<tr>
<td>ELEC547 TOPICS IN SYSTEM DESIGN 2 5cp</td>
<td>A topic oriented to students concerned with advanced design rather than basic research.</td>
<td></td>
</tr>
<tr>
<td>ELEC548 ADVANCED DIGITAL SIGNAL PROCESSING 5cp</td>
<td>Advanced techniques in recursive filter design: bandwidth, ambiguity functions, two-dimensional imaging, array processing.</td>
<td></td>
</tr>
<tr>
<td>ELEC549 COMPUTER AND ELECTRONICS SEMINAR 1 5cp</td>
<td>The major project in the Master of Engineering Science - Computer Engineering program undertaken in the Department of Electrical and Computer Engineering.</td>
<td></td>
</tr>
<tr>
<td>ELEC550 COMPUTER AND ELECTRONICS SEMINAR 2 5cp</td>
<td>The major project in the Master of Engineering Science - Computer Engineering program undertaken in the Department of Electrical and Computer Engineering.</td>
<td></td>
</tr>
<tr>
<td>ELEC551 COMPUTER AND ELECTRONICS SEMINAR 3 5cp</td>
<td>Each subject consists of a series of seminars for research postgraduate students. Each student will prepare a seminar on research literature.</td>
<td></td>
</tr>
<tr>
<td>ELEC552 COMPUTER AND ELECTRONICS SEMINAR 4 5cp</td>
<td>Each subject consists of a series of seminars for research postgraduate students. Each student will prepare a seminar on research literature.</td>
<td></td>
</tr>
<tr>
<td>ELEC553 SYSTEMS AND CONTROL SEMINAR 1 5cp</td>
<td>Each subject consists of a series of seminars for research postgraduate students. Each student will prepare a seminar on research literature.</td>
<td></td>
</tr>
<tr>
<td>ELEC554 SYSTEMS AND CONTROL SEMINAR 2 5cp</td>
<td>Each subject consists of a series of seminars for research postgraduate students. Each student will prepare a seminar on research literature.</td>
<td></td>
</tr>
<tr>
<td>ELEC555 SYSTEMS AND CONTROL SEMINAR 3 5cp</td>
<td>Each subject consists of a series of seminars for research postgraduate students. Each student will prepare a seminar on research literature.</td>
<td></td>
</tr>
</tbody>
</table>
Geography Subjects

GEOG101 INTRODUCTION TO PHYSICAL GEOGRAPHY 10cp
An introduction to physical geography including meteorology and climate; the influence of geomorphic processes on landforms; weathering, rivers, ice, frost, wind and the sea; the physical, chemical and biological characteristics of the soil and the development of soil profiles; environmental and historical factors that influence plant distribution. Practical work includes an introduction to the study of climatic data and maps, and the use of topographic maps and aerial photographs for landform analysis.

Text

GEOG102 INTRODUCTION TO HUMAN GEOGRAPHY 10cp
An introduction to human geography including cultural, population, economic, development and urban geography. Practical work includes an introduction to elementary statistical data and its presentation by thematic maps in human geography.

Text

See Faculty of Science and Mathematics Handbook for further information.

Geology Subjects

GEO101 THE ENVIRONMENT 10cp
A lecture, field and practical course which examines in the widest contest the evolution of our planet and man's environment. Specific topics are the Earth in space; evolution and dynamics of the planet Earth; evolution of the atmosphere, hydrosphere, biosphere and man; the impact of climatic change; mineral resources and society.

See Faculty of Science and Mathematics Handbook for further information.

Additional Geology subjects are described in the Faculty of Science and Mathematics Handbook.

Information Science Subjects

INFO101 INTRODUCTION TO INFORMATION SYSTEMS 10cp
Computers have made it possible to store and retrieve massive amounts of data. The "information age" is now a reality. This course introduces the skills and concepts needed to fully exploit the power of this new tool. After completion of the subject, students will understand how and why organisations build and use information systems, will be able to document information flow through particular systems, and will be able to use the microcomputer as a personal support tool. The course provides a solid grounding in computers and their use, which today is important for all students, irrespective of the discipline which they are studying.

Topics covered include: The evolution of computer hardware and software. Systems and their characteristics, the components of an Information System (hardware, software, data and people). Examples of computer based Information Systems. Problems which can/cannot be solved using computers. Types of information systems, formal/informal, public/private. Types of problems structured/unstructured. The computer as a personal support tool, word-processing, spreadsheets, data base management. The importance of people in the information network, the social, organisational and personal implications of computer based information systems.

INFO102 INFORMATION STORAGE AND MANAGEMENT 10cp
The design and implementation of the data repository for any computer based information system is a skilled and extremely critical task. Overall performance of the system will be seriously compromised by an inefficient data storage and retrieval strategy.

This subject introduces the tools needed to design, implement and maintain computer based database systems. It will be of particular interest for students who will need to design and/or access large databases regularly in their chosen profession.

Topics covered include: Storage and representation of data in computer systems. Data types, records, file structures and access mechanisms. Stand-alone file maintenance procedures. Introduction to COBOL, a business/file oriented third generation language.

Semantic data modelling, entity/relationship modelling, functional dependence and other constraints on attribute values. Introduction to database management systems, the hierarchical, network and relational models. Data manipulation languages, with particular emphasis on relational techniques using SQL. Physical database design, normalisation.

INFO201 HUMAN CONTEXT OF INFORMATION SYSTEMS 10cp
This course focuses on the human and organisational effects of computer based systems. It examines the impacts of computer technology and information systems at the individual, group and organisational levels. In doing so, the course combines both the micro and the macro perspectives surrounding the human/organisational aspects of computer/information technology. More specifically, the course seeks to provide a critical examination of issues such as: the personal, social and organisational factors which affect the success/failure of information systems; the role of information systems in human communication; the nature and implications of computer based human problem-solving. The course seeks to address some of the questions raised above, such as: What factors affect an organisation's potential for successful technology management? Why do certain groups of employees resist technological change in their workplace? Why are certain organisations always riding the crest of the technological wave while others lag behind? Also, a substantial portion of the course will be devoted to examining the practical issues surrounding the implementation of Information Systems in the area of human Resource Management. Aspects such as: the role of Human Resource Information Systems (HRIS) in manpower planning and recruitment; job satisfaction and payment systems; monitoring attendance; managing grievances, etc. are considered. These latter aspects are examined from both theoretical and practical perspectives. The Laboratory-based Workshops will familiarise students with various aspects of Human Resource Information Systems (HRIS) and their practical applications.

INFO202 ANALYSIS OF INFORMATION SYSTEMS 10cp
Structured analysis and design methodology will be introduced. Specific topics include: Characteristics of information systems. The role of the system analyst. The system life cycle. Interview techniques. Report writing. Document/techniques (data flow diagrams, data dictionary, entity relationship diagrams, etc.). Cost benefit analysis and implementation techniques.

INFO203 INFORMATION SYSTEMS DESIGN 10cp
Using the techniques introduced in Information Systems Analysis students will work in small groups to design and implement small on-line computer based information processing systems. Specific topics include: file design techniques, form design, security controls and backup, system testing and implementation, the on-going maintenance of systems.

INFO204 COMMERCIAL PROGRAMMING 10cp
COBOL as a business data processing and file organisation language. Basic concepts of file handling and maintenance. Sequential, relative and indexed sequential file organisation. Structured techniques, as applied to COBOL, programming, are emphasised. Structure diagrams, pseudo-code, programming standards, etc. Students are expected to complete assignments using both COBOL 74 and COBOL 85.

Graduate Diploma students who enrol in this subject but have not completed INFO102 should obtain INFO102 COBOL notes from the Department of Management prior to the commencement of classes.

INFO301 INFORMATION SYSTEMS METHODS AND TECHNIQUES 10cp
Alternative information system analysis design and development techniques are compared with the aim of identifying their strengths and weaknesses when used in particular problem domains.

Specific topics covered include:
- Strategies such as prototyping, adaptive design and iterative design.
- Alternative conceptual data modelling approaches such as UML.
- Practical software development methods for: transaction based systems, real time systems, process systems, management reporting systems, decision support systems, etc.
- Computer aided software engineering techniques.
INFO303 INFORMATION SYSTEMS AND THE ORGANISATION 10cp

This subject brings together the techniques introduced in the other Information Systems units, highlighting their use in the management of information systems within an organisation. Specific topics include:

- Systems theory
- Organisational structure
- Decision theory
- The use of information within an organisation
- Division of responsibility for information system development
- End user computing
- Stages of information system growth
- Security disaster planning management control of information systems
- Integration of information systems
- Strategic planning for information systems

INFO304 KNOWLEDGE SYSTEMS 10cp

This subject provides a theoretical and practical foundation for the development of computerised knowledge systems. The theoretical aspects are based on classical and non-classical logics. These logics have well defined semantics and as such allow us to formalise interesting facets of knowledge systems.

Specific topics include:
- Knowledge representation
- Production rules and search strategies
- Reasoning with uncertainty
- Relational theories
- Updating knowledge
- Theory revision
- Planning

The practical aspects involve the study and use of several knowledge processing programming languages

INFO501 COMPUTING AND INFORMATION SYSTEMS 10cp

This course is designed to provide students with an overview of information systems in today's business environment. The course will introduce personal support software available on microcomputers and their applications to management decision making.

During compulsory workshop sessions students will gain "hands on" experience using software packages such as electronic spreadsheets, database management systems, and word processing.

INFO503 SYSTEMS ANALYSIS 10cp

Structured analysis and design methodology will be introduced. Specific topics include: characterisation of a system, information systems, the role of the systems analyst, the system life cycle, interview techniques, report writing, documentation techniques (data flow diagrams, data dictionary, flowcharts, etc.), cost/benefit analysis, implementation techniques.

INFO504 SYSTEMS DESIGN 10cp

Using the techniques introduced in MNGT512 Systems Analysis students will work in small groups to design and implement small on-line computer based information processing systems. Specific topics include: file design techniques, form design, security controls and backup, system testing and implementation, the ongoing maintenance of systems.

INFO505 MANAGEMENT INFORMATION SYSTEMS 10cp

This course is designed to expose potential managers to the variety of management information systems available today. The aim is to emphasise the role of the computer in the planning function, rather than simply in the day-to-day transactional operational systems. Specific topics covered will include: database management systems, distributed versus centralized processing, the role of the microcomputer, decision support systems, expert systems, security and privacy implications.

Law Subjects

MATH102 MATHEMATICS 102 10cp


MATH103 MATHEMATICS 103 10cp


See Faculty of Science and Mathematics Handbook for further information.

Text

MATH217 LINEAR ALGEBRA 1 5cp

See Faculty of Science and Mathematics Handbook for further information.

MATH218 LINEAR ALGEBRA 2 5cp

See Faculty of Science and Mathematics Handbook for further information.

Additional Mathematics subjects are described in the Faculty of Science and Mathematics Handbook.

Mechanical Engineering Subjects

MECH101 INTRODUCTION TO MECHANICAL ENGINEERING 5cp
Manufacturing techniques and materials related to mechanical engineering processes and design. Seminar and plant visits intended to enhance understanding of the mechanical engineering degree coursework and the role of the professional engineer in industry and society.

MECH102 INTRODUCTION TO ENGINEERING COMPUTING 5cp
An introduction to the use of computers and computer programming in Engineering. The programming language is FORTRAN 77 under a Unix operating system. Emphasis is placed on the development of a programming style and the logical development of a program. Lectures will cover variable types and their uses, file and data handling, functions, subroutines, arrays, the computer operating system and text editors. Assessment is based partly on programs written by students.

Text

MECH103 ENGINEERING CHEMISTRY 5cp

Text
Lecture Notes, Murch, G.E., 1994, Department of Mechanical Engineering, The University of Newcastle.

MECH111 ENGINEERING DRAWING 5cp
A study of the basic fundamentals of technical graphics with an emphasis on communication and visualisation. The subject matter is reviewed using CAD, drafting and freehand techniques. The use and interpretation or orthographic projection in engineering is emphasised in association with sectioning, auxiliary views, dimensioning, and Australian Standard AS1100. Development of freehand skills for pictorial presentations is highlighted. An introduction into the basics of Descriptive Geometry including elementary intersections is given.

Text
Technical Drawing for Students - SAA H1 1988, Standards Association of Australia.


MECH121 MATERIALS 1 5cp
The course provides a general introduction to materials of engineering significance and to the relationships which exist between structures, properties and applications. The following sections are given approximately equal amounts of time and emphasis. Atomic bonding; atomic arrangements in metals, glasses and polymers; the effects of stress and temperature on simple metals; the control of metallic structures by composition and thermal treatments; common metals of engineering importance; the structures and properties of ceramics and cement products; polymers and rubbers; engineering applications for polymers; the mechanical testing of materials; composite materials; the electrical, magnetic, optical and thermal properties of solid materials.

Text
Lecture Notes, Murch, G.E. and Browne, J.D. 1994, Department of Mechanical Engineering, The University of Newcastle.

MECH101 INDUSTRIAL EXPERIENCE 5cp
These subjects are designed to formalise periods of Industrial Experience gained by part-time students only. Each year of Industrial Experience is worth 5 credit points. Students who wish to study any or all of the Industrial Experience subjects will be required to attend nominated lecture and tutorial periods which will deal with working and professional environments, essentials of communication and report writing. In addition, each student will be required to present a seminar relating to aspects of his experience and to report to his Industrial Experience tutor twice per semester. Students will also be required to present a report giving a connected account and critical evaluation of their engineering activities and experience during the year. A weekly diary commencing 1 November of the previous year must be kept and handed to the Class Supervisor at the beginning of the first semester.

MECH204 EXPERIMENTAL METHODS 1 5cp
A series of laboratory experiments designed to give the student familiarity with mechanical, optical and electrical systems used to measure basic physical quantities such as length, strain, pressure, temperature, force and fluid flow. Interpretation of experimental data and basic principles of error analysis. Proficiency in technical report writing is emphasized.

MECH205 ENGINEERING COMPUTATIONS 5cp
This course is concerned with developing a student's ability to write computer programs that use numerical analysis techniques to solve problems in the engineering field. Some discussion of the theories behind the numerical analysis techniques is given but the main emphasis is on computing. The programming work of MECH102 is extended to include some advanced FORTRAN programming techniques, the use of graph-plotting routines and the use of computer libraries such as the NAG library. Emphasis is placed on curve-fitting to well-ordered data and to experimental data and the differentiation and integration of such data. Systems of equations, both linear and non-linear, are considered. Other material covered includes solution
Faculty of Engineering  

Section Eight  
Guide to Subject Descriptions

of ordinary differential equations and partial differential equations.  

Text  

Handbook for VAX/VMS. The University of Newcastle Computing Centre.  

MECH211 MECHANICAL ENGINEERING DESIGN 1  
10cp  
Students intending to enrol in this subject who completed MECH111 prior to 1992 or who were granted credit in that subject should consult the Head of Department regarding bridging work to be undertaken in February and completed prior to commencement of classes in MECH211.  

Philosophy and fundamentals of mechanical engineering design. Conceptual design problems. Advanced mechanical engineering drawing using CAD including geometric tolerances, surface finish, symbols. Technology of design.  

MECH212 DESIGN OF MACHINE COMPONENTS  
5cp  
Basic components of mechanisms and machinery. Loading and stress calculations, allowable stresses and factors of safety. Design of standard machine components such as shafts, brackets, levers, springs and bolted connections.  

Text  

MECH222 MATERIALS 2  
5cp  
The mechanical behaviour and properties of engineering materials and how they are affected by the environment and by use. An introduction to the factors governing the selection of materials.  

Text  

MECH233 DYNAMICS  
5cp  

Text  

MECH234 DESIGN OF ENGINEERING SYSTEMS  
5cp  

Text  

MECH241 MECHANICS OF SOLIDS 1  
5cp  
Uniaxial loading, stress of strain, stress and strain relationships; internal forces, internal stresses, deflection of beams, torsion, buckling.  

Text  

MECH251 FLUID MECHANICS 1  

Text  

MECH271 THERMODYNAMICS 1  
5cp  

Text  

MECH304 EXPERIMENTAL METHODS 2  
10cp  
Selected engineering laboratory experiments designed to extend the concepts of experimental procedures and to complement the formal subject matter of the course.  

Text  

MECH305 NUMERICAL METHODS  
5cp  

Text  

MECH309 NOISE POLLUTION AND CONTROL  
5cp  

Text  

Selected research papers  

MECH317 BULK MATERIALS HANDLING 1  
15cp  

Text  

Selected research papers  

MECH318 CONVEYING OF BULK SOLIDS  
5cp  
Comparison based on economic and technical considerations of different types of continuous and discontinuous transportation of bulk solids. Overview of freight pipelines - pneumatic, hydraulic and capsule - and mechanical conveying: belt, screw and bucket elevators. Technical and economic considerations in the design of conveyors. Examples will be selected from the continuous conveyor systems mentioned above. In the case of belt conveyors the dynamic characteristics and the influence of these characteristics on design will be studied in some detail. In the case of pneumatic conveyors, the
design of both lean and dense phase systems will be discussed.

Texts


Selected research papers

MECH310 INTRODUCTION TO FINITE ELEMENT ANALYSIS 5cp


Text

MECH325 POLYMER SCIENCE AND TECHNOLOGY 5cp

Study of the engineering properties of polymers and how these properties are dependent on the structure and processing. Polymer structure and synthesis. Thermal, mechanical and optical properties of polymers. Additives, viscosity, elastomers, fibres, coatings. An introduction to polymer processing and fabrication. Applications.

MECH326 FABRICATION OF METALS 5cp

An introduction to the common metal working techniques and the effects these processes have on the properties of the finished product. Topics presented will be taken from: Rollng, Forging, Deep Drawing, Wire and Tube Drawing, Casting, Extrusion and Powder Metallurgy.

Text

MECH332 MATERIALS 3 5cp

This subject deals with metals, polymers, ceramics, composites and biological materials in conjunction with the following topics: review of traditional strength tests; fundamentals of fracture mechanics; rate and temperature effect on toughness; environmental effects these processes have on the properties of the finished product. Topics presented will be taken from: Rolling, Forging, Deep Drawing, Wire and Tube Drawing, Casting, Extrusion and Powder Metallurgy.

Text

MECH333 DYNAMICS OF MACHINES 5cp

Kinematics and dynamics of rigid bodies and rigid bodies in three-dimensional motion. Vectors of dynamic systems. Kinematic equations of rigid bodies. Kinematics of systems of particles and rigid bodies in three-dimensional motion. Text

MECH343 ADVANCED DYNAMICS 5cp

Not available to students who have completed MECH322.


Text

MECH344 MECHANICS OF SOLIDS 2 5cp


MECH352 FLUID MECHANICS 2 10cp

Kinematics of fluids. Dynamics of incomparable fluids. Similarity and the application of dimensional analysis. Exact solutions of the Navier-Stokes equations. Hydrodynamic lubrication. Laminar and turbulent flows. The course includes a number of laboratory experiments dealing with the above topics.

Text


MECH361 AUTOMATIC CONTROL 10cp


Text

MECH381 METHODS ENGINEERING 5cp


Text

MECH382 ENGINEERING ADMINISTRATION 5cp


MECH383 QUALITY ENGINEERING 5cp


MECH386 COMPUTER AIDED MANUFACTURING 5cp

Text


MCH347 OPERATIONS RESEARCH I 5cp
Concept of optimisation; Optimisation approaches; Formulation of Models; Linear Programming; Allocation and assignment; Simplex Method; Duality; Theory of Games, Parametric Programming; Decomposition principle. Network theory; Dynamic Programming; Geometric programming. Applications.

Text

MCH336 OPERATIONS RESEARCH 2 5cp
Statistical decision theory; Forecasting methods, moving average exponentially smoothed average. Inventory control theory. Fixed order quantity; fixed order cycle systems; Production - inventory systems. Queueing theory; simple queue, multi-server queues. Queues in series. Transients in queues; simulation of systems. Applications.

Text
For MCH337

MCH449 COMPUTATION OF TURBULENT FLOWS 5cp
Integral methods for solving engineering turbulent flow problems. Introduction to turbulence modelling ideas. Use of existing software packages such as PHOENICS to solve engineering problems.

MCH447 AIR POLLUTION MANAGEMENT 5cp
Physical and chemical interaction of air pollutants on the local and global scale. Meteorology, atmospheric diffusion models and ambient measurements of air pollutants and the control of exhausts from mobile and stationary sources.

MCH446 MACHINE CONDITIONING MONITORING 5cp

MCH414 BULK MATERIALS HANDLING 2 5cp

MCH418 MECHANICAL ENGINEERING DESIGN 3 10cp
Advanced design topics including the analysis of complete systems, principles of materials selection, the interaction of design geometry, material properties and fabrication processes in mechanical design. Selected projects including the development of computer packages as an aid to component selection, data bases and knowledge bases in systematic approaches to materials selection.

MCH416 ADVANCED FINITE ELEMENT ANALYSIS 5cp

MCH418 MAINTENANCE MANAGEMENT 5cp
Maintenance decision making; the action (replacement, repair, adjustment), timing the action (fixed time, conditional monitoring, operation failure, designed out maintenance). Preventive maintenance schedule — a six step approach. Equipment life cycle costs and maintenance documentation — manual, computer. Reliability. Life cycle cost analysis. Case studies and examples from local industry.

MCH421 COMPOSITES IN ENGINEERING 5cp

MCH484 ENGINEERING ECONOMICS 2 5cp

MCH485 PRODUCTION SCHEDULING 5cp

MCH496 PROJECT/SEMINAR 25cp
Major undergraduate project usually consisting of literature survey and review, analytical and/or experimental investigation into a mechanical or industrial engineering topic. Presentation of two seminars, briefing sessions and weekly guest seminars are mandatory. Two copies of the Project Report are required.

MCH497 PROJECT/DIRECTED READING 5cp
Private work of laboratory, literature search or theoretical nature requiring preparation of a report. Work will be undertaken at the direction of a supervisor with whom the topic should be negotiated. The work undertaken in this subject may form part of an extended MCH496 project or an independent topic.

MCH498 PROJECT/DIRECTED READING 10cp
Private work of laboratory, literature search or theoretical nature requiring preparation of a report. Work will be undertaken at the direction of a supervisor with whom the topic should be negotiated. The work undertaken in this subject may form part of an extended MCH496 project or an independent topic.
MECH516 FINITE ELEMENT METHODS IN DESIGN 5cp
Basic concepts of the finite element technique. Introduction to a finite element computer package. Finite elements as a tool for mechanical design. Application of a range of element types to the solution of linear static stress problems. Introduction to vibration analysis.

MECH517 BULK MATERIALS HANDLING SYSTEMS 5cp
Text

MECH518 CONVEYING OF BULK SOLIDS 5cp
Comparison based on economic and technical considerations of different modes of continuous and discontinuous transportation of bulk solids. Overview of freight pipelines - pneumatic, hydraulic and capsule and mechanical conveying - belt, screw and bucket elevators. Technical and economic considerations within the design of conveyors. Examples will be selected from the belt conveying. Comparison of pneumatic conveying systems mentioned above. In the case of belt conveyors the dynamic characteristics and the influence of these characteristics on design will be studied in some detail. In the case of pneumatic conveyors the design of both lean and dense phase systems will be discussed.
Text

MECH519 MAINTENANCE MANAGEMENT 5cp

MECH573 ADVANCED THERMODYNAMICS 5cp
Review of the 1st and 2nd Laws of Thermodynamics; entropy concepts. Availability (EXERGY); irreversibility; Availability Analysis of Closed and Open Systems; Second Law efficiency. Application to power generation and refrigeration cycles. Some advanced engineering cycles.

MECH584 ENGINEERING ECONOMICS 5cp
Review of basic principles of micro-economics: scarcity and choice, supply and demand, market system. Review of basic principles of accounting: financial statements; working capital; capital expenditure; budgets; costing; overheads; marginal cost. Economic Evaluation of projects: time value of money; present worth; annual equivalent; rate of return; cost-benefit; inflation; taxation; depreciation; capital budgeting, replacement analysis, Economic life concepts. Risk analysis: sensitivity; expected value and variance; sequential decision; decision trees. Economics of technical systems: system concepts; quality; inventory; lead time; flexibility; reliability; maintenance; models and optimization techniques.

MECH594 INDUSTRIAL SYSTEMS PROJECT/SEMINAR A 20cp
The first section of the major project in the Master of Engineering Science - Power Engineering program undertaken in the Department of Mechanical Engineering. It is expected that most projects will be of an applied research nature in an area relevant to the candidates employment and co-supervised by a professional engineer on site. Coursework components will cover areas of problem identification, research skills, communication skills, and strategies for applied research. Progress will be reported at seminars given by candidates and by the submission of a progress report in July. Submission of the final project report will be required by the 31st October followed by a formal presentation of the results of the project at a later date. The result awarded for this subject will reflect the quality of the Project Report resulting from the work undertaken in both MECH594 and MECH595.

MECH595 INDUSTRIAL SYSTEMS PROJECT/SEMINAR B 20cp
The final section of the major project in the Master of Engineering Science - Power Engineering program undertaken in the Department of Mechanical Engineering commenced in MECH594. Submission of the final Project Report will be required by 31 October followed by a formal presentation of the results of the project at a later date. The result awarded for this subject will reflect the quality of the Project Report resulting from the work undertaken in both MECH594 and MECH595.

MECH599 INDUSTRIAL SYSTEMS PROJECT/SEMINAR 40cp
The major project in the Master of Engineering Science - Industrial Systems program undertaken by the Department of Mechanical Engineering for students intending to complete the course in a singular academic year. It is expected that most projects will be of an applied nature in an area relevant to the candidates employment and co-supervised by a professional engineer on site. Coursework components will cover areas of problem identification, research skills, communication skills, and strategies for applied research. Progress will be reported at seminars given by candidates and by the submission of a project report in July. Submission of the final project report will be required by the 31st October followed by a formal presentation of the results of the project at a later date.

Thesis Subjects

PHILOSOPHY 101 INTRODUCTION TO PHILOSOPHY 20cp
First Semester: Book I of Hobbes' classic Leviathan will be read; it will be explained and expanded in small group discussions in class to bring out the Hobbesian world view systematically, the world view of liberalism that underlies western democracies (1 hour per week). A segment on morality discusses the nature of justice and some views on free will and on the basis of morality (1 hour per week). A segment on critical thinking aims to develop skills in analysing, constructing, and advancing arguments, considerable emphasis being placed on arguments as they naturally occur, and on reasoning as an everyday practice (1 hour per week).
Second Semester: Some of Plato's dialogues will be read, and the ethical, political, and metaphysical questions raised by them will be systematically expounded (1 hour per week). A segment on knowledge and reality examines some questions about belief and knowledge, the mind/body relationship, and the existence of God (1 hour per week). A segment on the historical development of scientific explanation and an introduction to the theory of scientific method (1 hours per week).

PHILOSOPHY 201 TECHNOLOGY AND HUMAN VALUES 10cp
A course of lectures and discussions focussing on the ethical, social, political, economic and moral dimensions of the participation in a parallel strand. Strand A is based on an examination of Newton's views on technology and the ethical, social, political, economic and moral dimensions of technology. The course will be presented in two parallel strands. Strand B focuses on the nature and control of technology. The course will be presented in two parallel strands. Strand B focuses on the nature and control of technology. The course will be presented in two parallel strands. Strand B focuses on the nature and control of technology.
PHIL392 TECHNOLOGY AND HUMAN VALUES 2 10ep
Not offered in 1994.
A team project on the role of technical and value factors in technological decision making. Students will form small teams under staff leadership for a year-long intensive study of a specific example of technological decision making. The aim is to provide a comprehensive and accurate understanding of the interaction between technical and value factors in the decision. Each team will produce a report of a quality aimed at management/ministerial discussion. Evaluation will be by the Team Report plus staff leader's/team's assessment of individual contributions. 
Example projects are Nuclear Electric Power for Australia, A Study of Technology Assessment. A wider variety of projects can be undertaken, selection by teams will occur during the first two weeks of semester.

PHIL691 TECHNOLOGY AND THE ENVIRONMENT 10ep

Physics Subjects

PHYS111 PHYSICS 111 10ep
Not to count for credit with PHYS113.

PHYS112 PHYSICS 112 10ep
Not to count for credit with PHYS114.

Texts

Reference

See Faculty of Science and Mathematics Handbook for further information.

PHYS113 PHYSICS 113 10ep
Not to count for credit with PHYS111.


Thermal Physics - Definitions of internal energy, heat, work, temperature, equilibrium, and temperature. The Zeroth law of thermodynamics. The First law of thermodynamics. The constant volume gas thermometer. The triple point cell. The Ideal Gas Scale. The International Practical Temperature Scale. Practical thermometers.


See Faculty of Science and Mathematics Handbook for further information.

PHYS114 PHYSICS 114 10ep
Not to count for credit with PHYS112.


Selected topics from gravitation, physics of fluids and non-linear dynamics.


Nuclear physics. Mass defect, binding energy curve. Nuclear reactions, neutrons, Coulomb barrier, fission, fusion, and mass-energy balance calculations.

Thermal physics - Introductory kinetic theory. The relationship between internal energy and temperature for ideal gases.

The second law of thermodynamics. Entropy. The thermodynamic temperature scale. See Faculty of Science and Mathematics Handbook for further information.

PHYB201 QUANTUM MECHANICS AND ELECTROMAGNETISM 10cp

Basic principles of modern quantum mechanics and electromagnetic theory. Laboratory, computational and tutorial work in these areas. See Faculty of Science and Mathematics Handbook for further information.

PHYB203 SOLID STATE AND ATOMIC PHYSICS 10cp

Solid state physics and applications, atomic physics and spectroscopy, optics and laser physics. See Faculty of Science and Mathematics Handbook for further information. Additional physics subjects are described in the Faculty of Science and Mathematics Handbook.

Psychology Subjects

PSTC101 PSYCHOLOGY INTRODUCTION 1 10cp

Three written laboratory reports. Introductory Methodology and Statistics for Psychology; Biological Foundations: Perception and Learning. See Faculty of Science and Mathematics Handbook for further information.

Texts

General — any recent comprehensive text on General Psychology or Introduction to Psychology. The following alternatives are recommended (others may be added later).


PSTC102 PSYCHOLOGY INTRODUCTION 2 10cp

Three written laboratory reports. Cognition; Social Psychology; Developmental Psychology. See Faculty of Science and Mathematics Handbook for further information.

Texts


Additional Psychology subjects described in the Faculty of Science and Mathematics Handbook.

PSTC202 BASIC PROCESSES 10cp

This subject generally examines such psychological processes as perception, human information processing, memory, socio-linguistics, and learning.

Animal and human models may be considered. The Cognition topic will examine the experimental science supporting various models for human memory. Emphasis will be placed on applied aspects of cognition and memory as well as an introduction to neural network concepts.

The Perception section will deal primarily with vision. The following topics will be covered: structure of the auditory system, subjective illusions of sound, sound localization and important aspects of speech perception.

The learning topic will explore ideas about the nature and mechanism of associative learning. The conditions under which learning occurs and the nature of the representations underlying learning will be described. The implications of these ideas for the application of learning theory to issues such as drug tolerance and addiction will be considered.

Tutorial and laboratory exercises dealing with the above topics will be used to demonstrate these basic psychological processes.

Texts


References


PSTC301 ADVANCED FOUNDATIONS FOR PSYCHOLOGY 10cp

This course consists of the following topics:

(a) Experimental design principles in psychology ranging from naturalistic observation to experimental and quasi-experimental designs, including single-case studies.

(b) Practical computation techniques for the analysis of experimental designs in psychological research, using MINITAB, BMDP and SPSSX.

(c) Introduction to multivariate statistical techniques such as: Multiple Linear Regression, Discriminant Analysis and Cluster Analysis.

(d) The MEL laboratory programs will be used to collect data in the tutorial periods.

Further information...

Faculty of Engineering

Section Eight

Guide to Subject Descriptions

Faculty of Engineering

Section Eight

Guide to Subject Descriptions
References
St. James, J. & Schneider, W. 1991. MEL LAB: Experiments in perception, cognition, social psychology and human factors, Psychology Software Tools, Pittsburgh, PA.

PSY500 TOPICS IN NEURAL SCIENCE 10cp
Not offered in 1994.

Statistics Subjects

STAT101 INTRODUCTORY STATISTICS 10cp

Text

References

STAT201 MATHEMATICAL STATISTICS 10cp
Random variables, probability density function, distribution functions, expectation, Likelihood, point and Interval estimation. Texts of significance.

Text

See Faculty of Economics and Commerce Handbook for further information.

STAT202 REGRESSION ANALYSIS 10cp
This course covers the practical and theoretical aspects of multiple regression analysis, including the assumptions underlying normal linear models, use of matrix notation, prediction and confidence intervals, stepwise methods and examination of the adequacy of models. The statistical computer packages MINITAB AND SAS are used.

Text

See Faculty of Economics and Commerce Handbook for further information.

STAT205 ENGINEERING STATISTICS 5cp

SURV111 SURVEYING 1 10cp
Elementary surveying principles. Nature, causes and classes of errors; elementary error propagation. Linear measurement with tapes: Ordinary differential levelling, Theodolite: angle measurement; magnetic compass. Field notes, traversing and traverse calculations; simple plan drawing.

Text

SURV112 SURVEYING 2 10cp
Plane table: contour surveys by stadia; detail surveys. Traverse surveys, areas, volumes, horizontal curves, transition curves, vertical curves. A brief history of surveying and surveying instruments. A three-day series of field-work exercises form a compulsory component of this subject.

Text

SURV191 INDUSTRIAL EXPERIENCE 5cp
This subject units are designed to formalise periods of industrial experience gained by part-time students and/or employers. Students will also be required to present a report giving a connected account and critical evaluation of their engineering activities and experience during the year. Such subjects may be taken by part-time students as electives.

SURV192 INDUSTRIAL EXPERIENCE 5cp
This subject units are designed to formalise periods of industrial experience gained by part-time students and/or employers. Students will also be required to present a report giving a connected account and critical evaluation of their engineering activities and experience during the year. Such subjects may be taken by part-time students as electives.

SURV203 SURVEY COMPUTATIONS 2 5cp

SURV216 INTRODUCTORY SURVEYING 5cp
Note: This subject will not be offered until 1995. This subject is not available to students who have completed SURV111 and/or SURV112.

Elementary surveying principles, ordinary differential levelling, Theodolite and angle measurement, field notes, reductions and map preparation.

SURV233 SURVEY COMPUTATIONS 2 5cp

SURV216 HYDROGRAPHIC SURVEYING 5cp
Hydrographic surveying, depth measurement, sonar, satellite positioning, integrated systems. Side-scan sonar, multi-beam sonars, sub-bottom profiling. Bathymetric data processing.
SURV34 ERROR THEORY 5cp
Revision and extension of error theory. Adjustment by least squares. Error ellipse calculations.

SURV35 GEODESY 1 10cp

SURV36 PHOTOGRAMMETRY 1 10cp
Stereoscopic vision - geometry of single aerial photograph - stereoscopic pairs - fundamental mathematical relationships - radial triangulation. Inner, relative and absolute orientation with respect to direct optical projection. Cameras, physical properties of photographs.

Text

SURV37 REMOTE SENSING 5cp
Introduction to sensing and sensors; sensor platforms; ground-based, aerial and satellite; applications.

Text

SURV39 LAND BOUNDARY DEFINITION 10cp
Cadastral surveys in N.S.W. Surveying Law. Torrens and Common law titles surveys and searches. Identification surveys. Field records and plans. A ten-day survey camp is a compulsory part of this subject.

Texts

SURV417 INDUSTRIAL AND OTHER SURVEYING 10cp
Review of statistics. Mechanical principles of instrument design, optical tooling in industry, pointing accuracy theory. Management of a survey practice including use of software systems.

Texts
1976, Manual of the N.S.W. Integrated Survey Grid, NSW Department of Lands.

SURV418 CONTROL NETWORKS 5cp
Analysis of field procedures and design of surveys. Survey control for construction projects, deformation surveys, integrated surveys.

Texts

SURV441 ASTRONOMY AND SATELLITE POSITIONING 10cp

Texts

SURV452 GEODESY 2 5cp
Least squares adjustment of control surveys; variance/covariance matrix, variance factor and weight coefficient matrix, elementary statistical testing of observations and adjusted values. Relationship between geoidal and ellipsoid, astro-geodetic levelling, ellipsoidal elevations, mean sea level and the geoid-gravity and its use in geodesy. Methods for establishing a world geodetic system. Precise levelling.

Texts
Torge, W., Geodesy, de Gruyter. Mikhail, E.M., Observations and Least Squares, IEP.

SURV462 PHOTOGRAMMETRY 2 5cp

Text
Wolf, P.R. 1974, Elements of Photogrammetry, McGraw-Hill.

SURV463 ADVANCED CARTOGRAPHY 5cp

Texts

SURV483 MINOR PROJECT B 20cp
A minor project approved by the Head of Department. The project may be a literature review, an analytical investigation, an experimental investigation or a land studies project; or a suitable combination of these components.

SURV499 SPECIAL TOPIC 5cp
A contemporary topic in surveying approved by the Head of Department.

The project may be a literature review, an analytical investigation, an experimental investigation or a land studies project; or a suitable combination of these components.

SURV484 MAJOR PROJECT 40cp
A major project approved by the Head of Department. This project includes a literature review, an analytical and/or experimental investigation or a major land studies project.

SURV489 SPECIAL TOPIC 5cp
A contemporary topic in surveying approved by the Head of Department.
SCHEDULE OF SUBJECTS

About This Section

This section contains the details of the subjects offered by the departments of the Faculty of Engineering together with subjects offered by departments of other faculties which are included in the course programs set out in Sections 5 and 7. The content descriptions of the listed subjects are set out in Section 8.

Guide to Subject Detail Schedule

Subject Codes

Each subject has been given a unique code (e.g. CIVL111). This code identifies the subject within the University's computer system and should be entered on form dealing with subjects. The alpha section of the code indicates the department responsible for offering the subject. The first number in the code indicates the level at which the subject is offered (i.e., 100, 200, 300, 400 etc.) and in the Faculty of Engineering, also indicates the WAM weighting of the subject. The latter two numbers usually indicate the sequence of a subject in a stream of subjects or within a course.

The departmental indicators included in this Handbook are listed in Section 9.

Credit Point Value

The credit point value of a subject thus indicates the workload of a subject as a proportion of a normal annual full-time program. Similarly, the credit point value of a subject indicates the proportion of the annual HECS liability which arises from enrolment in that subject. Further information on the meaning of credit points is given in the General Course Rules and Information in Section 4.

Semester Offered

Subjects may be offered in Semester 1, Semester 2, both Semester 1 and Semester 2 (i.e., the subject is repeated) or over a full year. The indications given in the Schedule are accurate at the time of publication but students should confirm final arrangements in the University Timetable.

Prerequisites and Corequisites

Many subjects have prerequisite and/or corequisite requirements. The meaning of these terms are defined in the Award Rules. The prerequisite and corequisite requirements of the subjects described in this Handbook are set out in the following pages. The head of the department offering a subject may waive the prerequisite or corequisite requirements of a subject offered by that department. Students should obtain any such waiver in writing on the form available from the Faculty Office and submit the completed form attached to any request for variation of program.

Assumed Knowledge

Many subjects also have assumed knowledge requirements. These are also set out in the following pages. Students are strongly advised to have completed the subjects prescribed as assumed knowledge before enrolling or to otherwise discuss the extent of their disadvantage with the head of department or the lecturer concerned.
<table>
<thead>
<tr>
<th>Code</th>
<th>Subject Name</th>
<th>Credit Point</th>
<th>Semester</th>
<th>Prerequisites</th>
<th>Corequisites (CR)</th>
<th>Corequisites (AK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEE111</td>
<td>Industrial Process Principles</td>
<td>5</td>
<td>2</td>
<td></td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE112</td>
<td>Introduction to Chemical Engineering</td>
<td>5</td>
<td>1</td>
<td></td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE113</td>
<td>Chemical and Manufacturing Processes</td>
<td>10</td>
<td>1</td>
<td></td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE191</td>
<td>Industrial Experience</td>
<td>5</td>
<td>Full year</td>
<td>Part-time enrolment</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE192</td>
<td>Industrial Experience</td>
<td>5</td>
<td>Full year</td>
<td>Part-time enrolment</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE193</td>
<td>Industrial Experience</td>
<td>5</td>
<td>Full year</td>
<td>Part-time enrolment</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE194</td>
<td>Industrial Experience</td>
<td>5</td>
<td>Full year</td>
<td>Part-time enrolment</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE241</td>
<td>Design Principles</td>
<td>10</td>
<td>1</td>
<td></td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE242</td>
<td>Chemical Engineering Computations</td>
<td>10</td>
<td>Full year</td>
<td></td>
<td></td>
<td>CHEE181, CHEE281</td>
</tr>
<tr>
<td>CHEE243</td>
<td>Transfer Processes 1</td>
<td>5</td>
<td>1</td>
<td>CHEE281</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE245</td>
<td>Energy and Extractive Processes</td>
<td>5</td>
<td>1</td>
<td></td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE257</td>
<td>Transfer Processes 2</td>
<td>5</td>
<td>2</td>
<td>CHEE285</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE260</td>
<td>Transfer Processes 3</td>
<td>5</td>
<td>1</td>
<td>CHEE112</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE281</td>
<td>Laboratory 1</td>
<td>5</td>
<td>1</td>
<td></td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE282</td>
<td>Laboratory 2</td>
<td>10</td>
<td>2</td>
<td>CHEE281</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE295</td>
<td>Selected Topic</td>
<td>5</td>
<td>Both 1 and 2</td>
<td>Permission of H.O.D.</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE321</td>
<td>Modeling of Processes</td>
<td>5</td>
<td>1</td>
<td>CHEE242, MATH501, MATH102</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE332</td>
<td>Thermodynamics</td>
<td>10</td>
<td>1</td>
<td>CHEE265, CHEE267, CHEE341</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE341</td>
<td>Project Engineering</td>
<td>10</td>
<td>1</td>
<td>CHEE241</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE342</td>
<td>Safety and Environment</td>
<td>10</td>
<td>2</td>
<td></td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE351</td>
<td>* Electrochemistry and Corrosion</td>
<td>5</td>
<td>1</td>
<td>CHEE241</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE352</td>
<td>* Transport Phenomena</td>
<td>5</td>
<td>2</td>
<td>CHEE285, CHEE368</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE353</td>
<td>* Surface Chemistry 1</td>
<td>10</td>
<td>Not in 1994</td>
<td>CHEE241</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE354</td>
<td>* Biotechnology</td>
<td>10</td>
<td>Not in 1994</td>
<td>CHEE241</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE355</td>
<td>* Process Synthesis</td>
<td>5</td>
<td>1</td>
<td>CHEE242</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE357</td>
<td>* Fuel Technology 1</td>
<td>5</td>
<td>1</td>
<td>CHEE286</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE358</td>
<td>* Process Metallurgy 1</td>
<td>5</td>
<td>1</td>
<td>CHEE286</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE360</td>
<td>* Introduction to Mineral Processing</td>
<td>5</td>
<td>2</td>
<td>CHEE286</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE361</td>
<td>* Waste Management</td>
<td>5</td>
<td>1</td>
<td>CHEE286</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE362</td>
<td>* Analysis of Pollution</td>
<td>5</td>
<td>1</td>
<td>CHEE286</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE367</td>
<td>* Separation Processes</td>
<td>10</td>
<td>2</td>
<td>CHEE285, CHEE341</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE381</td>
<td>* Engineering Application Laboratory</td>
<td>5</td>
<td>2</td>
<td>CHEE282</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE382</td>
<td>Laboratory 4</td>
<td>5</td>
<td>2</td>
<td></td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE383</td>
<td>* Special Topic</td>
<td>5</td>
<td>Both 1 and 2</td>
<td>Permission of H.O.D.</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE421</td>
<td>Process Control and Instrumentation</td>
<td>10</td>
<td>1</td>
<td>CHEE231</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE432</td>
<td>Rheology and Reaction Engineering</td>
<td>10</td>
<td>1</td>
<td>CHEE332</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE433</td>
<td>* Surface Chemistry 2</td>
<td>5</td>
<td>1</td>
<td>CHEE233</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE452</td>
<td>* Mineral Processing 2</td>
<td>5</td>
<td>1</td>
<td>CHEE235</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE453</td>
<td>* Process Optimization</td>
<td>5</td>
<td>1</td>
<td>CHEE237</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE454</td>
<td>* Heat Transfer</td>
<td>5</td>
<td>1</td>
<td>CHEE237</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE455</td>
<td>* Fuel Technology 2</td>
<td>5</td>
<td>1</td>
<td>CHEE237</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE456</td>
<td>* Process Metallurgy 2</td>
<td>5</td>
<td>1</td>
<td>CHEE237</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE457</td>
<td>* Environmental Process Technology</td>
<td>10</td>
<td>1</td>
<td>CHEE237</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE462</td>
<td>* Principles of Wastewater Treatment</td>
<td>10</td>
<td>1</td>
<td>CHEE237</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>CHEE491</td>
<td>Seminar</td>
<td>5</td>
<td>Full year</td>
<td>All Year III Subjects</td>
<td></td>
<td>CHEE113, MATH102</td>
</tr>
<tr>
<td>Code</td>
<td>Subject Name</td>
<td>Credit Points</td>
<td>Semester</td>
<td>Prerequisites</td>
<td>Corequisites (CR)</td>
<td>Assumed Knowledge (AK)</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------</td>
<td>---------------</td>
<td>----------</td>
<td>---------------</td>
<td>-------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>CIVL111</td>
<td>Mechanics and Structures</td>
<td>5</td>
<td>Both 1 and 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIVL131</td>
<td>Fluid Mechanics 1</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIVL141</td>
<td>Environmental Engineering 1</td>
<td>2</td>
<td></td>
<td>Full-time Enrollment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIVL191</td>
<td>Industrial Experience</td>
<td>5</td>
<td></td>
<td>Full-time Enrollment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIVL192</td>
<td>Industrial Experience</td>
<td>5</td>
<td></td>
<td>Full-time Enrollment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIVL212</td>
<td>Mechanics of Solids</td>
<td>5</td>
<td>1</td>
<td>CIVL111</td>
<td>AK: MATH102 or MATH112</td>
<td></td>
</tr>
<tr>
<td>CIVL213</td>
<td>Theory of Structures 1</td>
<td>5</td>
<td>2</td>
<td>CIVL111</td>
<td>AK: MATH102 or MATH112</td>
<td></td>
</tr>
<tr>
<td>MATH112</td>
<td>Material Science 1</td>
<td>5</td>
<td>1</td>
<td></td>
<td>AK: MBCS121</td>
<td></td>
</tr>
<tr>
<td>CIVL222</td>
<td>Materials 3</td>
<td>5</td>
<td>2</td>
<td></td>
<td>AK: CIVL232</td>
<td></td>
</tr>
<tr>
<td>CIVL225</td>
<td>Geotechnical Investigations 1</td>
<td>5</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIVL226</td>
<td>Geotechnical Investigations 2</td>
<td>5</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIVL232</td>
<td>Fluid Mechanics 2</td>
<td>5</td>
<td>1</td>
<td>CIVL131</td>
<td>AK: MATH102 or MATH112</td>
<td></td>
</tr>
<tr>
<td>CIVL233</td>
<td>Fluid Mechanics 3</td>
<td>5</td>
<td>2</td>
<td>CIVL131</td>
<td>AK: CIVL232</td>
<td></td>
</tr>
<tr>
<td>CIVL242</td>
<td>Environmental Engineering 2</td>
<td>5</td>
<td>2</td>
<td>CIVL141</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIVL251</td>
<td>Systems</td>
<td>5</td>
<td>2</td>
<td>MATH102 or MATH112</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIVL271</td>
<td>Transportation Engineering</td>
<td>10</td>
<td>Full year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIVL314</td>
<td>Theory of Structures 2</td>
<td>5</td>
<td>1</td>
<td>CIVL213</td>
<td>AK: CIVL212</td>
<td></td>
</tr>
<tr>
<td>CIVL315</td>
<td>Stress Analysis</td>
<td>5</td>
<td>1</td>
<td>CIVL212</td>
<td>AK: CIVL131</td>
<td></td>
</tr>
<tr>
<td>CIVL316</td>
<td>Reinforced Concrete Design</td>
<td>10</td>
<td>2</td>
<td>CIVL212</td>
<td>AK: CIVL131</td>
<td></td>
</tr>
<tr>
<td>CIVL317</td>
<td>Steel Design</td>
<td>10</td>
<td>1</td>
<td>CIVL212</td>
<td>AK: CIVL131</td>
<td></td>
</tr>
<tr>
<td>CIVL335</td>
<td>Soil Mechanics 1</td>
<td>5</td>
<td>1</td>
<td></td>
<td>AK: CIVL221, CIVL224</td>
<td></td>
</tr>
<tr>
<td>CIVL336</td>
<td>Soil Mechanics 2</td>
<td>5</td>
<td>2</td>
<td></td>
<td>AK: CIVL235</td>
<td></td>
</tr>
<tr>
<td>CIVL337</td>
<td>Concrete and Metals Technology</td>
<td>5</td>
<td>2</td>
<td></td>
<td>AK: CIVL235</td>
<td></td>
</tr>
<tr>
<td>CIVL344</td>
<td>Open Channel Hydraulics</td>
<td>5</td>
<td>1</td>
<td>CIVL131</td>
<td>AK: CIVL233</td>
<td></td>
</tr>
<tr>
<td>CIVL342</td>
<td>Hydrology</td>
<td>5</td>
<td>2</td>
<td></td>
<td>AK: CIVL232, CIVL241</td>
<td></td>
</tr>
<tr>
<td>CIVL343</td>
<td>Environmental Modelling 1</td>
<td>5</td>
<td>1</td>
<td></td>
<td>AK: CIVL334</td>
<td></td>
</tr>
<tr>
<td>CIVL344</td>
<td>Environmental Modelling 2</td>
<td>5</td>
<td>2</td>
<td></td>
<td>AK: CIVL343</td>
<td></td>
</tr>
<tr>
<td>CIVL345</td>
<td>Environmental Modelling 3</td>
<td>5</td>
<td>2</td>
<td></td>
<td>AK: CIVL343</td>
<td></td>
</tr>
<tr>
<td>CIVL346</td>
<td>Environmental Modelling 4</td>
<td>5</td>
<td>2</td>
<td></td>
<td>AK: CIVL343</td>
<td></td>
</tr>
<tr>
<td>CIVL352</td>
<td>Management</td>
<td>5</td>
<td>2</td>
<td>Full Year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIVL353</td>
<td>Environmental Regulations</td>
<td>5</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIVL361</td>
<td>Statistical Methods</td>
<td>5</td>
<td>1</td>
<td>MATH102 or MATH112</td>
<td></td>
<td>AK: MEC205 or SURV233</td>
</tr>
<tr>
<td>CIVL362</td>
<td>Finite Element Methods</td>
<td>5</td>
<td>2</td>
<td>MEC205</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIVL410</td>
<td>Dynamics and Stability of Structures</td>
<td>Not in 1994</td>
<td>5</td>
<td></td>
<td>AK: CIVL34</td>
<td></td>
</tr>
<tr>
<td>CIVL418</td>
<td>Theory of Structures 3</td>
<td>5</td>
<td>1</td>
<td></td>
<td>AK: CIVL34</td>
<td></td>
</tr>
<tr>
<td>CIVL419</td>
<td>Masonry and Timber Design</td>
<td>5</td>
<td>2</td>
<td></td>
<td>AK: CIVL34</td>
<td></td>
</tr>
<tr>
<td>CIVL420</td>
<td>Geotechnical Engineering</td>
<td>10</td>
<td>1</td>
<td></td>
<td>AK: CIVL325</td>
<td></td>
</tr>
<tr>
<td>CIVL420</td>
<td>Geotechnical Engineering</td>
<td>10</td>
<td>1</td>
<td></td>
<td>AK: CIVL325</td>
<td></td>
</tr>
<tr>
<td>CIVL429</td>
<td>Rock Mechanics</td>
<td>5</td>
<td>1</td>
<td></td>
<td>AK: CIVL325</td>
<td></td>
</tr>
<tr>
<td>CIVL425</td>
<td>River and Coastal Engineering</td>
<td>5</td>
<td>2</td>
<td></td>
<td>AK: CIVL325</td>
<td></td>
</tr>
<tr>
<td>CIVL443</td>
<td>Water Resources Engineering</td>
<td>5</td>
<td>1</td>
<td></td>
<td>AK: CIVL251, CIVL342</td>
<td></td>
</tr>
<tr>
<td>CIVL483</td>
<td>Civil Engineering Design 1</td>
<td>15</td>
<td>1</td>
<td></td>
<td></td>
<td>All Year III subjects</td>
</tr>
<tr>
<td>CIVL484</td>
<td>Civil Engineering Design 2</td>
<td>15</td>
<td>2</td>
<td></td>
<td></td>
<td>All Year III subjects</td>
</tr>
<tr>
<td>Code</td>
<td>Subject Name</td>
<td>Credit Points</td>
<td>Semesters</td>
<td>Prerequisites</td>
<td>Corequisites (CR)</td>
<td>Assumed Knowledge (AK)</td>
</tr>
<tr>
<td>--------</td>
<td>-------------------------------------------</td>
<td>---------------</td>
<td>-----------</td>
<td>-------------------------------</td>
<td>-------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>COMP110</td>
<td>Introduction to Programming</td>
<td>5</td>
<td>Sem 1</td>
<td>Non-enrolment in</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BCompSc No. En.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>from COMP11,</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V COMP112 or COMP201</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP111</td>
<td>Introduction to Computer Science 1</td>
<td>10</td>
<td>Sem 1</td>
<td>—</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP112</td>
<td>Discrete Structures</td>
<td>10</td>
<td>Sem 2</td>
<td>COMP111 &amp; MATH111 or</td>
<td>COMP111</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>COMP111 or MATH112</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP113</td>
<td>Introduction to Artificial Intelligence</td>
<td>10</td>
<td>Full Year</td>
<td>1, 2 or PV Permission of H.O.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP321</td>
<td>Comparative Programming Languages</td>
<td>10</td>
<td>Sem 1</td>
<td>COMP111</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>COMP111 or COMP113</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP322</td>
<td>Theory of Computation</td>
<td>10</td>
<td>Sem 3</td>
<td>COMP112 &amp; COMP113</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP323</td>
<td>Analysis of Algorithms</td>
<td>10</td>
<td>Sem 1</td>
<td>COMP112</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP324</td>
<td>The Unix Operating System</td>
<td>10</td>
<td>Sem 2</td>
<td>—</td>
<td>COMP113</td>
<td></td>
</tr>
<tr>
<td>COMP325</td>
<td>Artificial Intelligence 2</td>
<td>10</td>
<td>Sem 1</td>
<td>COMP113</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP329</td>
<td>Project</td>
<td>5</td>
<td>1, 2 or PV</td>
<td>Permission of H.O.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP321</td>
<td>Software Engineering &amp; Project</td>
<td>20</td>
<td>Full Year</td>
<td>COMP111</td>
<td>COMP211</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AK: COMP224</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP322</td>
<td>Computer Vision and Robotics</td>
<td>10</td>
<td>Sem 2</td>
<td>COMP225</td>
<td>MATH112</td>
<td></td>
</tr>
<tr>
<td>COMP323</td>
<td>Computational Logic</td>
<td>10</td>
<td>Sem 1</td>
<td>COMP222</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP324</td>
<td>Parallel Processing</td>
<td>10</td>
<td>Sem 2</td>
<td>COMP225 &amp; ELEC170</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP325</td>
<td>Database Systems</td>
<td>10</td>
<td>Sem 1</td>
<td>COMP112</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP326</td>
<td>Data Security</td>
<td>10</td>
<td>Sem 2</td>
<td>COMP112</td>
<td>COMP223</td>
<td></td>
</tr>
<tr>
<td>COMP329</td>
<td>Project</td>
<td>20</td>
<td>Full Year</td>
<td>1, 2 or PV Permission of H.O.D.</td>
<td>COMP223</td>
<td></td>
</tr>
<tr>
<td>COMP327</td>
<td>Principles of Operating Systems</td>
<td>10</td>
<td>Sem 1</td>
<td>ELEC170</td>
<td>COMP224</td>
<td></td>
</tr>
<tr>
<td>COMP328</td>
<td>Computer Networks</td>
<td>10</td>
<td>Sem 2</td>
<td>COMP112 &amp; ELEC170</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP329</td>
<td>Compiler Design</td>
<td>10</td>
<td>Sem 1</td>
<td>COMP223</td>
<td>ELEC170</td>
<td></td>
</tr>
<tr>
<td>COMP330</td>
<td>Graphic User Interfaces</td>
<td>10</td>
<td>Sem 2</td>
<td>COMP112</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP331</td>
<td>Geometric Data Structures</td>
<td>10</td>
<td>Sem 1</td>
<td>COMP112</td>
<td>COMP223</td>
<td></td>
</tr>
<tr>
<td>COMP332</td>
<td>Computer Graphics</td>
<td>10</td>
<td>Sem 2</td>
<td>COMP112 &amp; MATH112</td>
<td>MATH217</td>
<td></td>
</tr>
<tr>
<td>COMP411</td>
<td>Special Topic A</td>
<td>10</td>
<td>Sem 1</td>
<td>Permission of H.O.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP412</td>
<td>Special Topic B</td>
<td>10</td>
<td>Sem 2</td>
<td>Permission of H.O.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP413</td>
<td>Special Topic C</td>
<td>10</td>
<td>Sem 1</td>
<td>Permission of H.O.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP414</td>
<td>Special Topic D</td>
<td>10</td>
<td>Sem 2</td>
<td>Permission of H.O.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP425</td>
<td>Honours Project</td>
<td>20</td>
<td>Full Year</td>
<td>Permission of H.O.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP435</td>
<td>Special Topic E</td>
<td>20</td>
<td>Full Year</td>
<td>Permission of H.O.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP441</td>
<td>Cryptographic Techniques</td>
<td>10</td>
<td>Sem 1</td>
<td>Permission of H.O.D.</td>
<td>COMP223</td>
<td></td>
</tr>
<tr>
<td>COMP442</td>
<td>Natural Language Processing</td>
<td>10</td>
<td>Sem 2</td>
<td>Permission of H.O.D.</td>
<td>COMP223</td>
<td></td>
</tr>
<tr>
<td>COMP443</td>
<td>Formal Reasoning in Artificial</td>
<td>10</td>
<td>Sem 1</td>
<td>Permission of H.O.D.</td>
<td>COMP226</td>
<td></td>
</tr>
<tr>
<td>COMP444</td>
<td>Program Semantics</td>
<td>10</td>
<td>Sem 2</td>
<td>Permission of H.O.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP445</td>
<td>Computational Geometry</td>
<td>10</td>
<td>Sem 1</td>
<td>Permission of H.O.D.</td>
<td>COMP223</td>
<td></td>
</tr>
<tr>
<td>COMP446</td>
<td>Advanced Computational Geometry</td>
<td>10</td>
<td>Sem 2</td>
<td>Permission of H.O.D.</td>
<td>COMP223</td>
<td></td>
</tr>
<tr>
<td>COMP447</td>
<td>Graph Algorithms</td>
<td>10</td>
<td>Sem 1</td>
<td>Permission of H.O.D.</td>
<td>COMP223</td>
<td></td>
</tr>
<tr>
<td>COMP448</td>
<td>Advanced Compiler Design</td>
<td>10</td>
<td>Full Year</td>
<td>Permission of H.O.D.</td>
<td>COMP229</td>
<td></td>
</tr>
<tr>
<td>COMP449</td>
<td>Advanced Parallel Processing: Theory</td>
<td>10</td>
<td>Full Year</td>
<td>—</td>
<td>COMP224</td>
<td></td>
</tr>
<tr>
<td>COMP450</td>
<td>Distributed Operating Systems</td>
<td>10</td>
<td>Sem 2</td>
<td>—</td>
<td>COMP227</td>
<td></td>
</tr>
<tr>
<td>COMP451</td>
<td>Advanced Parallel Processing: Applications</td>
<td>10</td>
<td>Full Year</td>
<td>—</td>
<td>COMP224</td>
<td></td>
</tr>
<tr>
<td>COMP501</td>
<td>Master of Computing Project Part A</td>
<td>30</td>
<td>Full Year</td>
<td>—</td>
<td>COMP501</td>
<td></td>
</tr>
<tr>
<td>COMP502</td>
<td>Master of Computing Project Part B</td>
<td>30</td>
<td>Full Year</td>
<td>—</td>
<td>COMP501</td>
<td></td>
</tr>
<tr>
<td>COMP503</td>
<td>Master of Computing Project</td>
<td>60</td>
<td>Full Year</td>
<td>—</td>
<td>COMP501</td>
<td></td>
</tr>
</tbody>
</table>

400 level subjects are normally available only to students in the following programs offered by the Department of Computer Science: BCompSc(Hons), MCompSc, MComputing, PhD.
### Schedule of Subjects Offered by the Department of Electrical and Computer Engineering

<table>
<thead>
<tr>
<th>Code</th>
<th>Subject Name</th>
<th>Credit Points</th>
<th>Semester</th>
<th>Prerequisites</th>
<th>Corequisites (CR)</th>
<th>Assumed Knowledge (AK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEC101</td>
<td>Introduction to Electrical and Computer Engineering</td>
<td>5</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC130</td>
<td>Electrical Engineering 1</td>
<td>10</td>
<td>Full Year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC170</td>
<td>Computer Engineering 1</td>
<td>10</td>
<td>Full Year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC193</td>
<td>Industrial Experience</td>
<td>5</td>
<td>Full Year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC194</td>
<td>Industrial Experience</td>
<td>5</td>
<td>Full Year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC195</td>
<td>Industrial Experience</td>
<td>5</td>
<td>Full Year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC197</td>
<td>Industrial Experience</td>
<td>10</td>
<td>Full Year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC210</td>
<td>Introduction to Energy Systems</td>
<td>10</td>
<td>Full Year</td>
<td>ELEC130, MATH1102</td>
<td>CR: MATH103 or ELEC130, MATH1102</td>
<td></td>
</tr>
<tr>
<td>ELEC311</td>
<td>Electrical Energy Conversion</td>
<td>5</td>
<td>1</td>
<td>ELEC130</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC320</td>
<td>Electronics I</td>
<td>10</td>
<td>2</td>
<td>ELEC130, MATH1102</td>
<td>CR: MATH103 or ELEC130, MATH1102</td>
<td></td>
</tr>
<tr>
<td>ELEC321</td>
<td>Electrical Circuits</td>
<td>10</td>
<td>2</td>
<td>ELEC130, MATH1102</td>
<td>CR: MATH103 or ELEC130, MATH1102</td>
<td></td>
</tr>
<tr>
<td>ELEC332</td>
<td>Electrical Power</td>
<td>10</td>
<td>Full Year</td>
<td>ELEC210, ELEC231</td>
<td>AK: MATH206</td>
<td></td>
</tr>
<tr>
<td>ELEC352</td>
<td>Switching Electronics</td>
<td>5</td>
<td>2</td>
<td>ELEC220, ELEC231</td>
<td>AK: MATH206</td>
<td></td>
</tr>
<tr>
<td>ELEC361</td>
<td>Digital Signal Processing</td>
<td>5</td>
<td>1</td>
<td>ELEC220, ELEC231</td>
<td>AK: MATH206</td>
<td></td>
</tr>
<tr>
<td>ELEC351</td>
<td>Telecommunications</td>
<td>5</td>
<td>2</td>
<td>MATH102 or MATH112</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC352</td>
<td>Analogue and Digital Communications</td>
<td>10</td>
<td>Full Year</td>
<td>ELEC220, ELEC231</td>
<td>AK: MATH206 &amp; MATH206</td>
<td></td>
</tr>
<tr>
<td>ELEC371</td>
<td>Microprocessor Systems</td>
<td>10</td>
<td>Full Year</td>
<td>ELEC170</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC372</td>
<td>Computer Architecture</td>
<td>10</td>
<td>Full Year</td>
<td>ELEC170</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC390</td>
<td>Project/Directed Reading</td>
<td>5</td>
<td>1, 2 or Full Year</td>
<td>Permission of H.O.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC411</td>
<td>Electrical System Design</td>
<td>5</td>
<td>1</td>
<td>ELEC312</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC412</td>
<td>Electrical System Dynamics and Control</td>
<td>5</td>
<td>2</td>
<td>ELEC312, MECHE361</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC413</td>
<td>Electrical Technology</td>
<td>5</td>
<td>Not in 1994</td>
<td>ELEC210</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC420</td>
<td>VLSI Design</td>
<td>10</td>
<td>Full Year</td>
<td>ELEC220, ELEC372</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC431</td>
<td>Electronics Design</td>
<td>10</td>
<td>Full Year</td>
<td>ELEC231</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC440</td>
<td>Advanced Control</td>
<td>10</td>
<td>Not in 1994</td>
<td>MEC25681</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC441</td>
<td>Control System Design and Management</td>
<td>10</td>
<td>Full Year</td>
<td>MEC25681</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC445</td>
<td>Advanced Signal Processing</td>
<td>5</td>
<td>1</td>
<td>ELEC341, ELEC352</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC454</td>
<td>Engineering Electromagnetics</td>
<td>5</td>
<td>2</td>
<td>PHYS201</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC455</td>
<td>Advanced Communications</td>
<td>5</td>
<td>Not in 1994</td>
<td>ELEC352</td>
<td>AK: ELEC321</td>
<td></td>
</tr>
<tr>
<td>ELEC460</td>
<td>Computer Software</td>
<td>10</td>
<td>Full Year</td>
<td>ELEC371</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC470</td>
<td>Advanced Computer Architectures</td>
<td>10</td>
<td>Full Year</td>
<td>ELEC372</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC480</td>
<td>Electrical Engineering Project</td>
<td>30</td>
<td>Full Year</td>
<td>Completion of Year III</td>
<td>Electrical Engineering</td>
<td>Computer Engineering</td>
</tr>
<tr>
<td>ELEC485</td>
<td>Computer Engineering Project</td>
<td>30</td>
<td>Full Year</td>
<td>Completion of Year III</td>
<td>Computer Engineering</td>
<td></td>
</tr>
<tr>
<td>ELEC511</td>
<td>Condition Monitoring</td>
<td>5</td>
<td></td>
<td>THD</td>
<td></td>
<td>Graduate enrolment</td>
</tr>
<tr>
<td>ELEC512</td>
<td>Power System Operation and Control</td>
<td>5</td>
<td></td>
<td>THD</td>
<td></td>
<td>Graduate enrolment</td>
</tr>
</tbody>
</table>

### Code Subject Name Credit Points Semester Prerequisites Assumed Knowledge (AK)

<table>
<thead>
<tr>
<th>Code</th>
<th>Subject Name</th>
<th>Credit Points</th>
<th>Semester</th>
<th>Prerequisites</th>
<th>Corequisites (CR)</th>
<th>Assumed Knowledge (AK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEC541</td>
<td>Control System Design and Management</td>
<td>5</td>
<td>TBD</td>
<td>Graduate enrolment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC543</td>
<td>Optimization Techniques</td>
<td>5</td>
<td>TBD</td>
<td>ME or PhD Enrolment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC544</td>
<td>Linear Systems Theory</td>
<td>5</td>
<td>TBD</td>
<td>ME or PhD Enrolment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC545</td>
<td>Nonlinear Systems Analysis</td>
<td>5</td>
<td>TBD</td>
<td>ME or PhD Enrolment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC546</td>
<td>Topics in System Design 1</td>
<td>5</td>
<td>TBD</td>
<td>ME or PhD Enrolment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC547</td>
<td>Topics in System Design 2</td>
<td>5</td>
<td>TBD</td>
<td>ME or PhD Enrolment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC569</td>
<td>Advanced Digital Signal Processing</td>
<td>5</td>
<td>TBD</td>
<td>ME or PhD Enrolment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC571</td>
<td>Computer and Electronics Seminar 1</td>
<td>5</td>
<td>TBD</td>
<td>ME or PhD Enrolment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC572</td>
<td>Computer and Electronics Seminar 2</td>
<td>5</td>
<td>TBD</td>
<td>ME or PhD Enrolment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC573</td>
<td>Computer and Electronics Seminar 3</td>
<td>5</td>
<td>TBD</td>
<td>ME or PhD Enrolment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC591</td>
<td>Systems and Control Seminar 1</td>
<td>5</td>
<td>TBD</td>
<td>ME or PhD Enrolment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC592</td>
<td>Systems and Control Seminar 2</td>
<td>5</td>
<td>TBD</td>
<td>ME or PhD Enrolment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC593</td>
<td>Systems and Control Seminar 3</td>
<td>5</td>
<td>TBD</td>
<td>ME or PhD Enrolment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC594</td>
<td>Industrial Systems Project/Seminar A</td>
<td>20</td>
<td>Full Year</td>
<td>Enrolment in MEEngSc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC595</td>
<td>Industrial Systems Project/Seminar B</td>
<td>20</td>
<td>Full Year</td>
<td>Enrolment in MEEngSc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC596</td>
<td>Advanced Topics in Computers</td>
<td>5</td>
<td>TBD</td>
<td>ME or PhD Enrolment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC597</td>
<td>Advanced Topics in System Theory 1</td>
<td>5</td>
<td>TBD</td>
<td>ME or PhD Enrolment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC598</td>
<td>Advanced Topics in System Theory 2</td>
<td>5</td>
<td>TBD</td>
<td>ME or PhD Enrolment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC599</td>
<td>Advanced Topics in System Theory 3</td>
<td>5</td>
<td>TBD</td>
<td>ME or PhD Enrolment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEC601</td>
<td>T.B.D. = To be determined</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Elective or graduate subjects. Not all such subjects will be available in any one year. The subjects in this category indicated as potentially available may be cancelled if enrolments are insufficient. Availability should be confirmed with the Department Office.
### Schedule of Subjects Offered by the Department of Mechanical Engineering

<table>
<thead>
<tr>
<th>Code</th>
<th>Subject Name</th>
<th>Credit Points</th>
<th>Semester</th>
<th>Prerequisites</th>
<th>Corequisites (CR)</th>
<th>Assumed Knowledge (AK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MECH1101</td>
<td>Introduction to Mechanical Engineering</td>
<td>5</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH1102</td>
<td>Introduction to Engineering Computing</td>
<td>5</td>
<td>1 and 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH1103</td>
<td>Engineering Chemistry</td>
<td>5</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH1111</td>
<td>Engineering Drawing</td>
<td>5</td>
<td>1 and 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH1112</td>
<td>Materials 1</td>
<td>5</td>
<td>1 and 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH1191</td>
<td>Industrial Experience</td>
<td>5</td>
<td>Full Year</td>
<td>Part-Time Enrolment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH1192</td>
<td>Industrial Experience</td>
<td>5</td>
<td>Full Year</td>
<td>Part-Time Enrolment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH1193</td>
<td>Industrial Experience</td>
<td>5</td>
<td>Full Year</td>
<td>Part-Time Enrolment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH2304</td>
<td>Experimental Methods 1</td>
<td>5</td>
<td>1</td>
<td>MATH111</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH2306</td>
<td>Engineering Computations</td>
<td>5</td>
<td>2</td>
<td>MATH112 or MECH102 or COMP110</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH2311</td>
<td>Mechanical Engineering Design I</td>
<td>10</td>
<td>Full Year</td>
<td>CIVIL11, MECH111</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH2312</td>
<td>Design of Machine Components</td>
<td>5</td>
<td>2</td>
<td>CIVIL11, MECH111</td>
<td>AK: MECH241</td>
<td></td>
</tr>
<tr>
<td>MECH2322</td>
<td>Materials 2</td>
<td>5</td>
<td>2</td>
<td></td>
<td>AK: MECH121, MECH1103</td>
<td></td>
</tr>
<tr>
<td>MECH2333</td>
<td>Dynamics</td>
<td>5</td>
<td>1</td>
<td>MATH1102 or MATH111</td>
<td>AK: MATH112, CIVIL111, PHYS112</td>
<td></td>
</tr>
<tr>
<td>MECH2344</td>
<td>Dynamics of Engineering Systems</td>
<td>5</td>
<td>2</td>
<td></td>
<td>AK: MECH223, MATH112 or MATH112</td>
<td></td>
</tr>
<tr>
<td>MECH2346</td>
<td>Mechanics of Solids 1</td>
<td>5</td>
<td>1</td>
<td>CIVIL11</td>
<td>AK: MATH1102 or MATH112</td>
<td></td>
</tr>
<tr>
<td>MECH2351</td>
<td>Fluid Mechanics 1</td>
<td>5</td>
<td>2</td>
<td>MATH1102 or MATH112</td>
<td>AK: PHYS102</td>
<td></td>
</tr>
<tr>
<td>MECH2371</td>
<td>Thermodynamics 1</td>
<td>5</td>
<td>2</td>
<td>MATH1102 or MATH112</td>
<td>AK: PHYS102</td>
<td></td>
</tr>
<tr>
<td>MECH2394</td>
<td>Experimental Methods 2</td>
<td>10</td>
<td>Full Year</td>
<td>MECH2304</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH2350</td>
<td>Numerical Methods</td>
<td>5</td>
<td>1</td>
<td>MECH205</td>
<td>AK: MATH201, MATH203</td>
<td></td>
</tr>
<tr>
<td>MECH2359</td>
<td>Noise Pollution and Control</td>
<td>5</td>
<td>3</td>
<td>MECH232</td>
<td>AK: MECH233</td>
<td></td>
</tr>
<tr>
<td>MECH2311</td>
<td>Mechanical Engineering Design II</td>
<td>10</td>
<td>Full Year</td>
<td>MECH211</td>
<td>AK: MECH211, MECH212</td>
<td></td>
</tr>
<tr>
<td>MECH2315</td>
<td>Computer Aided Design</td>
<td>5</td>
<td>1</td>
<td>MECH211</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH2317</td>
<td>Bulk Materials Handling 1</td>
<td>5</td>
<td>1</td>
<td>MECH241</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH2318</td>
<td>Converting of Bulk Solids</td>
<td>5</td>
<td>2</td>
<td>MECH232</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH2310</td>
<td>Introduction to Finite Element Analysis</td>
<td>5</td>
<td>2</td>
<td>MECH211, MECH212, MECH241</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH2322</td>
<td>Materials 2</td>
<td>5</td>
<td>1</td>
<td>MECH241</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH2324</td>
<td>Ceramic Science and Technology</td>
<td>5</td>
<td>2</td>
<td>MECH212</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH2326</td>
<td>Polymer Science and Technology</td>
<td>5</td>
<td>2</td>
<td>MECH212</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH2330</td>
<td>Fabrication of Metals</td>
<td>5</td>
<td>2</td>
<td>MECH212</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH2353</td>
<td>Dynamics of Machines</td>
<td>5</td>
<td>1</td>
<td>MECH232</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH2354</td>
<td>Advanced Dynamics</td>
<td>5</td>
<td>2</td>
<td>MECH232</td>
<td>AK: PHYS102</td>
<td></td>
</tr>
<tr>
<td>MECH2343</td>
<td>Mechanics of Solids 2</td>
<td>5</td>
<td>2</td>
<td>MECH241</td>
<td>AK: MATH201</td>
<td></td>
</tr>
<tr>
<td>MECH2352</td>
<td>Fluid Mechanics 2</td>
<td>10</td>
<td>1</td>
<td>MECH251</td>
<td>AK: MATH203</td>
<td></td>
</tr>
<tr>
<td>MECH2391</td>
<td>Automatic Control</td>
<td>10</td>
<td>Full Year</td>
<td>MATH203</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH2372</td>
<td>Heat Transfer 1</td>
<td>5</td>
<td>2</td>
<td>MECH241</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH2373</td>
<td>Thermodynamics 2</td>
<td>5</td>
<td>2</td>
<td>MECH271</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH2361</td>
<td>Methods Engineering</td>
<td>5</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH2392</td>
<td>Engineering Administration</td>
<td>5</td>
<td>2</td>
<td>MECH211</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH2393</td>
<td>Quality Engineering</td>
<td>5</td>
<td>2</td>
<td>STAT205</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECH2366</td>
<td>Computer Aided Manufacturing</td>
<td>5</td>
<td>2</td>
<td></td>
<td></td>
<td>MECH211</td>
</tr>
<tr>
<td>MECH2367</td>
<td>Operations Research 1</td>
<td>5</td>
<td>1</td>
<td></td>
<td></td>
<td>MATH201</td>
</tr>
</tbody>
</table>

### Code Subject Name Credit Points Semester Prerequisites Corequisites (CR) Assumed Knowledge (AK)

- MECH3588 Operations Research 2 5 2 — AK: MATH101, STAT205
- MECH4505 * Computation of Turbulent Flows 5 2 MECH3585
- MECH4507 * Air Pollution Management 5 1 Completion of 320cp or permission of H.O.D.
- MECH4508 * Machine Condition Monitoring 5 1 MECH232
- MECH4142 * Bulk Materials Handling 2 5 2 MECH317
- MECH4145 Mechanical Engineering Design 3 10 1 Full Year MECH314
- MECH4146 * Advanced Finite Element Analysis 5 Not in 1994 MECH315, MECH342
- MECH4148 * Maintenance Management 5 2 Completion of 320cp or permission of H.O.D.
- MECH4149 * Computer Aided Design 5 1 MECH359
- MECH4151 Biofluidics 5 2 MECH352
- MECH4153 * Introduction to Turbulence 5 2 MECH352
- MECH4157 * Thermodynamics 3 5 1 MECH373
- MECH4159 * Heat Transfer 2 5 2 MECH372
- MECH4162 Engineering Economics 1 5 1 Completion of 200cp or permission of H.O.D.
- MECH4164 Engineering Economics 2 5 2 MECH482
- MECH4165 Production Scheduling 5 1 — —
- MECH4166 Project/Seminar 5 2 Full Year Completion of 320cp or permission of H.O.D.
- MECH4167 Project/Directed Reading 5 2 Full Year Completion of 320cp or permission of H.O.D.
- MECH4158 * Finite Element Methods in Design 5 TBD Graduate enrolment
- MECH4159 * Bulk Materials Handling Systems 5 TBD Graduate enrolment
- MECH4168 * Correlation of Bulk Solids 5 TBD Graduate enrolment
- MECH4169 * Maintenance Management 5 TBD Graduate enrolment
- MECH4173 Advanced Thermodynamics 5 2 Graduate enrolment
- MECH4184 * Engineering Economics 5 Not in 1994 Graduate enrolment
- MECH4186 Industrial Systems Project/Seminar A 20 Full Year MEng36 enrolment
- MECH4185 Industrial Systems Project/Seminar B 20 Full Year MEng36 enrolment
- MECH4199 Industrial Systems Project/Seminar 40 Full Year MEng36 enrolment and permission of H.O.D.

**T.B.D.**  To be determined

**H.O.D.**  = Head of Department

* Elective or graduate subjects. Not all such subjects will be available in any one year. The subjects in this category indicated as potentially available may be cancelled if enrolments are insufficient. Availability should be confirmed with the Department Office.

† Students intending to enrol in MECH111 who completed MECH111 prior to 1992 or who were granted credit in that subject should consult the Head of Department regarding a bridging course to be undertaken in February and completed prior to commencement of classes in MECH111.

‡ Students intending to enrol in MECH118 who completed MECH113 prior to 1989 or who were granted credit in that subject or in MECH111 should consult the Head of Department regarding bridging work in CAD to be undertaken in February and completed prior to commencement of classes in MECH115.
### Schedule of Selected Subjects Offered by Departments Outside the Faculty of Engineering

<table>
<thead>
<tr>
<th>Code</th>
<th>Subject Name</th>
<th>Credit Points</th>
<th>Semester</th>
<th>Prerequisites</th>
<th>Assumed Knowledge (UK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL101</td>
<td>Plant and Animal Biology</td>
<td>10</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL102</td>
<td>Cell Biology, Genetics and Evolution</td>
<td>10</td>
<td>2</td>
<td>BIOL101, BIOL102</td>
<td>CHEM101 and CHEM102 - 1994</td>
</tr>
<tr>
<td>BIOL201</td>
<td>Biotechnology</td>
<td>10</td>
<td>1</td>
<td>BIOL101, BIOL102</td>
<td>CR: CHEM101 and CHEM102 - 1994</td>
</tr>
<tr>
<td>BIOL202</td>
<td>Animal Physiology</td>
<td>10</td>
<td>1</td>
<td>BIOL101, BIOL102</td>
<td></td>
</tr>
<tr>
<td>BIOL204</td>
<td>Cell and Molecular Biology</td>
<td>10</td>
<td>2</td>
<td>BIOL101, BIOL102</td>
<td></td>
</tr>
<tr>
<td>BIOL205</td>
<td>Molecular Genetics</td>
<td>10</td>
<td>2</td>
<td>BIOL101, BIOL102</td>
<td></td>
</tr>
<tr>
<td>BIOL206</td>
<td>Plant Physiology</td>
<td>10</td>
<td>2</td>
<td>BIOL101, BIOL102</td>
<td></td>
</tr>
<tr>
<td>BIOL207</td>
<td>Ecology</td>
<td>10</td>
<td>2</td>
<td>BIOL101, BIOL102</td>
<td></td>
</tr>
<tr>
<td>BIOL203</td>
<td>Environmental Plant Physiology</td>
<td>10</td>
<td>Not in 1991</td>
<td>2 BIOL 200 subjects</td>
<td></td>
</tr>
<tr>
<td>CHEM101</td>
<td>Chemistry 101</td>
<td>10</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM102</td>
<td>Chemistry 102</td>
<td>10</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM221</td>
<td>Inorganic Chemistry</td>
<td>10</td>
<td>1</td>
<td>CHEM101, CHEM102</td>
<td></td>
</tr>
<tr>
<td>CHEM231</td>
<td>Organic Chemistry</td>
<td>10</td>
<td>1</td>
<td>CHEM101, CHEM102</td>
<td></td>
</tr>
<tr>
<td>CHEM241</td>
<td>Physical Chemistry</td>
<td>10</td>
<td>2</td>
<td>CHEM101, CHEM102</td>
<td></td>
</tr>
<tr>
<td>CHEM251</td>
<td>Environmental Chemistry</td>
<td>10</td>
<td>1</td>
<td>CHEM101, CHEM102</td>
<td></td>
</tr>
<tr>
<td>CHEM252</td>
<td>Inorganic Chemistry</td>
<td>10</td>
<td>1</td>
<td>CHEM221</td>
<td></td>
</tr>
<tr>
<td>CHEM261</td>
<td>Organic Chemistry</td>
<td>10</td>
<td>1</td>
<td>CHEM221</td>
<td></td>
</tr>
<tr>
<td>CHEM262</td>
<td>Environmental Chemistry</td>
<td>10</td>
<td>2</td>
<td>CHEM261</td>
<td></td>
</tr>
<tr>
<td>COMM101</td>
<td>Financial Accounting Fundamentals</td>
<td>10</td>
<td>1</td>
<td>Fulfillment of BComp entry requirements</td>
<td></td>
</tr>
<tr>
<td>COMM102</td>
<td>Financial Management Fundamentals</td>
<td>10</td>
<td>2</td>
<td>COMM101</td>
<td></td>
</tr>
<tr>
<td>ECON110</td>
<td>Macroeconomics I</td>
<td>10</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECON111</td>
<td>Microeconomics I</td>
<td>10</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECON211</td>
<td>Principles of Economics</td>
<td>10</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOG101</td>
<td>Introduction to Physical Geography</td>
<td>10</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOG102</td>
<td>Introduction to Human Geography</td>
<td>10</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GER101</td>
<td>The Environment</td>
<td>10</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GER111</td>
<td>German Language Revision</td>
<td>5</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GER113</td>
<td>Business German</td>
<td>5</td>
<td>1</td>
<td>GER110 or knowledge of German language and approval of H.O.D.</td>
<td>GER111 or demonstrated competence in German Language</td>
</tr>
<tr>
<td>INFO101</td>
<td>Introduction to Information Systems</td>
<td>10</td>
<td>1 or 2</td>
<td>INFO101</td>
<td></td>
</tr>
<tr>
<td>INFO102</td>
<td>Information Storage and Management</td>
<td>10</td>
<td>2</td>
<td>INFO101</td>
<td></td>
</tr>
<tr>
<td>INFO202</td>
<td>Analysis of Information Systems</td>
<td>10</td>
<td>1</td>
<td>INFO101</td>
<td></td>
</tr>
<tr>
<td>INFO203</td>
<td>Information Systems Design</td>
<td>10</td>
<td>2</td>
<td>INFO102</td>
<td>INFO101 prior to 1991 and INFO202</td>
</tr>
<tr>
<td>INFO204</td>
<td>Commercial Programming</td>
<td>10</td>
<td>1</td>
<td>Undergraduate: INFO102 Graduate</td>
<td></td>
</tr>
<tr>
<td>INFO501</td>
<td>Computing and Information Systems</td>
<td>10</td>
<td>1</td>
<td>Diploma: COMP212</td>
<td></td>
</tr>
<tr>
<td>INFO503</td>
<td>Systems Analysis</td>
<td>10</td>
<td>1</td>
<td>Postgraduate enrolment or permission of H.O.D.</td>
<td></td>
</tr>
<tr>
<td>INFO504</td>
<td>Systems Design</td>
<td>10</td>
<td>2</td>
<td>Postgraduate enrolment or permission of H.O.D.</td>
<td>MIN7512</td>
</tr>
<tr>
<td>INF0505</td>
<td>Management Information Systems</td>
<td>10</td>
<td>2</td>
<td>MNGT500 or MNGT510</td>
<td></td>
</tr>
<tr>
<td>LAW101</td>
<td>Foundations of Law</td>
<td>10</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LAW201</td>
<td>Property and Survey Law</td>
<td>5</td>
<td>2</td>
<td>LAW991</td>
<td></td>
</tr>
<tr>
<td>MATH102</td>
<td>Mathematics 102</td>
<td>10</td>
<td>1</td>
<td>MATH111</td>
<td></td>
</tr>
<tr>
<td>MATH103</td>
<td>Mathematics 103</td>
<td>10</td>
<td>2</td>
<td>MATH102 or MATH11</td>
<td>MATH112 and MATH112</td>
</tr>
<tr>
<td>MATH111</td>
<td>Mathematics 111</td>
<td>10</td>
<td>2</td>
<td>Both 1 and 2</td>
<td></td>
</tr>
<tr>
<td>MATH112</td>
<td>Mathematics 112</td>
<td>10</td>
<td>2</td>
<td>MATH111</td>
<td></td>
</tr>
<tr>
<td>MATH201</td>
<td>Multivariable Calculus</td>
<td>5</td>
<td>1</td>
<td>MATH102, MATH103 or MATH111, MATH112</td>
<td></td>
</tr>
<tr>
<td>MATH202</td>
<td>Partial Differential Equations</td>
<td>5</td>
<td>2</td>
<td>MATH102, MATH103</td>
<td></td>
</tr>
<tr>
<td>MATH203</td>
<td>Ordinary Differential Equations</td>
<td>5</td>
<td>2</td>
<td>MATH102, MATH103</td>
<td></td>
</tr>
<tr>
<td>MATH204</td>
<td>Real Analysis</td>
<td>5</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH206</td>
<td>Complex Analysis</td>
<td>5</td>
<td>1</td>
<td>MATH102, MATH103</td>
<td></td>
</tr>
<tr>
<td>MATH211</td>
<td>Group Theory</td>
<td>5</td>
<td>1</td>
<td>MATH102, MATH103</td>
<td></td>
</tr>
<tr>
<td>MATH212</td>
<td>Discrete Mathematics</td>
<td>5</td>
<td>1</td>
<td>MATH102 or MATH103</td>
<td></td>
</tr>
<tr>
<td>MATH213</td>
<td>Mathematical Modelling</td>
<td>5</td>
<td>2</td>
<td>MATH102, MATH103 or MATH111, MATH112</td>
<td></td>
</tr>
<tr>
<td>MATH214</td>
<td>Mechanics</td>
<td>5</td>
<td>2</td>
<td>MATH102, MATH103</td>
<td></td>
</tr>
<tr>
<td>MATH215</td>
<td>Operations Research</td>
<td>5</td>
<td>2</td>
<td>MATH102 or MATH103</td>
<td></td>
</tr>
<tr>
<td>MATH216</td>
<td>Numerical Analysis</td>
<td>5</td>
<td>2</td>
<td>MATH102, MATH103</td>
<td></td>
</tr>
<tr>
<td>MATH217</td>
<td>Linear Algebra 1</td>
<td>5</td>
<td>1</td>
<td>MATH102 or MATH111</td>
<td></td>
</tr>
<tr>
<td>MATH218</td>
<td>Linear Algebra 2</td>
<td>5</td>
<td>1</td>
<td>MATH102, MATH103</td>
<td></td>
</tr>
<tr>
<td>MNGT11</td>
<td>Introduction to Management and Organisational Behaviour</td>
<td>10</td>
<td>2</td>
<td>MATH102, MATH103</td>
<td></td>
</tr>
<tr>
<td>PHIL101</td>
<td>Introduction to Philosophy</td>
<td>10</td>
<td>2</td>
<td>MATH102, MATH103</td>
<td></td>
</tr>
<tr>
<td>Code</td>
<td>Subject Name</td>
<td>Credit Points</td>
<td>Semester</td>
<td>Prerequisites</td>
<td>Corequisites CRU</td>
</tr>
<tr>
<td>--------</td>
<td>--------------------------------------------------</td>
<td>----------------</td>
<td>----------</td>
<td>---------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>PHIL242</td>
<td>Basic Symbolic Logic</td>
<td>5</td>
<td>2</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>PHIL301</td>
<td>Technology and Human Values I</td>
<td>10</td>
<td>Full Year</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>PHIL302</td>
<td>Technology and Human Values II</td>
<td>10</td>
<td>Not in 1994</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>PHYS111</td>
<td>Physics 111</td>
<td>10</td>
<td>1</td>
<td>--</td>
<td>AK: Top 30% of 2u</td>
</tr>
<tr>
<td>PHYS112</td>
<td>Physics 112</td>
<td>10</td>
<td>2</td>
<td>--</td>
<td>AK: PHYS111</td>
</tr>
<tr>
<td>PHYS113</td>
<td>Physics 113</td>
<td>10</td>
<td>1</td>
<td>--</td>
<td>AK: 3u HSC</td>
</tr>
<tr>
<td>PHYS114</td>
<td>Physics 114</td>
<td>10</td>
<td>2</td>
<td>--</td>
<td>AK: PHYS113 or permission of H.O.D.</td>
</tr>
<tr>
<td>PHYS201</td>
<td>Quantum Mechanics and Electromagnetics</td>
<td>10</td>
<td>1</td>
<td>MATH102, PHYS113 and PHYS114 or MATH111 and MATH112 and PHYS111 and PHYS112 with permission of H.O.D.</td>
<td></td>
</tr>
<tr>
<td>PHYS203</td>
<td>Solid State and Atomic Physics</td>
<td>10</td>
<td>2</td>
<td>PHYS201</td>
<td>--</td>
</tr>
<tr>
<td>PSYC101</td>
<td>Psychology Introduction 1</td>
<td>10</td>
<td>1</td>
<td>Must satisfy entry to BSc(Psyc) or BA(Psyc)</td>
<td>--</td>
</tr>
<tr>
<td>PSYC102</td>
<td>Psychology Introduction 2</td>
<td>10</td>
<td>2</td>
<td>PSYC101</td>
<td>--</td>
</tr>
<tr>
<td>SCEN202</td>
<td>Environmental Planning and Pollution Control</td>
<td>10</td>
<td>1</td>
<td>--</td>
<td>SCEN202</td>
</tr>
<tr>
<td>SCEN302</td>
<td>Environmental Impact Assessment Techniques</td>
<td>10</td>
<td>2</td>
<td>--</td>
<td>SCEN202</td>
</tr>
<tr>
<td>STAT201</td>
<td>Mathematical Statistics</td>
<td>10</td>
<td>1</td>
<td>MATH102 or STAT101 and MATH112</td>
<td>--</td>
</tr>
<tr>
<td>STAT202</td>
<td>Regression Analysis</td>
<td>10</td>
<td>2</td>
<td>STAT201</td>
<td>--</td>
</tr>
<tr>
<td>STAT205</td>
<td>Engineering Statistics</td>
<td>5</td>
<td>1</td>
<td>MATH102 or MATH112</td>
<td>--</td>
</tr>
<tr>
<td>STAT306</td>
<td>Design and Analysis of Experiments and Surveys</td>
<td>10</td>
<td>2</td>
<td>STAT201</td>
<td>--</td>
</tr>
</tbody>
</table>